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Reproduction - Facts, Myths and Evidence

8 – 11 January

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Abstracts



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WEDNESDAY, 8 JANUARY 2025

SRF Post Doctoral Prize Session

82. Spatial transcriptomics identifies immune cell dysregulation in adenomyosis and potential for fertility-sparing therapeutic strategies

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Category

Uterus

Sub-Category

Translational

Abstract

Background: Adenomyosis is a common and neglected gynaecological condition affecting 20% of women of reproductive age (1-3), causing heavy periods, chronic pain, and subfertility. Immune dysregulation has been associated with adenomyosis, contributing to its pathogenesis and symptomatology (4, 5). Fertility-sparing treatments are urgently needed, requiring a deeper understanding of the transcriptome and molecular phenotype of adenomyosis lesions.

Objectives:
1. Characterise the transcriptomic profile of immune cells in adenomyosis lesions versus matched eutopic endometrium
2. Investigate functional implications of altered gene expression in adenomyosis lesion immune cels to identify potential novel therapeutic targets.

Methods: Paired endometrial biopsies and adenomyosis lesions from ten hysterectomy specimens were analysed. Whole transcriptome spatial profiling was conducted on endometrial functionalis, basalis, and adenomyosis lesions. Analyses included differential gene expression,

gene-set enrichment, ligand-receptor signalling, immune cell deconvolution, and *in silico* drug screening. Validatory immunostaining identified T cells (CD3+/CD4+, or CD3+/CD8+), B cells (CD19+), and dendritic cells (CD83+).

Results: Immune cells in adenomyosis lesions exhibited significant downregulation of genes involved in cellular proliferation and apoptosis (*FOS, JUNB, DUSP1*; adjusted $p = 0.002$). Gene set enrichment analysis revealed negative enrichment for DNA replication, transcription, nucleosome assembly, and oestrogen-dependent gene expression in lesion immune cells. Ligand-receptor signalling analysis showed prominent immune-epithelial cell crosstalk through TNFSF10 ligand. Importantly, increased proportions of dendritic cells, T cells, and B cells were confirmed in lesions ($n = 10$, $p < 0.05$). This suggests a dysregulated immune environment in adenomyosis, with altered cellular turnover, impaired oestrogen responsiveness, and enhanced immune cell infiltration. *In-silico* drug screening identified compounds that may selectively target adenomyosis lesions while sparing normal endometrium.

Conclusions: This study reveals a distinct immune microenvironment in adenomyosis lesions, characterised by increased proportions of T cells, B cells, and dendritic cells. Potential targets for novel, fertility-sparing treatments are proposed, to be tested in future studies.

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66. Kingdom of reproductive life; core sperm proteome

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Background: Reproductive biology is often considered in the three siloed research areas, namely humans, domesticated animals and wildlife. Yet, there are common needs across these silos, notably biomarkers for fertility/gamete selection, development of assisted reproductive technologies and effective contraception. To efficiently develop solutions applicable to all species, we must improve our understanding of the common biology underpinning reproductive processes.

Methods: Accordingly, we performed an *in-silico* analysis of publicly available sperm proteomic data across 12 vertebrate species (boar, buffalo, bull, crocodile, dolphin, human, koala, mouse, rabbit, rat, rooster, sheep) to consolidate these proteomic data and to define the core sperm proteome; a collection of highly conserved proteins that are critical for sperm structure and function. >2TB of mass spectrometry data was sourced from ProteomeXchange and reprocessed through a stringent and uniform search protocol to provide high confident protein identifications.

Results: A total of 13,853 sperm proteins were identified, with the most significant contributors being humans and mice. Proteomic characterisation of non-traditional model species revealed >90% of their sperm proteins are currently curated as predicted to exist or inferred from homology, indicating that experimental evidence for their existence remains poorly defined. Despite variations in sperm proteome size, pathway analyses showcased functional relationships between species that differed from that of their evolutionary distances. Moreover, we report proteins that are highly conserved at the species (45 proteins) and order (135 proteins) taxonomic levels. Such proteins, in turn, mapped to critical and novel pathways and molecular functions including protein folding and recycling, acrosome function and energy generation. Lastly, through KO mouse studies, we demonstrate for the first time four novel core proteins that affect sperm motility and fertilisation capacity.

Conclusions: We highlight the utility of integrating publicly available proteomic data, revealing conserved sperm proteins critical for fertility, and identifying novel targets for reproductive research

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332. Increased susceptibility to obesity in mice is linked to suppressed steroidogenesis in theca cells mediated by leptin-associated Nodal signalling suppression

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Objectives: Obesity is linked to reproductive dysfunction. Furthermore, obesity leads to hormonal imbalance, compromised ovarian steroidogenesis and disrupted leptin signalling. In the present study we characterised the impact of different susceptibility to obesity on ovarian

steroidogenesis associated with disturbance in the cross-talk between leptin and Nodal signalling in theca cells (TC).

Methods: Obesity prone C56BL/6J(B6) and obesity resistant 129S1 mice (129) were fed chow diet (CD) and high fat diet (HFD) for 16weeks. Following phenotypic characterisation, plasma, ovaries, TC and granulosa compartment were collected. Finally, ovarian explants isolated from lean and obese mice were cultured *in vitro* and treated with Nodal or its inhibitor SB431542(SB) for 12h. The mRNA and protein were isolated and analysed using RT-PCR and Western blot.

Results: B6 HFD presented increased body weight ($p<0.0001$), but no changes were noted in 129. PCR in TC revealed decline in *Lhr* ($p<0.05$), *Star* ($p<0.001$), *Cyp17a1* ($p<0.05$), *Nr5a1* ($p<0.05$) and *Era* ($p<0.05$) mRNA in B6 mice, but no changes were detected in 129. Decreased estradiol plasma level in B6 HFD was also noted($p<0.01$). Moreover, *Socs3* and *Smad7* mRNA were increased in TC ($p<0.05$). Conversely, *Nodal* and *Acvr2b* were suppressed in B6 HFD ($p<0.05$), despite no changes in 129. Ovarian explants from B6 CD mice treated *in vitro* with SB showed downregulation of *Lhr*, *Star* and *Cyp17a1* mRNA($p<0.05$). Furthermore, treatment of ovarian explants from B6 HFD with Nodal, upregulated level of *Lhr* ($p=0.05$), *Star* ($p<0.05$) and *Era* ($p<0.05$) mRNA in TC.

Conclusions: In obese females, the hyperactivation of leptin signalling in TC leads to increased Smad7 activity, which suppresses Nodal signalling, decreasing the transcription of steroidogenic markers. These results highlight the critical role of disrupted cross-talk between ovarian leptin and Nodal signalling in impaired steroidogenesis in obese mothers.

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277. A microRNA specific to mammals exhibiting cotyledonary placentation is present in, and exhibits, differential expression in in vivo and in vitro bovine endometrium.

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Category

Uterus

Sub-Category

Basic Science

Abstract

Placentation is a diverse process during pregnancy within Eutherian mammals. Key molecules which may contribute to conservation or diversity of placentation are microRNAs (miRNAs). Previous computational analysis of placental phenotype associated miRNAs identified presence of miR-11986 in every species within infraorder *Pecora* within *Artiodactyla*, and absence from every species outside of this group. This clade possesses unique cotyledonary phenotype placenta structures. We hypothesised that given the specificity of expression, miR-11986, miR-11986b and miR-11986c would be important for pregnancy in cattle. *In vivo* bovine caruncular and intercaruncular endometrial samples (n=23) were collected on Day 16 of pregnancy. Bovine endometrial luminal epithelial and stromal cells were isolated from abattoir sourced reproductive tracts and treated with PBS or 1000ng/µl roIFNT (recombinant ovine interferon tau) for 24hr. Bovine epithelial glandular organoids (n=3) were derived and treated with PBS or 1000ng/µl roIFNT for 24hr day 8 post-isolation. Ishikawa cells (n=3, human endometrial epithelial cell line) served as a control. RT-qPCR was performed to determine miR-11986, miR-11986b and miR-11986c expression. MiR-11986, miR-11986b and miR-11986c were expressed in caruncular and intercaruncular endometrium *in vivo*. They were significantly more highly expressed in aglandular caruncular than intercaruncular tissue ($p<0.05$). Only miR-11986b was detected *in vitro*, and only in epithelial cells and glandular organoids. Expression was not significantly altered following roIFNT treatment. MiR-11986b was significantly more highly expressed in organoids than epithelial cells for both PBS ($p<0.0001$) and roIFNT ($p<0.0001$) treatments. There was no detectable expression in Ishikawa cells. These results validate the computational prediction that miR-11986 is present in bovine endometrium. Higher expression in caruncular regions - which participate in placentome formation - may suggest that miR-11986 is involved in placentation. Future studies will investigate functional roles.

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35. Paternal Nutritional Insults Alter the microRNA Distribution in Male Reproductive Tract- Extracellular Vesicles

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Objectives: Poor paternal diet at the time of conception can have significant effects on post-fertilisation development, foetal growth and adult offspring health. As sperm transit the male reproductive tract (MRT), a range of extracellular vesicles (EVs) modify and contribute to the sperm RNA landscape with potential effects for post-fertilisation development. The aim of this study was to analyse the miRNA profile of EVs isolated from different regions of the MRT.

Methods: Male C57/BL6J mice (n=8/group) were fed either a low-protein (LPD: 9% casein, 24% sugar, 10% fat), Western (WD: 19% casein, 34% sugar, 21% fat) or control diet (CD: 18% casein, 10% fat, 21% sugar) for 8 weeks. EVs were isolated from caput and cauda epididymis (epididymosomes) and seminal vesicle fluid (Svf-EVs) and characterized following MISEV 2018 and MIFlowCyt-EV guidelines. Epididymosome and Svf-EV RNA was sequenced using the NextSeq500 platform (Illumina).

Results: Epididymosomes and Svf-EVs had comparable size (110.26 to 121.26 nm) and round, cup-shaped morphology. Caput epididymosomes had a significantly higher percentage of 'true' EVs than cauda epididymosomes and Svf-EVs ($P < 0.0001$). Immunophenotyping identified distinct tetraspanin profiles between epididymosomes and Svf-EVs. High-sensitivity RNA ScreenTape® analysis failed to detect any RNA in Svf-EVs. Contrarily, epididymosome miRNA-Seq revealed diet-specific miRNA profiles. Predicted gene ontology terms for differentially expressed miRNAs indicated potential dysregulation of embryo development (LPD-Caput), cellular homeostasis (LPD-Cauda), transcription regulation, cellular turnover and signalling (WD-Cauda) processes.

Conclusions: We identified distinct molecular, transcriptomic and phenotypic characteristics in EVs isolated from different regions of the MRT (caput/caput epididymis and seminal vesicle fluid). The differential profiles of epididymal EV miRNAs could provide one mechanism through which poor paternal diet influences offspring development and well-being. Further research is warranted to unravel their functional diversity in male reproductive physiology and to assess their potential impact on development and offspring health.

THURSDAY, 9 JANUARY 2025

PW1 Poster Walk

223. Improving embryo ploidy prediction with ERiCA using graph-based methods and time-lapse image analysis

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: To develop a ploidy prediction method for embryos by leveraging graph theory into machine learning to extract interpretable features based on long-range correlations and attentional mechanisms.

Methods: Database interrogation of 60 time-lapse videos of known ploidy outcomes was examined. From each, three images were selected, representing stages of blastomere division (tn), compaction (tSC), and blastulation (tSB) (30 euploid, 30 aneuploid). Each was converted into a graph-based representation to capture the structural and morphological characteristics.

Dimensionality reduction was performed using Uniform Manifold Approximation and Projection (UMAP) with the Hamming metric to visualize features for each stage and overall. Clustering algorithms, including K-Means, Agglomerative Clustering, and Gaussian Mixture Models (GMM), were applied. The resulting clusters were compared with the known ploidy status to assess performance with the metrics accuracy, F1-score, and specificity.

Results: The Birch clustering method demonstrated the highest effectiveness, with accuracy of 74.2% and a specificity of 82.2%. This was particularly effective in detecting euploid embryos and identifying cases negative for aneuploidy. When evaluating each developmental stage separately, the Gaussian Mixture Model (GMM) method showed the highest accuracy (79.3%) and specificity (80.0%) at the tn stage, minimizing false positives in predicting aneuploidy.

At tSC and tSB stages, the Birch method showed superior performance, with precision and specificity values of 82.6% and 86.7% at tSC, and 96.7% and 92.9% at tSB stage, suggesting that the Birch method is useful in identifying euploidy during specific stages of development.

Conclusions: The results indicate the potential for graph-based clustering approaches, particularly the Birch method, for timelapse analysis to distinguish between embryo ploidy, with the Birch method being most effective for detecting euploidy and the GMM method performing well at specific developmental stages. Further validation with larger datasets and additional clinical parameters is necessary to confirm these findings and enhance their clinical applicability.

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109. An In-Sillico Framework for Evaluating the Safety of Large-Scale PGT-P

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Introduction: Recent advances in preimplantation genetic testing for polygenic disorders (PGT-P) have promised improved health outcomes by leveraging genome-wide association studies (GWAS) to produce polygenic risk scores. Adoption of PGT-P has the potential to reduce

healthcare costs in the long-run. Notwithstanding, PGT-P faces many challenges. Large-scale adoption may reduce human genetic diversity and population resilience. Additionally, the GWAS work PGT-P is built upon is susceptible to genetic and environmental confounding. Many genes are pleiotropic, influencing multiple health-impacting phenotypes - positive and negative. Moreover, genes linked to marginalised subpopulations may be misattributed with higher risk scores. Finally, ethical concerns have been raised over defining the "desirability" of traits.

While development is cautious in the UK, regulatory differences may accelerate PGT-P adoption elsewhere. In this work, we propose a framework to ascertain whether PGT-P-driven selection can be used safely in the presence of confounding factors.

A Framework for Safe PGT-P: We propose an *in-silico* model to assess the robustness of PGT-P techniques against confounding factors. Our system employs a genome-scale simulation (~5 Mb) and includes a genotype-phenotype mapping model incorporating the effects of pleiotropy and transcription factors. By using a diverse set of phenotypes, classified as "good" or "bad", we evaluate a given PGT-P technique's ability to enhance the proportion of "good" phenotypes in a simulated population over multiple generations without increasing the prevalence of "bad" ones. If a technique is unable to operate within our simulation (with a genome size comparable to *E. coli*), we argue that safe deployment in human populations is unlikely.

Conclusions: PGT-P is likely to play a significant role in the future of reproduction. It is thus crucial that it is implemented responsibly. Our framework aims to ensure PGT-P is safe, providing a tool for laboratories and regulators to evaluate techniques before they are applied in human populations.

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234. Validation of a slide-based Sperm Chromatin Structure Assay (SCSA) for low sperm count samples using Acridine Orange (AO) staining.

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Objective: The SCSA is traditionally a flow cytometry assay. To ensure we can perform Sperm DNA Fragmentation (SDF) testing for severely Oligospermia men, an alternate method is required. Standard DNA integrity assays require 15,000 sperm cells[1]. This study aims to introduce a modified slide-based SDF-SCSA testing.

Methods: The conventional SCSA technique was modified to enable the assessment of AO-stained sperm on a fluorescent microscope. An adapted Chohan et al. (2004)[2] protocol was applied to create a slide-based assay technique. 300 cells were counted for each anonymised samples; the results were compared to traditional flow cytometric analysis.

Results: The staining and imaging methodologies successfully distinguished between healthy and DNA-damaged sperm cells. Comparing manual counting (300 cells) and flow cytometry (15000 cells) revealed no significant differences (R^2 = 0.9948, Pearson's r = 0.9974)). DNA-damaged sperm percentages were similar: 14.77% ± 10.11% (manual) and 14.85% ± 9.43% (flow cytometry). The high p-value (0.9211) from the paired t-test confirms no statistically significant difference between methods.

Conclusions: This research presents the SDF assessment method that accurately identifies fragmented sperm, potentially aiding infertility treatment for oligospermia patients previously ineligible for standard SCSA testing[3]. For the on-slide technique, it confirms our ability to obtain precise measurements even with limited cellular material. Meanwhile, for flow cytometry, it verifies that our data truly represent sperm cells rather than extraneous particles, as evidenced by direct visualization. Thus, effectively addressing potential limitations of each method - sample size constraints for the on-slide assay and debris interference for flow cytometry. Applying morphological evaluation of fragmented versus non-fragmented sperm after AO staining could provide insights into structural impacts of DNA damage. Integration of Artificial Intelligence for automated sperm image analysis represents another opportunity. This work lays a foundation for exciting research trajectories to further elucidate the role of sperm DNA fragmentation in male infertility.

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335. Challenges in performing fertility preservation in sickle cell anaemia: a proposal for a safe multi-disciplinary pathway

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Category

Other

Sub-Category

Clinical

Abstract

Background: Sickle cell anaemia (HbSS) is estimated to affect 1 in every 2000 live births making it one of the most common genetic conditions affecting people in England, predominantly affecting people of African and African-Carribean origin (1).

Haemopoietic stem cell transplant (HSCT) is a curative treatment strategy for HbSS and the UK has become one of the first countries in the world to approve HbSS gene editing; however, both involve ablative treatment with high gonadotoxic impact. Therefore, the performance of fertility preservation (FP) is key but the sequelae of HbSS denote challenges (2).

Objective: To design a multi-disciplinary pathway that allows safe execution of FP for HbSS.

Methods: Assessment of 8 cases with HbSS referred for oocyte cryopreservation over two years (May 2022-May 2024) enabled identification of hurdles, mitigation measures and multi-disciplinary pathway development.

Results: Eight women with HbSS (median age 29.5, range 21-41) and complex medical histories, including frequent HbSS crises, chest-syndrome and intra-cranial aneurysms, were referred for fertility preservation (FP). Seven planned curative HSCT.

Three women underwent four oocyte cryopreservation cycles, with two cycles cancelled due to poor ovarian response and raised reticulocyte count, respectively. Two completed cycles, despite significant patient complexity, resulted from meticulous multi-disciplinary team forward-planning of practicalities including venous access, thromboprophylaxis, timed red-cell-exchange and anaesthetic preparation culminating in uncomplicated storage of 7 and 10 oocytes each.

Five women did not proceed with FP: two had commenced chemotherapy for concurrent cancer, one elected against and two were advised against FP due to health risks and low ovarian reserve.

Conclusion: Oocyte cryopreservation can be viable and safe if ovarian reserve is adequate and peri-procedural risks managed and offers potential for safer pregnancies post-curative HbSS treatment.

We recommend a multidisciplinary pathway to capture HbSS patients for FP in the right window and to overcome the challenges posed.

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15. Endocannabinoid concentrations in seminal fluid of fertile and infertile males: A systematic review

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Objectives: Endocannabinoids, such as anandamide (AEA), 2-arachidonoyl glycerol (2-AG), oleoylethanolamide (OEA), and palmitoylethanolamide (PEA), are involved in various reproductive processes, including sperm function and fertilization. However, as endocannabinoid concentrations in human seminal fluid are poorly described, this study aimed to systematically review endocannabinoid concentrations in human seminal fluid of fertile and infertile males.

Methods: A PRISMA systematic review was conducted on PubMed and Scopus. Observational studies that determined concentrations the common endocannabinoids AEA, 2-AG, OEA, and PEA in human semen samples were included.

Results: After retrieving 1172 articles, 7 cross-sectional studies met the eligibility criteria. This included healthy, fertile and/or normozoospermic cohorts (n=7) and infertile or abnormal semen parameter cohorts (n=4) reporting the expression of AEA (n=6), 2-AG (n=2), and OEA and PEA (n=4) across the studies. AEA levels were lower than OEA and PEA in fertile and healthy donors, whereas both AEA and OEA were separately found to be lower than PEA in normozoospermic donors. OEA and PEA positively correlates with sperm concentration, and AEA negatively correlates with motility in healthy donors. AEA, OEA and PEA were lower in asthenzoospermia and oligoasthenoteratozoospermia compared to normozoospermia, whereas both AEA and 2-AG were lower in infertile men compared to fertile men. OEA and PEA was higher in teratozoospermia compared to the normozoospermia, although PEA was separately found to be unchanged. 2-AG, but not AEA, was higher in leukoctospermia compared to controls, and positively correlated with seminal macrophages (CD14+) but not global leukocytes (CD45+).

Conclusions: Endocannabinoids are differently expressed in human semen samples, depending on semen parameters, highlighting potential roles in male reproduction and infertility. However, the included studies are limited in number and showed heterogeneity in terms of endocannabinoids tested, patient cohort analysed, and concentrations reported. Concentrations and (patho)physiological associations of endocannabinoids in seminal fluid require further investigation.

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296. Don't Forget Men: They Need Help Too!

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Category

Other

Sub-Category

Clinical

Abstract

Introduction: Fertility treatment guidelines impose stringent requirements on women, such as age limits and BMI thresholds, for NHS-funded services. However, no equivalent criteria exist for men, despite evidence that male health factors, such as high BMI and smoking, impair fertility by increasing sperm DNA fragmentation. The prevalence of these risk factors in men remains underexplored.

Aim: This service evaluation aimed to assess the prevalence of obesity (BMI ≥ 30) and smoking among men undergoing semen analysis at a single Andrology laboratory.

Methods: A retrospective service evaluation was conducted on data from men attending semen analysis between October 2019 and July 2024. BMI and smoking status were extracted from records, with obesity defined as BMI ≥ 30. Smoking was classified as "Never Smoked," "Current Smoker," "Past Smoker," and "Vaping." Men with incomplete BMI data were excluded.

Results: Of 5,313 men, 4,159 (78.3%) had complete BMI and smoking data, while 1,154 men (21.7%) were excluded due to incomplete BMI data. The mean age was 35.8 years, and the mean BMI was 25.6. A quarter (25.7%) of men were classified as obese. Regarding smoking, 59.3% never smoked, 12.7% were current smokers, 27.3% were past smokers, and 0.6% vaped. Notably, 11.0% were both obese and smokers.

Conclusion: This service evaluation highlights the high prevalence of obesity and smoking among men attending semen analysis. Both factors are associated with adverse sperm outcomes, including increased DNA fragmentation and reduced motility, which negatively impact fertility and overall reproductive health. The exclusion of 21.7% of men due to incomplete BMI data underscores the need for improved data collection practices within fertility clinics. Integrating lifestyle interventions, such as smoking cessation, weight management, and overall health improvement, into routine male fertility assessments could enhance reproductive outcomes, reduce the need for costly treatments, and improve long-term fertility success rates.

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308. The effect of valproate-containing drugs on male fertility and reproductive function

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Background: Valproate-containing drugs (VCDs) are widely used anti-epileptic drugs (AEDs). Valproate is highly teratogenic and is contraindicated in pregnancy; however, relatively less is known about the effect of valproate on male reproductive function. The Medicines and Healthcare products Regulatory Agency (MHRA) have issued a national safety alert restricting its use in patients under the age of 55 years, with impacts on clinical care and service provision (1). This study systematically reviews data on VCDs and male fertility and reproductive function.

Methods: PubMed and Embase were searched for articles reporting reproductive outcomes for male patients who received treatment with VCDs. Data was extracted on the following outcome measures: pregnancy/fatherhood, semen analysis, reproductive hormone measurements, puberty, and testicular volume. Study was conducted as per PRISMA 2020 guidelines

Results: Literature search yielded 368 studies; 42 papers met inclusion criteria, encompassing 1190 males taking VCDs. Nineteen studies included patients using polytherapy and results were not always stratified by treatment. Eight papers reported patient-specific data on a total of 25 male patients who had taken VCDs, with study ages ranging from 20-59. Fatherhood outcomes were reported in 25 patients; there were no spontaneous pregnancies reported in patients taking VCDs and three reported in patients who had switched from valproate to an alternative AED. Where sperm count was reported (n=13), 7 patients were oligospermic and 6 normospermic. Of the normospermic patients, 4/6 patients had been switched from sodium valproate to phenytoin in the preceding 3-6 months, while the remaining 2/6 continued to take valproate.

Discussion: There are limited data on the effect of valproate on male reproductive function and fertility. These data suggest that there are higher rates of oligospermia and lower fertility rates in patients taking VCDs. However, larger studies specifically investigating the effect of VCDs on male reproductive outcomes are required.

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184. Improving nursing operation efficiency through the use of a digital clinic and patient management platform

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Category

Nursing

Sub-Category

Clinical

Abstract

Introduction/Objective: Assisted reproductive technology (ART) presents distinct challenges for nursing professionals, who handle responsibilities such as cycle monitoring, patient education, communication, and administrative tasks. This study assesses the impact of a dedicated fertility mobile application that provides patients with immediate access to medical records and medication notifications, aiming to enhance nursing operational efficiency and improve the patient experience.

Methods: This study was conducted at a single fertility centre in the UK, utilising a digital IVF-focused platform for clinical workflow management and patient communication. The platform automatically handles patient consent forms, appointment bookings, payments, and medication information and notifications.

The methodology involved evaluating standard, admin-intensive nursing tasks versus those managed through the digital platform. Over an eight-month period, interviews with nurses and user interface feedback were used to compare time efficiency between traditional methods and the digital platform.

Results: Initial findings revealed that nurses typically spend 9 to 16 hours per IVF cycle on manual, admin-heavy tasks, such as booking appointments and managing patient records, leading to data inconsistencies and communication breakdowns. The integration of the digital platform led to a 40% reduction in administrative workload, freeing up more time for direct patient care. The most notable change was the decrease in emails and phone calls, as patients accessed their information directly through the platform. This improved patient experience, allowing nurses more uninterrupted time with patients.

Additionally, immediate access to blood results and scan reports provided a more transparent and informative journey for patients, who reported feeling "incredibly well informed" and "much more involved" in their treatment compared to experiences at other clinics.

Conclusions: Adopting a digital platform for clinic and patient management in fertility nursing significantly improves nursing efficiency and the quality of patient care. Transitioning from traditional methods to integrated digital solutions enhances operational efficiency and patient satisfaction.

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202. Unexpected ejaculation failure on the day of oocyte retrieval: the psychosocial effect of ethical beliefs on ART

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Category

Psychosocial

Sub-Category

Translational

Abstract

Introduction: The efficacy of oocyte cryopreservation has significantly improved with the optimisation of vitrification[1]. Despite this, unplanned oocyte vitrification due to ejaculation failure is rare[2]. There is limited literature on the outcomes of such cycles, particularly when psychogenic factors play a role.

Objective: This case report explores how ethical concerns surrounding ART contributed to ejaculation failure and impacted the outcome of an IVF cycle.

Case Presentation: A heterosexual couple in their early 30s, presenting with 3 years of unexplained infertility, expressed ethical reservations about ART. The male patient, with no prior history of ejaculation difficulties, failed to provide a semen sample on the day of oocyte retrieval despite multiple attempts at the clinic and at home. The couple's ethical concerns included creating excess embryos and non-consent to gamete freezing. Emergency oocyte vitrification was required but delayed due to the need for revised patient consent, resulting in the

vitrification process exceeding the maximum recommended timings post oocyte collection. A subsequent cycle using thawed sperm and oocytes failed to yield a successful outcome.

Discussion: The cause of ejaculatory failure in patients with no previous history of such issues is often psychogenic3. Research on the psychological impact of fertility treatment on men is limited. One study identified 'stigma' as a risk factor for temporary ejaculation failure (TEF)4.

Conclusion: This case highlights the importance of identifying psychosocial risk factors in patients with ethical concerns regarding ART. IVF professionals should be conscious of these nuances and competent in recognising the need for preventative measures such as back-up sperm freezing and mandatory counselling.

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280. Growing interest in home fertility treatment options: an online study demonstrates

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Category

Assisted Conception

Sub-Category

Translational

Abstract

Introduction: With the rising demand for fertility care and the current cost of living crisis, barriers to accessible fertility treatments are increasing. Although NICE recommends IVF as first line treatment for the majority of causes of infertility, many women express the desire to try less invasive options first. The aim of this quantitative study was to establish the desire people have to utilise a home fertility treatment.

Methods: An online questionnaire was designed to evaluate why people would consider the Béa Treatment. The Béa Treatment (StepOne Fertility Ltd, London) is a class I medical device that is designed to deliver safe and effective treatment at home. The survey was open for 3 months, during which time 4110 women completed the survey and data from 1087 women were analysed.

Results: Most frequent answers regarding the reasons why women would consider the Béa Treatment included "the ability to perform at home" (52.5%), "looking for something new to try" (39.8%) and "lower cost compared with clinical care" (37.6%). When asked for their free-text views, thematic analysis produced four themes: being less invasive than IVF, wanting to try something else before IVF, exclusion from NHS funded treatment and no waiting list.

Conclusions: Lack of affordable and accessible fertility care is leading people to seek support elsewhere, outside of the clinical environment. It is evident that there is a growing interest in at-home fertility treatment options for people trying to conceive due in part, the ability to perform at home. More research is needed into accessible and more personalised fertility solutions in order to meet the increasing demands of the infertile population.

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224. Unexpected hypo-response in predicted hyper-responders: incidence and predictive factors

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Category

Oocytes and ovary

Sub-Category

Clinical

Abstract

Objective: Women with high ovarian reserve are at risk of hyper-response to controlled ovarian stimulation. However, in some cycles an unexpected hypo-response is seen.
We aimed to establish the incidence and predictive factors of hypo-response (<9 oocytes per Poseidon criteria) in women with AMH >30 pmol/l.

Method: This is a single-centre retrospective study of IVF cycles between 1st January 2021 and 31st December 2023. Clinical features, treatment protocols and outcomes in women with AMH >30 pmol/l who had <9 oocytes collected (Group 1) were compared with those who had ≥ 9 oocytes (Group 2) using Mann-Whitney U and Chi-squared tests, with Kolmogorov-Smirnov test to determine normality of data. Fertility preservation cycles were excluded.

Results: Of 1652 cycles reaching egg collection, 311 were in women with AMH >30 pmol/l and were included in the study. Poor response (0 – 3 oocytes) was seen in 4 cycles (2.7%) and suboptimal response (4-9 oocytes) in 42 cycles (13.5%).

Group 1 women were older (36 years (31,36) vs 33 (31,36)), heavier (69.2 kg (64, 75) vs 65 (59, 73)) and had lower AMH (40.1(33,46) vs 43.5(36,54)) and AFC (25(17,32) vs 30(22,37)) than Group 2 (all data median (Q1, Q3) $p<0.05$ for all comparisons). There was no difference in FSH dose, type or days of stimulation. As expected, Group 1 had fewer oocytes, mature oocytes and embryos.

Discussion: This is the first study to identify and characterize hypo-response in a group of women who are generally considered to be at low risk of hypo-response and are in fact at increased risk of hyper-response and OHSS. We show a significant incidence of hypo-response, related to patient factors and not FSH dose or duration. Further studies are needed to determine whether the reduced embryo number affects the cumulative chance of livebirth.

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30. From force to function: agonism of the PIEZO1 mechanosensor enhances nitric oxide signalling in placental endothelial cells

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Category

Pregnancy outcomes

Sub-Category

Basic Science

Abstract

Objectives: Friction caused by blood flowing across fetoplacental endothelial cells (FpECs) activates mechanical force sensors. This fluid shear stress (FSS) stimulates nitric oxide (NO) production via endothelial NO synthase (eNOS), which induces placental vasodilatation[1]. PIEZO1 calcium (Ca^{2+})-permeable ion channels are dominant force-sensors, important for vascular adaptation in multiple body systems, and required for murine embryonic development[2]. We determined whether PIEZO1 activity led to NO signalling, and investigated healthy placentas and those where babies were small for gestational age (SGA), commonly associated with compromised placental blood flow.

Methods: Patients were recruited as SGA (birthweight $<10^{th}$ percentile UK-WHO Growth Charts) or appropriately grown for gestational age (AGA). FpECs were isolated using CD31-conjugated paramagnetic microbeads, cultured and validated[3]. Experiments included RT-qPCR and western blotting for RNA and protein expression respectively, short interfering RNA and Ca^{2+} measurements.

Results: Protein lysates from AGA FpECs exposed to FSS were probed with antibody to phosphorylation at serine site 1177 in eNOS. Compared with static controls, FSS-exposed FpECs had greater p-eNOS ($p=0.018$). Basal p-eNOS was higher in SGA versus AGA lysates ($p<0.001$). PIEZO1 RNA and protein were demonstrated in FpECs, and after PIEZO1 silencing, FSS-evoked p-eNOS was blunted. PIEZO1 activation with the small molecule channel agonist, Yoda1, evoked dose-dependent increased intracellular Ca^{2+}. In AGA and SGA FpECs, Yoda1 increased p-eNOS versus control ($p=0.031$, $p=0.0003$ respectively)[4].

Conclusion: Yoda1-dependent activation of PIEZO1 phosphorylates eNOS in FpECs from AGA and SGA, mimicking flow-induced p-eNOS, and demonstrating coupling between PIEZO1 and NO. Basal p-eNOS was upregulated in SGA, but not saturated, as Yoda1 led to further enhancement.

This new understanding of PIEZO1 as a consistently expressed and functioning mechanosensor, presents an opportunity for targeted drug development for placental vascular disease. PIEZO1 agonism with novel compounds could be an intervention for SGA, bridging the gap between mechanisms and therapeutics.

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62. The Implementation of a dedicated study day for Health Care Support Workers

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Category

Nursing

Sub-Category

Translational

Abstract

The Implementation of a dedicated study day for Health Care Support Workers

Abstract Text: Implementing a healthcare support worker study day is crucial for enhancing the competency and confidence of healthcare support workers (HCSWs) in delivering patient care.

'Nursing support workers have a critical role to play in delivering high quality care and excellent outcomes for patients, however their vital contribution can often go unnoticed'.RCN 1

By providing a dedicated Health Care Support Worker study day our aim was to highlight to the delegates the importance of their role with-in the fertility clinics, bridge knowledge gaps and reinforce best practices in patient care.

Method: Information was gained from the lead nurses in the sector that are members of the Senior Infertility Nurse Group Which topics would be useful to their HCSWs or had been requested in the past by their HCSWs.

Topics included: Who are the HFEA and why do they do what they do?
Counselling- the key themes discussed

A patient story
What happens in the lab?

The number of delegates 28.

An evaluation form was completed to assess the day from the perspective of the delegates

Questions asked about the planning, timings and venue, to feedback for each individual session.

The questions were scored from 1-5 , 1 being the lowest and 5 being the highest

All 28 delegates completed the Evaluation form

Results: All questions were scored from 1-5 and all responses ranged from 3/5 to 5/5 The results clearly showed the value in the format of the day to allow networking and the benefit of the education gained to improve patient care

Recommendations: After review of the evaluation forms the recommendation will be to continue to provide a study day dedicated to HCAs.

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182. How a Four-Day Workweek Coupled with Digitalisation Enhances Nursing Well-Being and Job Satisfaction in Assisted Reproductive Technology (ART)

Lauren Ryan[1], Katie Rankin[1], Christina Hancock[1], Teodora Popa[1,2], Chloe He[3,4], Rufus Morgan[1], Alexa Zapeda[1], Andrew Thomson[1,2], Oana Paun[1], Hannah Coffey[1], Madison Bailey[1], Ahmed Amer[5,6], Lynae Brayboy[7], Rami Wakim[1], Muhammad Fatum[1,2], Cristina Hickman[1,7]

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Category

Nursing

Sub-Category

Clinical

Abstract

Introduction/Objective: Assisted reproductive technology (ART) nursing staff face significant challenges, including cycle monitoring, patient education, communication, and administrative tasks, often leading to burnout due to high workload and emotional demands. Nurses typically spend 9-16 hours per IVF cycle. Balancing patient care and nurse well-being is essential. This study evaluates the impact of a four-day workweek and a digital clinic and patient management platform on nursing staff well-being, job satisfaction, and patient care quality.

Methods: A four-day workweek with 10-hour shifts was introduced at a single fertility centre in the UK, along with a digital clinic and patient management platform. Over eight months, interviews with nurses assessed the impact of these changes on their well-being, job satisfaction, and patient care quality. The study aimed to see if a condensed workweek and digital tools could reduce administrative burdens and improve job satisfaction.

Results: Five nurses participated in the study. Two main themes emerged regarding staff well-being. The first was the benefit of the four-day workweek, particularly consecutive days off, which improved work-life balance. All nurses reported enhanced well-being, increased

engagement, and greater job satisfaction, potentially leading to better patient care. The second theme highlighted the digital platform's role in improving patient management, allowing for remote care and greater job flexibility. The platform enhanced efficiency with features like in-app communication, automatic record sharing, and consent management.

Conclusions: The introduction of a four-day workweek combined with a digital patient management platform in an IVF clinic showed promising benefits for nursing staff well-being and job satisfaction, without compromising patient care quality. This approach could serve as a model for improving nurse retention and patient outcomes in high-demand clinical environments.

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218. Exploring the Ethical Implications of PGT-P on Marginalized and Disabled Sub-populations

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Category

Other

Sub-Category

Translational

Abstract

Introduction: Preimplantation Genetic Testing for Polygenic Risk (PGT-P) generates polygenic risk scores (PRS) in embryo selection with the goal of reducing heritable conditions. Some purported benefits are reduced healthcare costs and more freedom in decision-making for prospective parents.

Ethical Concerns: Defining the desirability of traits in PRS is not morally neutral. The features of a given trait exist in relation to some socially defined “desirable” criteria. This risks categorising embryos with undesirable traits as undesirable themselves, despite this correlation being erroneous, as desirability/undesirability is not objective. The socio-political conditions under which PRS are defined largely overlooks the social factors contributing to the negative implications of certain disabilities/diseases. This is largely down to ableism in defining desirability of traits.

An additional concern is that even when allowing parents to make the choice of whether to select an embryo, the population of children with so-called undesirable traits will drop, despite the decision not being made in the lab.

Addressing critiques: Pursuing IVF is physically, emotionally and financially taxing, meaning individuals will want to ensure as reduced a risk as possible for their child, but avoiding the prospect of discarding embryos whose "undesirable" genes may not express is of concern.

We also acknowledge issues with restricting parent choice considering additional information about the risk factors of an embryo, but we argue that there is no way of giving prospective parents neutral information about embryo health, as there is implicit value judgement in labelling traits as a risk.

Conclusion: Given the risks outlined for PGT-P, restriction of development is of pressing concern. Social factors affecting human quality of life are of greater importance in consideration of disability/disease than what can be known by mere genetic analysis.

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111. Comparing hormone receptor expression in the inner and outer layers of the human myometrium during labour and across the menstrual cycle.

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Category

Uterus

Sub-Category

Basic Science

Abstract

Background: The myometrium, the uterine muscular wall, plays an essential role in menstruation and parturition by generating and coordinating contractions (1). It has two distinct layers: the inner junctional zone and the outer longitudinal layer, hypothesised to have different embryonic origins (2). Hormone-responsive myometrial pathologies like leiomyoma and adenomyosis, often cause debilitating symptoms e.g. chronic pelvic pain and heavy menstrual

bleeding, impact quality of life and affect one in three women of reproductive age (3). The hormone receptor profiles of the myometrial layers have not yet been fully characterised. Understanding the physiological profiles is essential before studying myometrial pathologies. The cellular composition and structure of the non-pregnant myometrium is poorly understood, with limited research on myometrial layers.

Aim: Investigate hormone receptor profiles for the different layers of non-pregnant human myometrium across the menstrual cycle and during pregnancy.

Methods: Immunohistochemistry (IHC) was used to detect oestrogen receptor (ERα), progesterone receptor (PR) and androgen receptor (AR) in the myometrium during the proliferative phase ((PP) n=10), secretory phase ((SP) n=10), and in term, non-labouring pregnancy (n=10).

Results: IHC confirmed the presence of ERα, PR and AR in both myometrial layers. ERα and AR levels were significantly higher in the outer than the inner myometrium during PP and SP ($p<0.05$). Higher PR levels were observed in the outer myometrium in SP only ($p<0.05$). All hormone receptors levels were significantly higher in the inner layer of term pregnant myometrium ($p<0.05$).

Summary: This study demonstrates that inner and outer myometrial layers have distinct hormone receptor profiles, with differences observed between PP, SP, and pre-labour term pregnancy. Elevated hormone receptor levels in the outer myometrium suggests heightened hormone-responsiveness, which may influence contractility and contribute to the development of pathologies such as subserosal leiomyoma and adenomyosis. Further characterisation of myometrial layers in physiological and pathological states is required.

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197. Is ovarian reserve associated with risk of miscarriage? A systematic review and meta-analysis

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Objective: To determine the association between ovarian reserve with risk of miscarriage in women undergoing ART.

Materials and Methods: A systematic literature search was conducted using PubMed, EMBASE, Cochrane database and Google Scholar from inception to September 2023. Studies were included if they provided: patient age at the time of treatment, AMH or AFC and miscarriage rate, defined as an intrauterine pregnancy loss before 22 weeks.

Results: There were 18 retrospective studies, including 47,122 patients included. A random effects model and Odds Ratio was used to assess the risk of miscarriage. There is a significantly higher risk of miscarriage in women across all ages with a low AMH, compared to those with medium and high concentration (OR 1.41; 95% CI, 1.14-1.73; P=0.001). When age is adjusted, there is a significantly increased risk of miscarriage in women <35 years old with low AMH, compared to those with medium and high concentrations (OR 1.31; 95% CI, 1.15-1.49; P<0.0001). Although the risk change observed for women ≥35 years old was not significant (OR 1.29; 95% CI, 0.95-1.76; P=0.10), an observed significance was demonstrated with a sensitivity analysis.

There is a significant increased risk of miscarriage in women with a low AFC compared to those with medium and high AFC across all age groups (OR 1.80; 95% CI, 1.33-2.45; P=0.0002). When age is adjusted, there is a significant increased risk of miscarriage in women aged < 35 years old (OR 1.61; 95% CI, 1.2-2.16; P=0.002), but not amongst women aged ≥35 years (OR 1.41; 95% CI, 0.9-2.22; P=0.14).

Conclusions: A reduced ovarian reserve is associated with an increased risk of miscarriage in women across all ages. Current studies suggest the risk is not significant in women ≥35 years old, as miscarriage in this age group is most likely attributed to other factors, such as aneuploidy.

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300. Statistical and machine learning methods for prediction of embryo ploidy status: a potential alternative to invasive preimplantation genetic testing for aneuploidy.

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Category

Assisted Conception

Sub-Category

Translational

Abstract

Objective: Investigate the association between embryo morphological grading and ploidy status. Compare the performance of various machine learning (ML) methods for predicting embryo ploidy status.

Methods: Retrospective analysis of 787 fresh embryos subjected to Preimplantation Genetic Testing for Aneuploidy (PGT-A) between January 2018 and May 2024 at a London Fertility Clinic. Correlations between morphological grades (expansion, Trophectoderm (TE) and Inner Cell Mass (ICM)) and ploidy status were analysed using mixed-effects logistic regression (MELR) models adjusted for maternal age. Predictive performance of five ML algorithms (MELR, Support Vector Machine, Decision Tree, Random Forest, XGBoost) was evaluated using three distinct sets of clinical variables.

Results: Univariate analyses revealed significant associations between each morphological grade and ploidy status (Expansion: OR=1.47, 95%CI:1.24-1.76, P<0.001; ICM: OR=1.53, 95%CI:

1.16-2.03, P=0.003; TE: OR=2.13, 95%CI:1.58-2.87, P<0.001). Multivariate analysis incorporating all three morphological variables demonstrated that the TE grade was the strongest predictor (OR=1.83, 95%CI:1.33-2.50, P<0.001), followed by the expansion grade (OR=1.40, 95%CI:1.18-1.68, P<0.001). Although the ICM grade (OR=1.26, 95%CI:0.94-1.68, P=0.120) was associated with ploidy status, it was not statistically significant. For ploidy prediction, the XGBoost model using the three morphological grades and maternal age achieved the highest Area Under the Curve (AUC) of 0.73, with an accuracy of 0.68, sensitivity of 0.52 and specificity of 0.76.

Conclusions: Our results suggest that when two embryos have equal expansion grades but differ by one grade in ICM and TE, the embryo with the higher TE grade should be prioritised for clinical use. For ploidy prediction, we propose the potential use of a ML model as an embryo screening tool, where only embryos likely to be classified as euploid would be selected for PGT-A, offering a more cost-effective alternative. With further research and validation, a ML model could potentially offer a non-invasive embryo selection method as an alternative to PGT-A.

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174. Scenario modelling to assess whether fertility treatment costs can be reduced by judicious use of PGT-A?

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective:

To compare the cumulative costs of alternative treatment scenarios:

A. Fresh (ET) and frozen embryo transfer (FET) without PGT-A (standard IVF)

B. PGT-A with FET (standard PGT-A)

C. ET of unbiopsied blastocyst, with PGT-A of supernumerary blastocysts followed by FET

Methods: Authors' clinic treatment costs were used. The proportion of embryos suitable for transfer following PGT-A (euploid/suitable mosaic) was obtained from the genomic service provider (>120,000 embryos). Costs were calculated for scenarios where 1, 2 or 3 blastocysts were available for women aged (<35, 35-37, 38-40, 41-42 and 43-44 years[y] receiving treatments A, B or C. Expected blastocyst numbers were calculated using internal AMH data (>3000 patients; <5 [low responder], 5-20 [normal responder] and >20 [high responder] pmol/L). The model assumed that patients had all suitable embryos from one egg retrieval transferred irrespective of outcomes.

Results: When there were 2 embryos, treatment C costed 10% higher than A for women <35y, 6% higher for women 35-37y and 1% higher for women 38-39y, but 5% lower for women 41-42y and 8% lower at 43-44y. When there were 3 embryos, C costed 4% more than A for women <35y, but 2% less at 35-37y, 10% less at 38-40y, 18% less at 41-42y and 24% less at 43-44y.

Treatment B was more expensive than A when 3 embryos were available in women <40y, but 8% less at 41-42y and 16% less at 43-44y.

C was less expensive than A in expected normal or high responders >37y. B was less expensive than A in expected high responders >40y.

Conclusions
Cost-effectiveness of PGT-A is influenced by age and number of embryos. Costs of fertility treatment can be lowered by judicious use of PGT-A in expected high responders >40y. ET + PGT-A extends the cost-effectiveness of PGT-A to normal and high responders >37y.

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58. Bluetooth Security Analysis of FemTech IoT Devices and Apps

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Category

Other

Sub-Category

Translational

Abstract

Title: Bluetooth Security Analysis of FemTech IoT Devices and Apps

Objective: Digital health products (e.g. mobile apps and smart devices) collect massive amounts of data about users, including health, medical, sex life, and other intimate data. We study a set of 21 Internet of Things (IoT) devices [1-21] advertised for general and intimate health purposes of female bodies (aka female-oriented technologies or FemTech). We focus on the security of the Bluetooth connections and communications between the IoT device and the mobile app. Our research questions include:

RQ1: What are the security practices (e.g. Bluetooth version and services, encrypted traffic, pairing methods) of BLE communications in FemTech IoT devices and apps?

RQ2: How do inappropriate security practices (such as lack of authentication and encrypted traffic) put users at risk? What attacks can be performed to demonstrate such risks?

Methods: We study 21 FemTech devices (e.g. fertility trackers, smart wearables, and massagers). We assess each device's BLE communications for their security practices (i.e., BLE version, services, pairing method, encryption). We then perform targeted BLE attacks (MITM, replay, connection hijack, denial of service, and denial of sleep) resulting in malfunctioning of the device or the app e.g., draining the battery of the IoT device. We notify the corresponding developers and companies about these findings and provide recommendations to improve these systems.

Results: Our results highlight serious security issues in off-the-shelf FemTech devices. These include unencrypted Bluetooth traffic, unknown Bluetooth services and insecure Bluetooth authentication when connecting to the app. Our Bluetooth attacks on the communication between these devices and apps result in malfunctioning of the device and app.

Conclusions: We recommend that the current practices are far from protecting the end users' security and privacy, and these systems should be designed and implemented with state-of-the-art security and privacy approaches.

References

List of FemTech IoT devices and apps in this study:

1. Vibease vibrator

2. Lioness Clara vibrator
3. Vibease Lipstick vibrator
4. Vibio Frida vibrator
5. Mystery Vibe Crescendo vibrator 2
6. Kgoal kegel exerciser
7. Perifit kegel exerciser
8. We-Vibe Bloom pelvic trainer
9. Vibio Clara kegel balls
10. Elvie pelvic trainer
11. Vinca 2 Femometer
12. Daysy Day Cycle computer
13. Mira fertility tracker
14. Clearblue ovulation test
15. Breath Ilo cycle/fertility tracker
16. Ava fertility tracker
17. Bellabeat Ivy bracelet
18. Keen 2 Habit aware bracelet
19. Garmin Lily watch
20. Oura ring
21. Hidrate Spark 3 water bottle

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113. Chicken chemerin, alone or in mixture with adiponectin and visfatin, has an inhibitory effect on primary hen granulosa cell's progesterone secretion.

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Category

Endocrinology

Sub-Category

Basic Science

Abstract

Objectives: Adipokines like adiponectin (ADIPO), chemerin (CHEM) and visfatin (VIS) are hormones involved in the regulation of metabolic and reproductive functions in mammals and birds. Their expression in ovarian cells vary with the follicular development. In a previous study we demonstrated that VIS and ADIPO can regulate *in vitro* steroid production by hen granulosa cells (GCs). To date, CHEM's role in chicken ovarian functions is still not fully understood. Furthermore, the combined effect of ADIPO, VIS and CHEM on GCs remains unclear.

Methods: Therefore, the objective of the present study is to investigate the impact of an *in vitro* administration of growing doses of chemerin (0, 12, 25, 50 and 100 ng/mL) on GCs (cultured from the largest follicles (F1) and from the smaller ones (F3/F4)) on cell viability and proliferation and progesterone (Pg) secretion. The experiments were reproduced with an addition of CHEM (25 ng/mL) in response to gonadotropins (LH and FSH) or IGF-1 (10^{-8}M) with and without a mixture of ADIPO (10 µg/mL) and VISF (100 ng/mL).

Results: Exposure to CHEM alone or in mixture with ADIPO and VIS had no effect of F1 and F3/4 GCs viability and proliferation. However, Pg secretion was reduced in a dose dependent manner in both F1 and F3/4 follicles. This inhibitory effect was stronger in presence of the mixture of ADIPO and VIS. Furthermore, LH and FSH-stimulated Pg secretion in F1 follicles was significantly reduced by the CHEM exposure, while FSH and IGF-1-stimulated progesterone secretion in F3/4 follicles was significantly reduced by the CHEM exposure. Interestingly, CHEM inhibitory effect on Pg secretion was increased by the mixture only in F3/4 GCs.

Conclusions: Taken together, our results show that CHEM impairs Pg secretion by *in vitro* cultured GCs. ADIPO and VIS combined with CHEM modulate this inhibitory effect.

23. AMH levels: a strong predictor of oocyte quality assessed by artificial intelligence, even for younger patients undergoing ICSI cycles.

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Category

Oocytes and ovary

Sub-Category

Clinical

Abstract

Introduction: Anti-Müllerian hormone (AMH) is a key marker of ovarian reserve, often linked to the quantity of oocytes in reproductive-aged women (1). However, some studies challenge this, suggesting that oocyte quality in young women undergoing ART cycles remains consistent regardless of AMH levels (2). AMH has also been analysed as a potential predictor of oocyte quality based on embryonic outcomes. AI tools like MAGENTA™ now offer a more objective assessment of oocyte quality, scoring from 0 to 10, with higher scores indicating better reproductive prognosis(3).

Objective: This study aimed to evaluate the correlation between AMH levels, maternal age in ICSI patients, and the MAGENTA™ score for assessing oocyte quality.

Methods: We retrospectively analysed 980 mature eggs used for ICSI from August 2023 to March 2024. Serum AMH levels were measured with ultrasensitive ELISA (Beckman-Coulter), all patients were dividing into Low (<1.1 ng/ml) and High (>1.1 ng/ml) AMH groups. Oocyte images were scored by MAGENTA™ on a 0-10 scale. In a second phase, our data set was specific to patients under 35 years old. Differences between MAGENTA™ scores and AMH levels were compared using Student's t-test, with $p < 0.05$ considered statistically significant.

Results: We analyzed 980 oocyte images for the correlation between AMH levels and oocyte quality. The Low AMH group (n=682) had a mean MAGENTA™ score of 5.6, while the High AMH group (n=323) had a score of 7.1, showing a statistically significant difference ($p < 0.05$). In younger patients (<35 years), MAGENTA™ scores were 4.5 in the Low AMH group (n=36) and 6.6 in the High AMH group (n=231), also statistically significant.

Conclusions: AMH is a reliable predictor of oocyte quality, with strong correlations seen in all patients. It would be beneficial to explore the relationship between gonadotropin dose and oocyte quality based on AMH levels.

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102. Exploring treatment effectiveness and perceptions for endometriosis and adenomyosis TEPEA: a national questionnaire.

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Category

Uterus

Sub-Category

Clinical

Abstract

Background: Endometriosis and adenomyosis affect 10% of women of reproductive age[1], leading to chronic pain and subfertility. Treatments rely on hormonal therapies, which are unsuitable for women seeking a pregnancy. Understanding perceptions and experiences with treatments is essential to developing effective non-hormonal, fertility-sparing therapies.

Objectives: To understand expectations and experiences of medical treatments for endometriosis and adenomyosis, before using this to inform the development of acceptable alternative treatments.

Methods: A voluntary, anonymous questionnaire was designed and distributed online for 3 months, targeting women of reproductive age with endometriosis, adenomyosis or both. Data was exported to Excel for preliminary analysis, and further analysed using SPSS. Ethical approval was obtained from the University of Liverpool.

Results: 1170 responses were obtained. 524 respondents had endometriosis, 317 had adenomyosis and 301 had both. 142 women were currently trying to conceive, and of those, 79 were experiencing subfertility. Expected benefits of the oral contraceptive pill included reduced pain (66.3%), reduced growth of disease (42%) and a cure (12%). Their experience caused 74% to stop the pill. Mirena IUS users expected benefits of reduced pain (55%), reduced growth of disease (42.2%) or a cure (13.2%) but only 20.2% experienced reduced pain, 11.2% reported migration and 14.2% expulsion, leaving 54% very/ somewhat dissatisfied with the Mirena. 27% were very/ somewhat satisfied with information provided by their healthcare professional about treatment options, compared with 53% of those seeking information elsewhere.

Conclusions: Women have negative perceptions and experiences with medical treatments, particularly those trying to conceive, and there is a clear desire for non-hormonal alternatives. Unrealistic expectations, disproportionate concerns and poor experience leads to lower satisfaction and higher discontinuance and given the prevalence of these conditions and limited pharmaceutical options, the findings highlight the urgent need for further research and development of effective non-hormonal drugs.

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20. Evaluating Ultrasound Accuracy in Diagnosing Benign Ovarian Cysts in Infertility Patients: A Retrospective MRI Analysis

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Category

Oocytes and ovary

Sub-Category

Clinical

Abstract

Objective: To determine the accuracy of diagnosing benign ovarian cystic lesions via ultrasound and avoid unnecessary MRI follow-ups, aiming to achieve 100% accuracy in diagnosing simple benign ovarian cysts using ultrasound.

Design: Retrospective analysis of MRI reports, from January to May 2023. Reports were retrieved form IMPAX/Xero. The analysis focused on MRI report texts that included ovarian cysts to assess the accuracy of initial ultrasound diagnoses.

Method: 55 MRI cases reporting ovarian cysts were identified. The selection criteria were narrowed to include only simple, benign, functional, physiological, and polycystic ovarian syndrome (PCOS) cysts. Most cysts were discovered while patient being investigated for infertility.

Cysts discovered incidentally, or where the MRI was performed for surgical purposes (e.g. known endometriotic cysts), were excluded. 31 cases were excluded, while 24 MRIs conducted following ultrasound reports indicating complex ovarian cysts for patient under infertility investigation.

Results: Of the 24 cases, 17 (71%) revealed simple benign cysts, while 7 (29%) involved a mixture of complex-benign and malignant cysts. Therefore, over 70% of the MRI scans performed due to ultrasound reports of complex ovarian cysts were unnecessary, as the cysts were ultimately found to be simple and benign.

Conclusion: The study reveals a considerable gap in the ultrasound accuracy in diagnosing simple benign ovarian cysts, with an accuracy rate of only 71%. This shortfall results in a substantial number of unnecessary MRI scans, increasing both costs and resource utilization within the department. There is a critical need to enhance ultrasound diagnostic protocols and training to address this issue. Improvements in these areas could lead to better diagnostic

accuracy, reducing the reliance on MRI follow-ups, and ultimately contributing to more efficient patient care and optimized resource allocation. Future research should focus on developing and testing enhanced ultrasound techniques and protocols to achieve the desired diagnostic accuracy.

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43. Dietary behavior and concordance among couples with a history of recurrent miscarriage: a prospective multi-center cohort study

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Objective: Understanding the link between maternal and paternal dietary behaviors is important to develop effective nutritional strategies The objective of this study is to examine the typical dietary habits and concordance among couples with a history of recurrent miscarriages.

Design: Prospective multi-center cohort study (Tommy's Net).

Setting: Three university hospital research centers in the United Kingdom.

Population or Sample: 1247 couples with a baseline history of two or more miscarriages.

Methods: We compared the maternal and paternal participants' dietary habits using frequency-weighted scatter plots and paired t-tests. Each couple's degree of dietary concordance was analyzed using Bland-Altman (BA) plots.

Main Outcome Measures: To describe the typical dietary habits of couples with a history of recurrent miscarriage, examine the presence and significance of consumption differences between partners, and assess the concordance of dietary choices within couples.

Results: Paternal participants had higher rates of smoking, alcohol consumption, and overweight status compared to maternal participants. Notably, 14% of maternal (n=176) and 25% of paternal (n=306) participants did not consume fresh fruits or vegetables daily. Women consumed more fresh fruits, vegetables, soya products, chocolate, and nuts, while men consumed more red and white meat. Maternal and paternal intake showed agreement across all food groups with a small mean difference (MD) of less than one for all groups. The smallest MD was observed in the intake of dairy products (MD 0.01, 95% Confidence Interval (CI) -0.12 to 0.14) and fish (MD 0.04, 95% CI -0.02 to 0.10), and the largest for fresh fruit (MD 0.75, 95% CI 0.62 to 0.88) and vegetables (MD 0.66, 95% CI 0.56 to 0.76).

Conclusions: Periconceptual diet and lifestyle are suboptimal in our cohort, particularly for paternal participants. While general agreement exists on dietary choices, significant individual variability persists within couples.

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204. Dysregulation of immune, coagulation and endocrine pathways in Asherman syndrome

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Category

Uterus

Sub-Category

Basic Science

Abstract

Objective: Asherman syndrome (AS) is characterised by endometrial fibrosis resulting in menstrual and reproductive dysfunction. Definitive treatment with hysteroscopic adhesiolysis is challenging due to a high recurrence rate of intrauterine adhesions. This is likely the result of

defective endometrial homeostasis associated with chronic inflammation. The aim of this study is to investigate the immune changes in AS and identify potential pathways for optimisation of therapeutic strategies.

Methods: Women diagnosed with AS during investigation for subfertility and healthy control participants aged 18-43 were recruited into the Targeting Immunity for Endometrial and Reproductive Health (TIER) study. Serum analysis was undertaken using Luminex multiplex immunoassays (R&D Systems) to measure levels of 65 biomarkers. Flow cytometry was used on endometrial tissue to obtain a detailed immune cell profile.

Results: Serum analysis was undertaken on 50 patients, including healthy control participants (n=40) and women with AS (n=10). Results indicate systemic dysregulation of immune (IL-1 alpha, S100A8, CCL22, ICAM-1, LIGHT), coagulation (protein C) and endocrine (adiponectin) pathways. The immune changes demonstrate involvement of myeloid cells and anti-inflammatory immune responses.

Women in the AS group were followed-up eight to twelve weeks post-adhesiolysis and oestrogen supplementation. Despite normal uterine cavity assessment at follow-up hysteroscopy, all immune parameters remained abnormal. Additionally, a significant increase in IGFBP-1 is observed post-adhesiolysis, suggestive of tissue proliferation.

Flow cytometry was carried out on endometrial tissue from AS patients and controls. This showed that the high numbers of monocytes observed in AS patients were sustained post-adhesiolysis, indicating ongoing immune dysfunction despite macroscopic resolution of fibrosis.

Conclusions: We identified changes in immune, coagulation and endocrine pathways that may improve understanding of fibrosis in AS. Targeting these immune changes, and in particular monocyte differentiation, along with surgery may help prevent recurrence of intrauterine adhesions and improve long-term reproductive outcomes.

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55. Sharing bad news in fertility care: what steps do professionals take and how do they cope with the associated stress? (A qualitative study)

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Category

Psychosocial

Sub-Category

Clinical

Abstract

Introduction: Sharing bad news (SBN) is a task that reproductive health professionals (RHPs) regularly face, despite this many often feel poorly prepared and stressed by the experience (1-3). Fortunately, there are existing frameworks to assist professionals in SBN, but more research is needed to assess their applicability to fertility care and investigate professional's experience of SBN. The aim of the study was to examine RHP's personal perceptions regarding steps taken when SBN and how they cope with the stress associated.

Method: An online cross-sectional, mixed methods survey was distributed through social media and societies for fertility professionals. Participants reported personal perceptions of steps they usually undertake when SBN and how they cope with the associated stress in open-text boxes. Thematic analysis (REF) was used to code, analyse and derive broad themes in responses to each question.

Results: The themes identified for steps undertaken when SBN were *Optimising the Sharing of Bad News* (53.1%), taking a *Holistic Approach to the Patient* (45.8%), being *Future Orientated* (37.9%), and ensuring *Self-preparation* (37.9%) and *Clinical Preparation* (19.2%). RHPs coped with the stress associated with SBN by using adaptative behaviours, such as *Support Seeking* (42.4%), *Accommodation to the Situation* (31.6%), and *Problem-solving* (30.5%). Others responded to stress through *Emotional Expression/regulation* (18.6%). Less frequently RHPs were found to cope by using maladaptive behaviours, such as *Avoidance/distancing* (14.7%) and *Rumination* (3.4%).

Conclusion: This study identified common themes and various consistencies in RHP's responses regarding steps taken and methods to cope with associated stress when SBN. More frequently occurring themes may have represented aspects that RHPs found more important whilst SBN and coping with the stress associated. Highlighting these shared experiences allows us to better understand the professional process of SBN in fertility care and may be beneficial in guiding future SBN training schemes for RHPs.

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RF1 Rapid Fire Poster Session

101. PGT-A results led to change in order of embryo transfer compared to embryo morphology alone

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Background: Pre-implantation genetic testing for aneuploidy (PGT-A) allows for the prioritisation of euploid embryos for transfer. This technology is particularly useful for women of advanced reproductive age and for those who have suffered previous recurrent pregnancy loss. PGT-A has been shown to reduce time to pregnancy for some patients, by avoiding repeated unsuccessful embryo transfers(1). Euploidy does not always correlate with embryo morphology, though embryos with excellent morphology are more likely to be euploid(2).

Methods: This was a retrospective review of the embryology and PGT-A results of couples who underwent PGT-A cycles in our clinic. Two senior embryologists independently ranked embryos for each couple in the order they would have selected embryos for transfer based on embryo

morphology, and they were blinded to the results of the PGT-A. These ranking scores were compared with the PGT-A results.

Results: Eighty five couples and 99 PGT-A cycles were included in our study. The mean age of women was 39 years (range 35-44 years). A total of 359 embryos were biopsied. PGT-A changed the order of embryo selection for transfer in 49 cycles (50%), compared with embryo morphological grade alone.

Conclusion: In the analysis completed to date, performing PGT-A changed the recommendation on the first embryo selected for transfer in half of patients, thereby avoiding transfer of an aneuploid embryo which likely would result in a negative outcome or early pregnancy loss. Further analyses, including a cost effectiveness analysis, are planned.

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289. Mitotic Aneuploidy and its Consequences on Preimplantation Mouse Embryo Development

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Objective: Preimplantation embryos obtained from IVF procedures often contain a mixture of euploid and aneuploid cells, termed "mosaic embryo aneuploidy." However, the impact of aneuploidy on early development and its relationship to embryo morphology remains poorly understood and is important in the context of choosing the best embryos to transfer during clinical IVF.

Methods: A mitotic motor CENPE inhibitor and/or a spindle checkpoint inhibitor were used to treat mouse embryos at the 2- to 4-cell transition to cause mitotic aneuploidy. Chromosome counting, live microscopy, live apoptosis imaging and immunofluorescence techniques were used to assess the subsequent effects upon embryo development.

Results: The combined use of both drugs increased aneuploidy in healthy cells to ~80% of cells (high aneuploidy), while treatment with a single drug led to embryos with ~50% (medium aneuploidy), while untreated embryos had ~20% as expected. We studied the morphogenetic events of preimplantation development in these embryos using bright-field time-lapse imaging. All groups showed similar mitosis durations, cell cleavage timings during the 4 to 8-cell division, and timing of morula formation. Medium-aneuploid embryos could develop into blastocysts at rates comparable to controls, but high-aneuploidy exhibited **Sub**stantially inhibited development at the morula-blastocyst transition, including reduced blastocyst formation and cell counts. Lineage tracing in high-aneuploid embryos using H2B-RFP and live microscopy revealed significantly prolonged interphases after 8-cell stage compared to controls. Using live apoptosis imaging we also found that high-aneuploid embryos experienced increased cell death in later preimplantation development.

Conclusions: Our data suggest that cells of the early embryo are insensitive to aneuploidy and that aneuploid cells divide and behave morphologically similar to euploid cells, but that aneuploidy profoundly alters embryo development starting around the morula-blastocyst transition. Our data has important implications for the development of techniques for selecting embryos based on their morphokinetic behaviour.

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328. Comparison of density gradient preparation methods, with and without centrifugation

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Introduction: The standard method for sperm preparation for ART treatment is density gradient centrifugation to isolate the motile, mature, spermatozoa from the seminal fluid, immotile sperm and cellular debris. However, centrifugation may cause sperm DNA damage, increasing the likelihood of failed implantation or miscarriage of the resultant embryo.

Methods: 14 samples were split between a standard density gradient method using 40 and 80% density gradient layers (Origio, Cooper Surgical) and wash media (GTLP fertilisation medium: Global) incorporating 2 centrifugation steps for 10 and 5 minutes respectively at 320 G. This was compared to direct mixing of the semen with the same lower density layer and then overlaying with the upper density layer and fresh sperm preparation media (LoLix method). The motile sperm were harvested from the wash media after incubation at room temperature for 30 minutes. The two methods were compared for recovered total concentration, motile concentration and velocity using a paired-student t-test. DNA fragmentation rates were also compared before and after each method using a SCSA test (Cytoscreen Solutions, Logixx Pharma).

Results: There was no difference in mean recovered concentration ($x10^6$/ml) at 5.86 vs 3.19 ($p=0.76$), mean recovered motile concentration ($x10^6$/ml) at 8.94 vs 10.24 ($p=0.18$) or average velocity (µm/s) of the recovered motile sperm at 31.86 vs 27.62 ($p=0.056$) for the density gradient and the Lolix method respectively. DNA fragmentation testing results will also be presented.

Discussion: This novel preparation technique was able to achieve comparable recovery rates for average total and motile concentrations across the samples. This may be a promising approach for preparing sperm for treatment without the requirement for centrifugation.

264. Attenuating Effect Of Alpha Tocopherol On Propoxur - Induced Gonadotoxicity In Wistar Rat Testes via Oxidative Stress.

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Background: Propoxur, a widely used carbamate pesticide, has been implicated in inducing gonadotoxicity through oxidative stress mechanisms in male reproductive organs (1, 2). The study aims to investigate the attenuating effects of alpha-tocopherol on Propoxur-induced gonadotoxicity in Wistar rats, focusing on biochemical markers, hormonal levels, & histological changes in the testes (3, 4).

Methods: Twenty adult male Wistar rats were divided into four groups: control, propoxur treated, alpha tocopherol treated and propoxur plus alpha tocopherol treated. Biochemical assays, histological analysis, and oxidative stress markers, including malondialdehyde (MDA), superoxide dismustase (SOD), and reactive oxygen species (ROS) were evaluated.

Results: Result showed a significant increase in MDA levels and ROS activities ($P>0.05$), coupled with a decrease in SOD activity in the propoxur-treated group ($P<0.05$), indicating oxidative damage. Histological examination revealed severe disruptions in the seminiferous tubules.Conversely, alpha-tocopherol administration mitigated these adverse effects by restoring anti-oxidant enzyme activities, lipid peroxidation, and preserving testicular architecture.

Conclusions: This study indicate that Alpha tocopherol exhibits a protective role against propoxur-induced gonadotoxicity by enhancing the antioxidant defence system and reducing oxidative stress.

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RF2 Rapid Fire Poster Session

287. Transcription factor-based transdifferentiation of human embryonic to trophoblast stem cells

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Category

Other

Sub-Category

Basic Science

Abstract

Background: Our understanding of human trophoblast biology is limited in comparison to the mouse, due to a historical lack of models for molecular analysis. Single cell RNA-seq analysis of human embryos cultured to different stages of preimplantation development provides a data mining resource for the identification of candidate developmental regulators [1]. We identified *GATA2*, *GATA3*, *TFAP2C*, *KLF5* and *MYC* as trophectoderm-associated transcription factors and

here test their ability to transdifferentiate human embryonic stem cells to induced trophoblast stem cells (iTSCs).

Methods: We engineered doxycycline-inducible hESCs to overexpress *GATA2*, *GATA3*, *TFAP2C*, *KLF5*, and *MYC (*5 factors*)*. Transgenes were induced by exposing 5 factors-hESCs to doxycycline for 20 days in the presence of hTSC media. In parallel we employed a strategy of transcription factor overexpression using chemically modified mRNAs, which has been used to generate transgene-free human iPSCs. Resultant cells were assessed for TSC-identity by RNA-seq, immunofluorescence analysis as well as assessing the ability of iTSCs to be differentiated into both syncytiotrophoblast and extravillous trophoblast cells.

Results: After 20 days' exposure to doxycycline epithelial colonies with polygonal hTSC-like morphology were apparent. These colonies could be isolated by passaging and continued to maintain their morphology and proliferate as iTSCs in the absence of doxycycline. RNA-seq analysis showed that the iTSCs generated in this study were most similar to established hTSCs [2]. iTSCs were capable of generating both STB and EVTs. Systematic evaluation of transdifferentiation factors revealed that *GATA2* and *GATA3* together are sufficient and necessary to induce the trophoblast network.

Conclusions: This is the first study to show direct transdifferentiaiton of primed hESCs to iTSCs. We propose that the transdifferentiation strategy presented here could be applied to generate iTSCs from fibroblasts, or fibroblasts isolated from disease-affected placentas. This strategy could open up the possibility of generating disease-specific human TSCs for disease modelling.

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5. What is the effect of sildenafil citrate intake on women undergoing assisted reproduction? A systematic review and meta-analysis of randomized controlled trials

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective: To conduct a systematic review and meta-analysis evaluating sildenafil citrate (SC) on clinical outcomes in women undergoing Assisted reproductive technologies (ART).

Methods: A comprehensive literature search was conducted using multiple databases, including PubMed, Scopus, Embase, Web of Science, and the Cochrane Central Register of Controlled Trials. The search covered studies from inception until April 15, 2023, and identified relevant randomized controlled trials (RCTs) for inclusion in the analysis. The endpoints were summarized as risk ratio (RR) or standardized mean difference (SMD) with 95% confidence interval (CI).

Results: After meticulous analysis, twenty-eight RCTs comprising 3,426 women were included in the study. The results revealed significant findings regarding the impact of SC on clinical pregnancy (CP) rates. Women receiving SC demonstrated a significantly higher probability of CP compared to the control group (n=21 RCTs, RR=1.43; 95% CI: 1.29, 1.59). Additionally, when SC was combined with other medications like clomiphene citrate (CC) or estradiol valerate, it further improved the likelihood of CP compared to these medications alone (RR=1.35, 95% CI: 1.19, 1.53; RR=1.55, 95% CI: 1.08, 2.22, respectively). Furthermore, the study observed that the mean endometrial thickness (ET) was significantly higher in women who received SC compared to the control group, which involved other active interventions or placebo (SMD=0.77, 95% CI: 0.20, 1.34). Particularly, the administration of SC resulted in a notably higher ET level compared to the placebo (SMD: 1.33, 95% CI: 0.15, 2.51).

Conclusion: The findings suggest that luteal supplementation of SC can be considered a beneficial approach to enhance ET and improve the CP rate in women undergoing ART.

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324. Impact of adenomyosis and co-existing endometriosis on IVF/ICSI outcomes

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Background&Objective: Adenomyosis and endometriosis frequently co-exist and independently reduce chances of success in women undergoing assisted conception. This study aimed to investigate whether women with adenomyosis and co-existing endometriosis have worse reproductive outcomes compared to adenomyosis or endometriosis alone.

Methods: Retrospective observational cohort study between September 2018-September 2024 of infertile women diagnosed with adenomyosis, endometriosis, adenomyosis with co-existing endometriosis or tubal factor undergoing a fresh or frozen IVF/ICSI cycle. Adenomyosis was diagnosed by transvaginal sonography(TVS) and severity of disease scored as previously described(1). Endometriosis was diagnosed on TVS or laparoscopy and scored according to revised ASRM criteria. Demographic data and reproductive outcomes including embryo quality were recorded. Data was retrieved from an imaging database(Viewpoint)and assisted conception database(Ideas v 6.0).

Results: There were a total of 386 IVF/ICSI cycles performed in women with adenomyosis(n=87), endometriosis(n=168), adenomyosis with co-existing endometriosis(n=42) and tubal factor(n=82). Compared to women with adenomyosis alone, women with adenomyosis and co-existing endometriosis having a fresh transfer had a lower live birth rate(17/48 [35.4%]vs3/14 [21.4%])(p=0.259). The same finding was seen when having a frozen transfer(11/24 [45.8%]vs.6/19[31.6%])(p=0.264). Live birth rate was higher when undergoing frozen transfer vs. fresh in women with adenomyosis alone and those with adenomyosis with co-existing endometriosis(11/24[45.8%]vs.17/31 [35.4%])(p=0.259)and(6/19 [31.6%]vs.3/14[21.4%])(p=0.264). There was no significant difference in fertilisation rate, blastulation rate and embryo grade between groups.

Conclusions: Women with adenomyosis and co-existing endometriosis have a lower live birth rate compared to those with adenomyosis alone, which may reflect of severity of disease. Frozen embryo transfer appears to give better outcomes. There is a need for a large prospective study evaluating the benefit of frozen embryo transfer in women with adenomyosis and endometriosis.

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319. Exploring preimplantation genetic testing for aneuploidy (PGT-A) of 0PN and 1PN blastocysts to increase embryo utilisation rate in fertility treatment

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Background: Embryologists aim to select embryos that are most likely to result in a successful pregnancy. Current practice only recommends use of blastocysts derived from two pronuclei (2PN) zygotes for treatment based on the consensus that 2PN represents parental diploidy according to morphological assessment criteria. Embryos with either zero pronuclei (0PN) or one pronucleus (1PN) are considered unfertilised or abnormal and usually discarded. However, recent studies using pre-implantation genetic testing for aneuploidy (PGT-A) have suggested that good quality blastocysts derived from these zygotes may be euploid and could be considered for use in treatment.

Aim: To determine if PGT-A should be offered to patients with 0PN and 1PN derived blastocysts that are suitable for embryo biopsy (graded ≥CC).

Methods: Embryo time-lapse (TL) annotation scores and grades were reviewed from anonymised data of 1080 0PN and 982 1PN embryos (and the 2PN embryos within the same

cohort) cultured within EmbryoScope® (ES) (Vitrolife) TL incubator. The percentage of 0PN and 1PN derived blastocysts was determined and compared against the 2PN blastocysts. Good quality blastocysts are a prerequisite for embryo biopsy. They data was separated according to insemination method and compared against the 2PN blastocysts using ANOVA and t-tests.

Results: <1% of 0PN and 5% of 1PN zygotes developed into ≥CC graded blastocysts. ANOVA tests showed no significant difference in scores between all embryos in the IVF group (P=0.631). T-test showed a significant difference in the intracytoplasmic sperm injection (ICSI) group (P=0.013).

Conclusion: This data combined with scientific evidence has determined that PGT-A is a beneficial service to offer to patients. This will be a particularly important service that could be available for patients undergoing treatment for fertility preservation wherein they are storing embryos for future use. PGT-A could provide more options for such patients and increase the yield of usable embryos.

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26. The Experiences and Psychological Health of Surrogates 20 years after their Surrogacy

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Category

Psychosocial

Sub-Category

Basic Science

Abstract

Intro: The use of surrogacy is increasing[1]. In the UK both gestational surrogacy, using donor oocytes/eggs and traditional surrogacy utilising the surrogate's own eggs are permitted[2]. The shorter-term psychological health and experience of surrogates has been studied but there have been no studies beyond 10 years after the surrogacy arrangement.

Aims: This study examined the long-term experiences and psychological and physical health of surrogates 20 years after their surrogacy, the relationships between the surrogate and intended family, and the surrogate's perception on the impact this had on their own family. Any differences between the type and number of surrogacies was also measured.

Method: 21 surrogates were interviewed using in-depth semi-structured interviews as well completing a series of questionnaires assessing their psychological health, overall wellbeing and marital quality.

Results: The findings showed 76% (16/21) of the surrogates were in contact with the surrogate family with 93.7% (15/21) of surrogates reflecting positively about this relationship. A significant finding showed only gestational surrogates reported a 'special bond' with the surrogate child. Other significant findings included those that had performed both types of surrogacy were more likely to feel unique when compared to those that had performed either surrogacy type alone. No differences were seen between reported health outcomes and the type or number of surrogacies undertaken.

Conclusion: The majority of surrogates and their own family reflected positively about their relationship with the surrogate family lending support to the positive wider impact surrogacy can have for all those involved. The type or number of surrogacies had no impact on the surrogate's reflections of surrogacy or their relationship with the intended parents. Overall, the findings demonstrated surrogates' high satisfaction with life and no negative psychological consequences of surrogacy in the long term.

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PW2 Poster Walk

216. Female fertility preservation in a primary brain tumour cohort

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Introduction: Oncofertility services have seen a rise in primary brain tumour (PBTu) referrals despite survivorship uncertainties. Fertility preservation (FP) strategies are offered due to varying gonadotoxic effects of chemotherapy and radiotherapy. This study examines a female PBTu cohort, assessing spontaneous pregnancies, mortality, and long-term utilisation of stored gametes.

Methods: A systematic literature review, following PRISMA guidelines, was conducted using OVID Medline, PubMed, and Scopus databases, revealing no reports of long-term FP outcomes or stored material use in this population. **Sub**sequently, data from all female PBTu referrals (2017-2024) were prospectively collected via the EPIC database. Descriptive statistics were the primary analytic method.

Results: In this cohort (n=41), diagnoses included Anapaestic Astrocytoma (n=10), Diffuse Astrocytoma (n=6) and Medulloblastoma (n=4). 23 patients (56%) underwent FP aged 26.43 ± 6.56 years. Reasons for not proceeding included avoiding treatment delays, existing children, and predicted stable ovarian reserve. FP methods included oocyte (78%, 14.63 ± 11.42 MII oocytes), embryo (13%, 4.5 ± 1.91 embryos), and ovarian tissue (9%) cryopreservation. The average follow-up duration post-FP was 5.32 ± 5.02 years. No patients utilised their stored gametes, two had spontaneous pregnancies and four were lost to follow-up. Reasons for non-utilisation of gametes included death, ongoing malignancy, spontaneous conception, and deferred pregnancy plans. All glioblastoma patients (n=8) either died (aged 32 ± 5.40 years) or have persistent tumours.

Discussion: This study highlights FP challenges in a PBTu cohort, including gamete disposal, informed consent, and posthumous reproduction, given the high mortality signal and low rates of use. Future studies should report long-term outcomes, including pregnancy rates and live births (spontaneous and assisted), mortality, and reasons for non-utilisation of preserved gametes.

Conclusion: This audit underscores the need for standardised PBTu oncofertility protocols prioritising patient benefit. Given the limited follow-up, ongoing cohort monitoring and multidisciplinary approaches are critical for informed patient decision-making.

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24. Predicting total fertilisation failure in ART: a comparison of factors at play in IVF and ICSI

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Methods: This was a retrospective study with data from a single fertility clinic from December 2011 to November 2023 (n=4,077). 1,374 ICSI cycles and 1,198 IVF cycles were included. The total fertilisation failure (TFF) group was defined as the number of cycles where two distinct pronuclei failed to form.

The TFF group (n=128) was compared to a control group (n=128). The following factors were compared: AMH, follicle number, egg number and mature eggs, infertility duration, parity and infertility reason. The same parameters were studied differentiating for type of ART (ICSI or IVF).

Results: 142 of 2,572 cycles resulted in TFF (5.5%). The mean age of the TFF group was higher than the control group (mean 38.86 vs 36.65, $p<0.001$). The TFF group had lower AMH (median 5.1 vs 8.9, $p<0.001$); follicle number (median 5 vs 8, $p<0.001$); number of eggs retrieved (median 3 vs 7.5, $p<0.001$) and number of mature eggs (median 3 vs 7, $p<0.001$) compared to the control group. Duration of infertility and parity did not achieve statistical significance. Reasons for infertility were grouped; the reasons for infertility between the two groups were different ($p = 0.0195$)

Independently comparing IVF TFF (n=46) with IVF controls (n=46) and ICSI TFF (n=82) with ICSI controls (n=82) yielded the same results as the whole TFF group for age, AMH, follicle number, egg number, mature egg number and parity. The IVF TFF group compared to the IVF control group had a statistically different length of infertility (median 3 vs 2 years, p=0.04). The ICSI comparison showed a statistical difference in the reasons for infertility between control and TFF (p=0.004).

Conclusions: The results of this study provide a useful foundation for the development of a model which predicts individual risk of TFF with either an ICSI or IVF cycle.

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81. Utilization of the ICER protein to increase fertility levels in zebrafish models

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Objective: Overfishing remains a critical issue worldwide. Fish are a crucial food source for many, particularly in developing countries. The aim of this project is to increase the fertility levels of fish and the viability of their offspring to help rebuild endangered populations. Previous unresearch has shown that the inducible cAMP early repressor (ICER) protein increases ovulation in mouse models.

Methods: To determine if the ICER protein could enhance fertility in zebrafish models, a plasmid vector capable of integrating into the genome of single-celled zebrafish embryos was created. The plasmid was inserted into the embryos via microinjection, along with TOL-2 mRNA, which facilitates DNA integration by cutting the zebrafish DNA, allowing for the insertion of the plasmid containing the ICER protein gene. Once the injected zebrafish reached adulthood, PCR and gel electrophoresis were used to confirm which fish carried the ICER gene. These fish were then bred with wild-type zebrafish, and their offspring were genotyped to identify which

members of the F1 generation carried the transgene. Mating trials were conducted with the F1 generation and compared to wild-type zebrafish to assess the number of offspring born and their survival rates.

Results: While more offspring were born from wild-type crossings, the transgenic offspring exhibited a much higher survival rate compared to the control group. Only one-third of the wild-type offspring survived, whereas over two-thirds of the transgenic offspring survived.

Conclusion: By increasing the levels of the ICER protein, there may be a positive correlation with offspring survival, which could potentially be leveraged by farm fisheries.

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320. Medical students' knowledge, attitudes, and practices regarding infertility in Poland: Findings from the Pol-Infertility pilot study

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Category

Other

Sub-Category

Clinical

Abstract

Background: There is a significant lack of knowledge among medical students about infertility, including its medical procedures and legal regulations. Current medical curricula do not

adequately cover infertility and assisted reproductive technologies (ART), resulting in knowledge gaps among students, trainees, and professionals.

Methods: This was a cross-sectional, anonymous online survey conducted between January and March 2022. The study aimed to assess the knowledge, attitudes, and practices of medical students regarding the legal and clinical definitions of infertility, as well as ethical issues related to ART and in vitro fertilization (IVF). A total of 155 students from various Polish universities participated in the study by completing an online questionnaire shared via university groups and webpages.

Results: The survey revealed that 61% of respondents knew someone facing infertility, but their knowledge of fertility treatments, especially IVF, was highly variable. Regarding funding for IVF by the National Health Fund, 39% believed it is funded in some cases, 40.9% said it is not, and 20.1% were unsure. Additionally, 22.7% thought IVF was only available to married couples, while 48.7% disagreed, and 28.6% were uncertain. Attitudes toward fertility preservation in cancer patients were more consistent, with 83.7% opposing the idea that it should be chargeable. Around 35.1% of respondents were aware that oncopreservation for patients under 18 is legal, but 26.6% were uncertain about the legality of storing oocytes or semen in Poland.

Conclusions: This pilot study highlights a significant lack of knowledge regarding infertility and ART among medical students in Poland. Addressing these gaps through targeted education could enhance the future competence of healthcare professionals in this area. Expanding the study to a larger group could provide more detailed insights and help shape educational interventions. These findings, although from Poland, are likely to be replicated in the UK.

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21. Private-Public Interplays behind IVF Clinical Outcomes

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Category

Other

Sub-Category

Translational

Abstract

Public and private funding varies significantly between and within clinics that provide in-vitro fertilisation (IVF) in the UK. These relative differences explain not only who can afford to access ART treatment, but also how IVF is practiced in terms of managing treatment inputs and trajectories.

Objective: This study explores how a clinic's past experience with publicly funded IVF cycles, an indicator of public-private "hybridity", relates to three important performance indicators at the clinic level: effective management of clinical throughput, clinic compliance with regulatory prerogatives, and patient persistence with IVF treatment.

Methods: We use a longitudinal sample of 88 clinics observed between 2000-2012 that provide us with 826 clinic-years analysed via multiple regression. 35 of the clinics are private clinics and 53 are state-owned clinics (with a majority of IVF treatments still privately-funded). Our main regressor is the accumulated experience with state-funded IVF cycles, used to predict two indicators of clinical performance (success rates and percent of singletons), regulatory non-compliance (average embryos transferred per attempt) and patient persistence (attempts per patient).

Results: We find support that IVF subsidies are a conduit for developing clinic capabilities that maintain high performance (for both treatment success rates and singleton rates) and foster regulatory compliance. There is also a downside to higher experience with IVF subsidies which deserves further attention: lower patient persistence in the face of IVF failure.

Conclusions: We conclude with recommendations for further investigations that would strengthen the above results. Specifically, how publicly funded cycles are managed at the clinic-level compared to patient-funded cycles.

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208. Fertility enhancing herbs and their mechanism of actions

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Objectives: Fertility treatment in low-resource settings has employed phytochemicals, particularly for males with abnormal semen parameters. This is particularly so because of the high cost of assisted reproductive techniques. Herbs are considered safe, effective, cheap, and easily accessible when compared to the other methods. These herbs have different mechanisms of action depending on the activity of the phytonutrient. The study aims to carry out an updated analysis of the leading fertility-enhancing herbs in the low-resource settings of Africa and point out important gaps that may enhance their optimal and practical use.

Methods: A number of basic research work and clinical trials conducted within the last two decades were collated and reviewed. Studies employing phytonutrients to enhance male fertility were carefully selected.

Results/Conclusions: Over twenty herbs were identified, and about eight pathways have been discovered for managing infertility using traditional African herbs. While many herbs utilize a combination of pathways, some rely on a single path in their mechanism of action. This thorough analysis of the potential of male fertility-enhancing herbs in low-resource settings provides a robust foundation for further research and practical application.

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323. A conundrum for gynaecologists – safety of hormone replacement therapy in germ cell malignancy survivors with premature ovarian insufficiency

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Category

Other

Sub-Category

Clinical

Abstract

Background: The incidence of iatrogenic premature ovarian insufficiency (POI) is rising with improvements in cancer treatment in teenage and young women. Oestrogen replacement is recommended until the average age of the natural menopause to minimise the risks of long-term sequelae of POI. However, current guidelines suggest that a small subset of germ cell tumours may be hormone sensitive, and HRT should be avoided on theoretical grounds. This creates a dilemma on what to advise patients.

Objective: This case series includes three patients identified in the specialist Late Effects Clinic at Sheffield Teaching Hospitals. They were survivors of ovarian germ cell malignancy and we discuss their individualised management with HRT for POI.

Results: All three cases developed POI after surgery and chemotherapy. The first case had ovarian stroma test positive for oestrogen receptors with immunohistochemistry (IHC) testing. After multi-disciplinary team (MDT) discussion, she decided to commence HRT. The other two patients had surgery abroad therefore no IHC data was available. One patient opted to

commence HRT in view of significant menopausal symptoms while the other patient opted not to commence HRT due to the unknown risk of oestrogen replacement with ovarian germ cell tumours.

Conclusion: When evidence for best practice is lacking, a holistic and individualised approach is recommended when assessing and advising women. A MDT approach including IHC testing is recommended. A joint decision with the patient should be made on whether they wish to continue HRT or not, after discussing the risks and benefits. Further studies on hormone receptors in ovarian cancers are required to help predict the risk of recurrence.

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225. Estradiol regulates the activity of DNA methyltransferases in luminal and stromal cells of the porcine endometrium

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Category

Uterus

Sub-Category

Basic Science

Abstract

Objective: Early pregnancy establishment requires proper communication between the embryo and the maternal organism. In pigs, maternal recognition of pregnancy occurs between days 11 and 12 of pregnancy. At this time, porcine conceptuses signalize their presence by secreting multiple factors. Estradiol-17β (E2) is considered to be the main embryonic signal in the pig. In our previous studies, we have shown that during early pregnancy, the methylation patterns of some genes are changed in endometrial tissue, which may be related to the regulation of these gene expression. The process of DNA methylation is dependent on DNA methyltransferases (DNMTs). The present study aimed to determine whether estradiol-17β controls the activity of the DNMTs in luminal epithelial (LE) and stroma cells (ST) of the porcine endometrium.

Methods: LE and ST cells were isolated from porcine uterus obtainedfrom gilts (n=6) on day 11-12 of the estrous cycle. LE and ST cells were treated with medium containing E2 (1,10 and 100 nM) and control medium, with or without estrogen receptor antagonist (ICI 182,780). The activity of DNMTs was determined in nuclear protein extracts of endometrial cells using commercially available colorimetric assays. Statistical analyses were performed using one-way ANOVA, followed by Tukey post-test.

Results: Estradiol decreased DNMT activity in LE cells ($p<0.05$) however, in ST cells the DNMT activity was increased in response to E2 treatment ($p<0.05$). Co-treatment with estrogen receptor antagonist reversed the effect of E2 on DNMT activity both in LE and ST cells.

Conclusions: The present results indicate that E2 differentially regulates DNMT activity in LE and ST cells in the porcine endometrium. Our results suggest that DNA methylation in LE and ST cells could be regulated by embryonic signal (E2) during pregnancy establishment and development.

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91. Assessing phthalate effects on gonad development in vitro: distinguishing between biological and physicochemical effects

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Category

Other

Sub-Category

Basic Science

Abstract

Objective: Phthalates are best known for use in plastics and are known to adversely affect reproductive processes, many of which are measured using *in vitro* assays. Phthalates used as plasticisers are strongly hydrophobic with low water solubility. We hypothesised that reported

in vitro phthalate effects on reproductive tissues/cells are influenced by physicochemical properties and that this will influence the interpretation of biological effects relevant to reproduction.

Methods: Di(2-ethylhexyl) phthalate (DEHP) and mono(2-ethylhexyl) phthalate (MEHP) were dissolved in ethanol and then diluted with medium to a known environmental concentration. The final ethanol concentration was 0.1% and in-house methods were developed to measure DEHP and MEHP using HPLC LC-MS and HPLC LC-MS/MS. Day 4 mouse neonatal ovaries and testes were cultured for 5 days in medium alone or supplemented with DEHP or MEHP (n=9 cultures). Media samples for phthalate measurement were collected from three random cultures representative of middle and end of culture period.

Results: ***Ovary cultures:*** In DEHP supplemented cultures, DEHP was detected in 1 of 3 media samples at the end of culture. Notably, DEHP was also detected in 2 of 2 MEHP supplemented media samples from the middle of the culture period. ***Testis cultures:*** In DEHP supplemented cultures, follow up detection was variable. DEHP was detected in 2 of 4 MEHP supplemented media samples at the end of the culture period. DEHP was detected in 1 of 4 control media samples (near limit of detection). No MEHP was detected in media controls. The difference between nominal and measured concentrations of MEHP and DEHP in culture raises questions over the interpretation of biological effects.

Conclusion: Our findings suggest that the interpretation of biological effects of phthalates on reproductive tissues must take into account the physicochemical derived fate and behaviour of the chemicals tested in aqueous solution.

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152. Investigating the impact of prescribed DPPIV inhibitors on endometrial cell viability and spheroids attachment using an in-vitro co-culture model of embryo implantation

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Category

Uterus

Sub-Category

Basic Science

Abstract

Globally, 1 in 6 couples suffer from infertility, with 10% of couples suffering from recurrent implantation failure (RIF). In the UK, around 300,000 women of reproductive age are prescribed drugs, such as DPPIV inhibitors, to treat type 2 diabetes mellitus (T2DM), a common cause of female infertility. DPPIV is significantly upregulated in the endometrium during the window of implantation in fertile women and downregulated in those with RIF. This study aims to investigate the effects of two prescribed DPPIV inhibitors on endometrial cell viability and spheroid attachment using an *in vitro* co-culture model of embryo implantation.

Using a fluorometric enzymatic assay, the inhibitory effect of prescribed DPPIV inhibitors, drug A and B, were tested on endometrial Ishikawa lysate with these respective concentration ranges of 1nM-100μM and 10nM-1μM. Cell viability assay were performed using Presto blue to evaluate the toxicity of drug A & B on Ishikawa cells over time (1hr, 24hrs, 48hrs). Ishikawa endometrial cell monolayers were pre-treated (or not) using the drug-specific concentrations and BeWo spheroids were added to observe the impact of attachment onto them.

Using endometrial cell lysates, drug A reduced endometrial DPPIV enzymatic activity by approximately 55% at the highest concentration of 100μM, while drug B completely inhibited endometrial DPPIV activity at 1μM. No significant change in cell viability was observed using pharmacologically prescribed concentrations from both drugs. However, drug A significantly decreased Ishikawa cell viability across all time points at supra-pharmacological concentrations. Moreover, neither drug had a significant impact on spheroid attachment at the tested concentrations.

These preliminary findings suggest that prescribed DPPIV inhibitors can impair endometrial DPPIV enzyme activity. However, these drugs do not seem to impact attachment *in vitro* at implantation. This study sets the scene for further investigation into DPPIV enzymatic function in endometrial cells during implantation.

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98. Predictive age adjusted models to determine the number of oocytes cryopreserved during elective oocyte cryopreservation cycles

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Category

Oocytes and ovary

Sub-Category

Clinical

Abstract

Objective: To establish whether an adjusted statistical model using parameters such as age, AMH, AFC and FSH can predict the number of oocytes cryopreserved during elective oocyte cryopreservation cycles (EOC).

Material and Methods: A retrospective analysis was performed on all EOC cycles undertaken between 2016-2023. We used a negative binomial regression with log function and estimated parameter. Quasi Likelihood under Independence Model Criterion (QIC) was used to assess goodness of fit amongst the prediction models. Generalised Estimated Model was used to account for patients who undertook multiple cycles. We applied ROC and AUC to determine the model with the best predictive value for the cryopreservation of 10 or more oocytes (considered a good response) and 5 or more oocytes (considered an adequate response).

Results: 1,067 cycles were undertaken by 622 patients. Five different predictive models were created: **1** - Age, AMH, AFC, FSH (QIC 1114.2); **2** - Age, AMH, AFC (QIC 1115.2); **3** - Age, AMH, FSH (QIC 1114.0); **4** - Age, AMH (QIC 1113.5) and **5** - Age, AFC (QIC 1119.1). Model 4 provided the overall best goodness of fit, but only marginally. Model 1 provided the best predictive value for both a good (AUC 0.802, 95% CI 0.775-0.828) and adequate response (AUC 0.797, 95% CI 0.767-0.827), but only marginally from model 2 (AUC 0.801, 95% CI 0.774-0.827 and AUC 0.792, 95% CI 0.762-0.822, respectively).

Conclusions: Patient characteristics such as ovarian reserve can accurately predict the number of oocytes cryopreserved during elective oocyte cryopreservation cycles. The model including age, AMH, AFC and FSH has the most predictive value, almost comparable to the model with age, AMH and AFC.

314. Investigation into the effect of delayed freezing for ovarian cryopreservation

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Introduction: Cancer is the leading cause of childhood disease-related mortality(1). However, 5-year survival rates have reached 80%(2), thus, preservation of fertility by ovarian tissue cryopreservation (OTC) is crucial for prepubertal girls(3,4). In the Danish model, tissue is transported to centralised cryobanks rather than moving patients(5). This necessitates a delay, which we previous demonstrated using sheep ovaries, can actually improve follicle survival and health(6).

Aim: To investigate the effects of prolonged cooling at 4°C on pre-pubertal murine ovaries.

Methods: PND19 mouse ovaries were collected and transported in transport medium (Leibovitz's L-15 with 5%(v/v) FBS, Penicillin/Streptomycin) on ice. At the laboratory, ovaries were immediately (Control; n=6) fixed in Form-Acetic for 24h, or stored in transport medium at 4°C for 12h (n=5), 24h (n=5), 36h (n=5), 48h (n=6) or 72h (n=3) before fixation. Ovaries were embedded, sectioned, and morphology evaluated after H&E staining. Mitochondrial metabolism was evaluated with immunohistochemistry using TOM20.

Results: Ovarian integrity was not reduced in tissues cooled for 48h compared to Control, but was at 72h ($p<0.001$). Correlating follicle diameter and granulosa cell populations of secondary follicles highlighted predictive relationships across all timepoints ($p\leq0.001$), suggesting that reduced ovarian integrity was due to disrupted stromal integrity rather than disrupted intrafollicular structures. Surprisingly, TOM20 was stable within somatic cells of secondary follicles cooled for 24h and 48h, and pre-antral follicles cooled for 36h. However, after 72h TOM20 was decreased within somatic cells of secondary ($p<0.05$) and pre-antral follicles ($p<0.001$). Further, cold storage was more commonly found to reduce the TOM20 in somatic cells than in oocytes.

Conclusions: These data show that prolonged cooling impacts ovarian integrity and metabolism. Understanding the mechanisms and confirming this in human tissues will inform decisions concerning the duration of human tissue transport before OTC.

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268. Do breast cancer receptor and BRCA mutation statuses impact ovarian reserve parameters and response to ovarian stimulation in patients undergoing urgent fertility preservation treatment?

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Background: Breast cancer (BC) patients frequently undergo controlled ovarian stimulation (COS) for fertility preservation (FP). Ovarian reserve markers, namely AMH and AFC, are key indicators of responsiveness to COS. Previous studies have linked tumour grades to COS outcomes, prompting investigations into BC receptor and *BRCA* mutation statuses. However, current findings in these areas are conflicting. The present study aims to investigate associations between BC receptor status, *BRCA* mutation status, ovarian reserve parameters, and COS outcomes in BC patients undergoing urgent FP.

Methods: This study included 164 BC patients and 171 age-matched controls, all aged 21-45, who underwent COS with the GnRH antagonist protocol at a West London fertility centre between January 2012 and April 2024. Primary outcomes were baseline AFC and AMH levels, and total oocytes retrieved. Secondary outcomes included number of mature oocytes retrieved, stimulation duration, and total gonadotropin dose. Statistical analysis involved the Shapiro-Wilk test, unpaired t-test, and Mann-Whitney U test, with significance set at $P<0.05$.

Results: BC patients as a whole, patients with oestrogen-positive (ER+) disease and patients with hormone receptor positive (HR+) disease (i.e. oestrogen and/or progesterone receptor positive) all received greater total doses of gonadotropins, ($p<0.0001$ for all comparisons) and retrieved more mature oocytes ($p=0.00350$, $p=0.00880$ and $p=0.00870$ respectively) when compared to controls. No differences in outcome measures were seen when patients were stratified according to: individual receptor status, BRCA mutation status and across BC phenotypes.

Discussion: The higher gonadotropin doses used in BC patients may reflect treatment/indication bias. Since ER+ disease predominates in both BC and HR+ disease, the observed differences in dosage and mature oocyte yields with controls suggests mechanisms involving oestrogen receptors in treatment response.

Conclusion: Future studies should assess these outcomes in larger populations, considering confounders like tumour grades, and ethnicity, to enhance FP counselling tailored to disease characteristics.

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284. Effect of culture duration on *in vitro* follicle development

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Background: Studying the process of follicle activation and growth with ovary culture can give us a greater understanding of the mechanisms behind follicle development. Multi-stage fertility preservation techniques require the activation and growth of follicles within ovarian tissue culture. However, in previous studies, duration of ovary culture is variable [1] and developing follicles can be yielded after six [2], ten [3] and fourteen [4] days. Understanding when optimum *in situ* follicle development stops can optimise protocol for the isolation and maturation of follicles within multi-step fertility preservation cultures.

Objectives: Investigate how the health and development of follicles changes *in vitro* with duration of culture to optimise yield of competent oocytes.

Methods: Neonatal (P3) whole mouse ovaries were cultured for six (D6), ten (D10) or fourteen (D14) days before being fixed and sectioned. To enable comparison to *in vivo* developed follicles, control ovaries were also collected from mice at D17; D14 of culture. Three sections 100um apart through the centre of each ovary were stained with H&E to determine follicle numbers, classification and health. All follicles transitional stage onwards were considered developing.

Results: The percentage of developing follicles increased with the duration of culture. The percentage of transitional follicles doubled between D10 (2.3±1.3%; n=5) and D14 (5.6±3.5%; n=5) as did the percentage of primary follicles (D10; 0.43±0.26%, D14: 0.77±0.47%). Culture for 14 days did support the health and growth of transitional and primary follicles compared to *in vivo* controls since there was no difference in numbers (p>0.05).

Conclusion: We have established that ovary culture for 14 days supports follicle development to the same degree as *in vivo* controls, thus this culture length using our system can maximise the yield of activated follicles for fertility preservation.

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336. Maternal and fetal outcomes of singleton pregnancies conceived after fertility treatment.

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Introduction: Fertility treatments have been on the rise in recent years. Although the majority of these pregnancies have a normal course, however, literature has shown these pregnancies are at risk of both maternal and fetal complications. (1)

Objectives/Methods: We performed an audit to evaluate maternal and fetal outcomes of 455 pregnancies conceived after various fertility treatments (IVF, ICSI, IUI, and ovulation induction) between January 2021 and January 2024.

We collected a list of patients from medical coding and data were collected from patient electronic records.

Results: Data was collected for 455 pregnancies with maternal age range between 22 - 54 years.

Out of 455 pregnancies , 77% (351) had IVF, 6% (29) had ICSI, 5% (21) had IUI, and 12% (54) had ovulation induction.

Following pregnancy-related complications were noted: GDM 20 %, LGA 8%, PET 4%, FGR 3%, PIH 2 %, SGA 1%, obstetric cholestasis 0.6%.

Placental abnormalities (1%) and congenital abnormalities rates were low.

Mode of delivery included spontaneous labour 20% (out of these 4 % had EMLSCS), 29 % had IOL (out of these 67% had vaginal birth and 2% had EMLSCS). 29 % had ELCS and 16% had EMLSCS.

The total live birth rate of 93 %, preterm birth rate of 7 %, 6.5 %(30) neonatal admissions, and 2 % neonates were transferred to other units.

The most common complication noted at birth was PPH at 14 %.

Birth weight for newborns ranged from 1110 - 4750 grams.

APGAR at 1 minute less than 5 in 10 % of babies and 5 minute APGAR less than 6 in 1.4 % babies.

Conclusion: We noted that maternal and fetal outcomes after fertility treatment appears safe, although the risk of developing GDM, delivery by caesarean section and PPH was high in these pregnancies.

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161. Role of visfatin (Nampt) on the early embryogenesis of normal weight and obese mice

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Objective: Adipokines regulate female reproduction in dependence of animal metabolic conditions. Visfatin/*Nampt* level is upregulated in obesity. Visfatin improves oocyte maturation in obese and old individuals[1,2]. Besides, other adipokines, leptin and adiponectin, are necessary for the proper embryonic development, its lack leads to infertility[3]. The aim of this study was to determine the role of visfatin in the early embryogenesis in normal weight and high-fat-diet induced obese mice.

Methods: *Nampt* mRNA was examined in mice embryos from the 1-cell to the blastocyst stage. Then we silenced the mRNA expression of *Nampt* at the 1-cell stage embryo by siRNA and evaluated: i) embryo development, ii) mRNA of early embryogenesis (*Mater, Nobox, HSF1*), proliferation (*PCNA*), apoptosis (*Caspase 3, Bax, Bcl2*) and blastocyst differentiation (*Oct4, Nanog, Cdx2, Gata6, Sox2, Sox17, Eomes*) markers, iii) the percentage of OCT4, NANOG, CDX2, GATA6 positive cells in the blastocysts, and iv) blastocyst implantation rate and offsprings number. Statistical analysis was performed in GraphPad Prism software.

Results: *Nampt* mRNA abundance was downregulated with the early embryogenesis progression. Visfatin silencing does not affect the percentage of embryos developed, implantation rate and offspring number in normal weight mice. While in obese the percentage of blastocyst was lower. Besides, in normal weight animals lack of visfatin was linked with decreased antiapoptotic *Bcl-2* mRNA expression in the 4-cell embryos, increased *Nanog* mRNA level, and GATA6 positive cells in the blastocyst, while in obese the CDX2 protein positive cells number was decreased, what can lead to decreased trophoblast formation ($n=8$, $p<0.05$).

Conclusion: Visfatin is an important factor in the early embryogenesis especially in obese mice, which indicates that it may play a compensatory role in reproduction during obesity.

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65. Modelling the Mammalian Blastocyst

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Objectives: Computational and mathematical modelling hold the promise to uncover underlying processes governing development of the early mammalian embryo, and thus to develop new, more accurate methods to score blastocysts in the IVF clinic. Surprisingly, there are currently relatively few such models and here I describe my work and recent progress in this area.

Methods: I, along with other members of my group, have developed two complementary models of the very early mammalian embryo, starting from a single fertilised egg and proceeding to the mature blastocyst. These are a cellular Potts model and a vertex model, two well-established models that have been widely used throughout biology and medicine. These models can incorporate realistic biophysical forces and have been fit and validated using real

experimental data, thus maximising their applicability to the real embryo. Importantly, in both models we have included key processes including cell division, differentiation and apoptosis.

Results: Both models can recapitulate the developmental process from a single egg to the mature blastocyst. They shed light on various aspects of early development and make several predictions including:

Conclusions: Our models have demonstrated impressive early success with describing the earliest stages of mammalian development. This could have significant implications for human fertility and IVF treatment, particularly in improving the success rate of embryo selection for implantation. In my future work, I plan to capitalise on this by extending the models, improving parameter values and devising novel tools to aid blastocyst scoring.

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57. Enhancing Fertility Clinic Efficiency and Confidence for Registrars at Princess Royal Hospital through Standardised Protocols.

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Category

Psychosocial

Sub-Category

Clinical

Abstract

Objectives: To enhance the experience for both doctors and patients in the fertility clinics at Princess Royal Hospital (PRUH). There is significant variability among clinicians regarding the criteria used to refer patients from the PRUH clinic for IVF treatment rather than managing them locally. Additionally, registrars often lack confidence in following local protocols for ovulation induction.

Methods: A survey was conducted among 16 ST3-ST7 registrars to identify areas where they felt uncertain, with the aim of developing easily accessible proformas and flowsheets within the EPIC computer system.

Results: Out of the 16 registrars surveyed, 9 (56%) had participated in a fertility clinic at the PRUH, all of which were consultant-led, ensuring robust support. However, 6 out of these 9 registrars (67%) did not feel confident managing fertility patients independently. The survey included questions on unexplained infertility, low ovarian reserve, and male factor infertility. Only 4 out of 16 registrars (25%) correctly identified when to refer a patient for IVF in these scenarios, rather than continuing local treatment. Confidence in following the local ovulation induction protocol was low, with only 6 registrars (37%) feeling capable of prescribing medication and managing luteal phase serum progesterone levels. Half of the registrars (50%) correctly identified when to refer patients for a HyCoSy procedure. All 16 clinicians expressed a need for easily accessible flowsheets on EPIC for procedures like HyCoSy, ovulation induction, and referrals. They also recommended implementing a proforma to assist in history-taking.

Conclusions: To ensure that patients receive the most efficient care with the shortest time to conception, a standardised approach is necessary. The implementation of proformas and flowsheets would not only improve the confidence of clinicians but also enhance the overall experience for patients, leading to better outcomes.

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254. The effect of ketogenic diet on oocyte number and morphology and on oocyte metabolic state in rats.

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Overweight and obesity rates have recently reached epidemic proportions and became a world-wide health problem. Overweight and obesity are the factors contributing to the development of infertility, which has recently increased significantly. Ketogenic diet (KD) became the promising approach to reduce body weight. Nowadays, KD is regarded as valid therapeutic option in various clinical situations including obesity but also impaired fertility. However, studies on the effect of KD on reproductive processes in females are limited. The aim of the present study was to evaluate whether KD may affect the oocyte number and morphology but also their metabolic state in female rats

Female Wistar rats of similar age (12 weeks) were subjected to standard diet (SD; n=10; 10%kcal fat, 20%kckal protein, 70% kcal carbohydrates) or ketogenic diet (KD; n=10; 83.4%kcal fat, 11.1%kckal protein, 5.4% kcal carbohydrates) consumed ad libitum for 12 weeks. Animals were sacrificed at the onset of the estrus phase. Oocytes were collected from the oviducts and the number and morphology was assessed visually. **Sub**sequently, oocytes were stained with JC-1 and Mitotracker in order to evaluate the mitochondrial membrane potential and mitochondrial distribution.

The average number of the oocytes was 32 in rats subjected to SD and 28.75 in rats subjected to KD. The percentage of dysmorphic oocytes in rats fed with SD was 17.90 and was significantly lower than in rats fed with KD (26.56%; $p<0.05$). No differences in mitochondrial membrane potential was observed in animals subjected to SD and KD ($p>0.05$). Greater accumulation of mitochondria in perinuclear zone was observed in oocytes collected from rats subjected to ketogenic diet

Our results indicate that ketogenic diet affects oocyte morphology. Greater accumulation of mitochondria around oocyte nuclei may suggest intensive processes related to DNA modification. Hence, further studies of the effect of ketogenic diet on oocyte physiology are required.

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166. Understanding the functional impact of modulating Luteinizing Hormone Receptor (LHR) oligomerisation in the murine ovary.

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

The gonadotrophin hormone receptor, LHR, is essential for reproductive functions, mediating ovarian follicle growth and steroidogenesis, ovulation, and corpus luteum functions. As a G protein-coupled receptor (GPCR), LHR primarily signals through the Gαs recruitment/adenylyl cyclase/cAMP canonical pathway, however, under conditions of heightened LH concentration and LHR expression, LHR can activate Gαq/11, triggering intracellular calcium release. There is a wealth of evidence that GPCRs exist and function as dimers and higher-order oligomers (homomers), which diversify signal specificity, selectivity and diversifies receptor functions. Our studies have shown that LHR forms and functions as homomers, but how LHR mediates this functional and physiological diversity remains unknown. Our previous work has shown that LHR forms and functions as homomers and with FSHR as heteromers, providing a means to fine-tune signal specificity and magnitude of response. The aim of this study was therefore to determine the effect of modulating LHR homomerization on LH/LHR ovarian functions. Synthetic peptides designed to target specific receptor transmembrane domains (TM1,TM2,TM4,TM5 and TM6) were used to disrupt receptor oligomerisation. Disrupting peptides were shown to inhibit LH-dependent cAMP production. Culture of mouse ovarian fragment in the presence of the disrupting peptides highlighted trends for modulating LH-dependent regulation of EGF mediated pathways, steroidogenesis and inflammatory ovulatory pathways. Additional open follicle cultures demonstrated a shorter time to germinal vesicle breakdown (GVBD), in follicles treated with the disrupting peptides, suggesting a shift towards Gq-mediated activity. Together these data suggest that different LHR homomeric forms can distinctly modulate LH-dependent functions within the ovary fine tuning the response.

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327. Maternal obesity-associated hyperleptinemia compromises trophoblast cell proliferation, migration, and angiogenesis regulation: insights from an in vitro human HTR8 trophoblast model

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Category

Pregnancy outcomes

Sub-Category

Basic Science

Abstract

Background: Maternal obesity (MO) is linked to a higher incidence of pregnancy complications, including preeclampsia, placenta accreta, and gestational diabetes (Poston et al., 2016). The endocrine imbalance observed in obese mothers can adversely affect the development and function of the placenta, ultimately compromising embryo development and the health trajectories of the offspring. Our recent findings showed that hyperleptinemia and increased uterine leptin signalling impaired decidualisation and placental development in obese mice (Walewska et al., 2024). Presently, we explored the impact of increased leptin activity on trophoblast proliferation, migration, and the regulation of angiogenesis in MO.

Methods: human HTR8/SVneo (HTR8) cells (n=6) were treated *in vitro* with leptin (0; 100; 500; 2000; and 10000 ng/mL) for 24 h. We first analysed cell proliferation with MTS-assay, cell migration with wound-healing assay, the transcriptional profile by RNA-sequencing, and protein expression by immunofluorescence staining (IF).

Results: after confirming the expression of SOCS3 and PTPN2 proteins in HTR8 cells by IF, we found that 2000 ng/mL and 10000 ng/mL of leptin treatment upregulated *SOCS3* and *PTPN2* mRNA levels ($p<0.05$). Furthermore, leptin at 10000 ng/mL inhibited HTR8 cell migration ($p<0.05$). The lowest leptin dose promoted cell proliferation, but 10000 ng/mL inhibited the proliferation of HTR8 cells ($p<0.05$). Moreover, RNAseq analysis revealed that 10000 ng/mL of leptin upregulated the transcription of pro-inflammatory genes, including *C3* ($p<0.001$), *IL-8* ($p<0.001$), *CCL2* ($p<0.001$), *CXCL1* ($p<0.001$), and *IL-6* ($p<0.001$), as well as the pro-apoptotic gene *TNFSF14* ($p<0.01$). Both qPCR and RNA-seq analysis showed dysregulated transcription of angiogenic genes, with the upregulation of *VCAM*-1 ($p<0.001$) and *PECAM* ($p<0.05$), and the downregulation of *FGF2* ($p<0.05$).

Conclusions: our findings provide important insights into the molecular mechanisms underlying impaired trophoblast migration, proliferation, and angiogenic activity associated with enhanced leptin signalling in maternal obesity.

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310. Outcome of post chemotherapy semen analysis in men. How many improve?

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Objective: This retrospective study aimed to evaluate the effect of chemotherapy on semen parameters in men with haematological cancer (19 leukaemia, 1 myeloma, 21 lymphoma) and to assess the subsequent need for assisted reproductive technology (ART) for fertility. Previous studies suggest that haematological malignancies lead to increased testicular temperature[1, 2] sperm DNA fragmentation and oxidative stress[3], which negatively affect sperm production and semen quality. However, the effect of chemotherapy on post-treatment semen analysis and the requirement for ART remain unclear.

Method: We reviewed the medical records of 41 men diagnosed with haematological cancers who provided semen samples before undergoing chemotherapy and again at least one year after completing chemotherapy. Semen parameters were analyzed and patients were categorized pre- and post-chemotherapy.

Results: Out of the 41 men, 12 showed significant improvement in semen parameters post-chemotherapy. An additional 12 patients demonstrated normal semen parameters before and after chemotherapy, Conversely, 10 patients had compromised semen parameters before and after chemotherapy. Lastly, 7 men developed worsened semen parameters post-chemotherapy.

Conclusions: Our findings demonstrate that while chemotherapy may improve semen quality in a subset of men with haematological cancer, a significant proportion continues to exhibit impaired parameters post-treatment. Approximately 29% (12/41) of patients improved to no longer need continuation of sperm freezing, while 24%(17/41) had consistently poor parameters including azoospermia 31% (13/41), indicating the need for continuation of freezing. These results highlight the variability in semen recovery post-chemotherapy and suggest that individualised fertility preservation strategies should be considered for men with haematological malignancies.

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76. Psychosocial insights on the consideration phase of the egg freezing journey; The need for clearer information and evidence.

Alexandra Draycott[1], Ruth O Dywer[2], Valerie Shaikly[1]

[1]Egg Advisor, London, United Kingdom. [2]Unfolding Fertility, London, United Kingdom

Category

Psychosocial

Sub-Category

Translational

Abstract

Background and Objective: Despite the global rise in the awareness and uptake of elective egg freezing, limited data exists on women's perceptions and informational needs at the consideration phase. This study aimed to explore the motivations and perceptions of women considering elective egg freezing, identify the gaps and develop recommendations for improved care.

Methods: A self-selected, cross-sectional, anonymous online survey was conducted between March to July 2024 using a questionnaire designed to provide independent information for people actively 'considering freezing'. The survey included Likert scale questions, multiple-choice options, and free-text responses.

Results: Of 35 respondents, 97% cited age-related fertility decline as the primary reason for considering egg freezing, with 27% also stating they were not ready to start a family. 3% shared experiencing fertility problems and wanting to store for future treatment. Although 70% of respondents felt optimistic and 69% believed they understood their fertility, 84% felt overwhelmed, 88% uncertain and 55% confused. Additionally, 71% felt they did not have sufficient information to understand the procedure, and 73% did not feel informed about outcomes. 60% of respondents had a good understanding of the costs involved; however, only 16% felt supported in their emotional decision-making.

Conclusions: While respondents considering egg freezing reported optimism, many felt significant uncertainty and confusion, highlighting the need for clearer, more accessible information. This study demonstrates the importance of novel insights into the motivations and emotions accompanying elective freezing. Further research with a larger sample size is recommended to validate these findings and explore perceptions about the lack of accurate data on egg freezing. Transparency, free from over-promising marketing, is crucial to support elective egg freezers.

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36. Sub-optimal Paternal Nutrition Impacts Foetal Cardiac Health Through Altered Transcriptomic Payload of Epididymosomes

Vipul Batra[1], Hannah Morgan[1,2], Marcos Castellanos[1], Iqbal Khan[1], Sean May[1], David Onion[1], Sonal Henson[1], Nadine Holmes[1], Victoria Wright[1], Adam Watkins[1]

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Objectives: Links between poor paternal diet and impaired offspring cardiovascular health have been identified. However, the mechanisms through which paternal programming occurs has still to be defined. To investigate whether epididymosomes and their non-coding RNA cargo might play a role, we compared epididymosome miRNA content with differential gene expression patterns in foetal hearts from the male mice fed sub-optimal diets prior to conception.

Methods: Male C57/BL6J mice (n=8/group) were fed either a low-protein (LPD: 9% casein, 24% sugar, 10% fat), Western (WD: 19% casein, 34% sugar, 21% fat) or control diet (CD: 18% casein, 10% fat, 21% sugar) for 8 weeks before mating with virgin female C57/BL6J (fed standard chow). Embryonic day 17.5 (E17.5) foetal heart gene expression was assessed by microarray (Clariome S Assay, Applied Biosystems). Stud males were culled for the isolation and enrichment of caput and cauda epididymosomes prior to sncRNA-Seq (NextSeq500 platform, Illumina).

Results: We identified diet-specific profiles of epididymosomal miRNAs and late gestation foetal heart mRNAs. Interestingly, we observed a significant overlap between the predicted targets of the differentially expressed epididymosome miRNAs (DEmiRs) and differentially expressed mRNA genes (DEGs) in the foetal hearts. The common transcripts between the potential gene targets of the epididymosome DEmiRs and foetal heart DEGs were predicted to be involved in crucial processes including modulation of transcription and translation (LPD), embryonic development and apoptosis and intercellular signalling (WD)

Conclusion: Dietary altered transcriptomic payload of epididymosomes may provide one mechanism through which poor paternal nutrition can influence foetal cardiac development potentially affecting long-term offspring health. However, further studies are required to elucidate their exact functional roles in development and offspring health.

266. From the flow hood, to the kitchen table: A case study on changing the workspace in Clinical Embryology

Millie kanani, Emma Whitney

The Evewell, London, United Kingdom

Category

Other

Sub-Category

Translational

Abstract

The Covid-19 pandemic necessitated an immediate re-evaluation of traditional working environments, and working from home became a lasting norm for many industries. For many, the concept of embryologists working from home seems impossible due to the time specific hands-on tasks required. However advancements in remote access, digital communication platforms, and specifically timelapse imaging systems have opened new possibilities.

The aim was to explore the viability of a rota system where an embryologist performs critical tasks from home, not just admin tasks, but participate in progressing the clinical workload. It is important to ensure that any new rota did not put further burden on those working at the clinic; would not impact success or workload efficiency, and actively supports staff well-being. Workplace stress is a global risk factor, and recent publications from France, Spain, USA and UK all agree that increased stress within the fertility laboratory setting, is resulting in burnout. The hours are long, the isolation of the lab is hard and the anxiety that this group of professional experience is only increasing. Furthermore, patient expectation has never been higher, in part driven by easily accessible information online.

Since 2021, the rota at The Evewell has undergone much development, responding to the needs of the clinic, as well as the needs of the staff. Embryologist tasks were grouped into 'lab based' and 'non-lab based', and designated to specific roles within the rota. The work from home role developed into one that included all embryo grading and related patient calls, consultations, reviewing genetic results and responding to internal and external communication.

Remote working for embryologists is feasible. We have discovered a way to maintain our

commitment to creating life whilst caring for our own; safeguarding the care of patients but also improving the lives of the professionals who make it possible.

RF3 Rapid Fire Poster Session

28. Differential expression of RNA in human sperm separated into normozoospermia and asthenozoospermia groups

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Background: Asthenozoospermia is a common cause of male infertility, diagnosed through routine semen analysis (<30% progressive sperm motility). However, the underlying causes are still unknown. Sperm utilise various metabolites to generate ATP necessary to sustain motility. Our previous study showed differences in the metabolome of high- and low-quality sperm (separated by density centrifugation) from men diagnosed with normo- and asthenozoospermia[1]. Metabolite utilisation is governed by the activation or inhibition of specific pathways which in turn are regulated by changes in RNA expression. In this study we utilised sequencing and bioinformatic analysis to identify RNAs which were differentially expressed between normo- and asthenozoospermic samples.

Methods: Human sperm from 8 healthy donors was obtained and screened for motility and concentration using CASA and defined as either normo- or asthenozoospermic, cDNA libraries were generated and sequenced. Bacterial and somatic cell contamination was estimated using gram-staining and PCR. Differential expression analysis and Gene Set Enrichment Analysis (GSEA) was performed on normalised gene counts using Galaxy (usegalaxy.org) and R (cran.r-project.org), respectively.

Results: High quality sequencing data was obtained from 7 of the 8 samples (one removed due to low alignment and mapping). 21 differentially expressed genes were identified between the normo- and asthenozoospermic samples ($p_{adj}<0.05$). These were associated with metabolism (PGAM2, PDHA2), motility (MNS1, LDHC, ARMC12, CFAP120) and fertilisation (GLIPRILI, SPACA3). GSEA also identified an enrichment in pathways associated with motility (including GO:0030317 Flagellated Sperm Motility), transcription (including GO:0001216 DNA-binding transcription activator activity) and fertilisation (including GO:0048240 Sperm Capacitation).

Conclusion: Impaired sperm motility potentially occurs at the spermatogenesis stage, with down regulation of genes associated with flagellum movement and energy metabolism pathways. Recent studies suggest that mitochondrial ribosome activity was responsible for protein abundance, and cytoplasmic ribosomes remain debated[2]. Further work continues to determine whether our observed changes occur with the testes or post-ejaculation.

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315. Comparison of live birth rates following single blastocyst transfer using GnRh agonist versus hCG trigger- a multicentre retrospective study

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective: The GnRh agonist trigger has revolutionized the practice of ART by decreasing the risk of OHSS[1]. However, there is evidence that live birth rates following fresh transfer with the agonist are significantly decreased due to a deficient luteal phase[1]. Despite significant developments to intensify the luteal support, there is still an ongoing debate on whether fresh embryo transfer would be optimal following an agonist trigger[2,3]. This analysis investigates the live birth rates following single blastocyst transfer with a GnRh agonist trigger and luteal rescue with 1500 IU hCG versus hCG trigger.

Methods: This was a multicentre retrospective study conducted at 13 ART centres across the UK. We included all women who underwent ART on the Antagonist protocol with a single blastocyst transfer between 2017 and 2023. The study population was divided into two groups based on the trigger for oocyte maturation. The primary outcome was live birth rate per embryo transfer. Logistic regression was used to adjust for relevant confounders, such as, age, BMI, embryo quality and endometrial thickness.

Results: A total of 10,794 cases were included in the analysis. The live birth rate was found to be significantly higher in the agonist group (42.3% vs. 30.6%; OR 1.66; 95%CI 1.5-1.9) as compared to the hCG group. The odds of achieving a live birth remained significantly higher in the agonist group after adjustment of predicted confounders (aOR 1.46; 95%CI 1.3-1.7). The miscarriage rate was found to be significantly lower in the agonist group as compared to the hCG group (5.3% vs 8.6%; OR 0.59; 95%CI 0.4-0.8). There was no significant difference in the rates of OHSS between the two groups (OR 0.44; 95%CI 0.09-1.96).

Conclusion: Fresh embryo transfer may be considered in ART cycles with an agonist trigger. The results need to be validated in larger prospective randomized trials.

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132. miRNA 151a – Exposing a Conserved Contender In Implantation: Incorporating A Flow based Approach

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Category

Uterus

Sub-Category

Basic Science

Abstract

We have previously determined a panel of core microRNA families originating at the evolution of placental mammals that are important for implantation in mammals. Specifically, we have shown hsa-miRNA-151a-3p and hsa-miRNA-151a-5p alter the ability of endometrial epithelial cells to facilitate implantation in a static in vitro model of implantation. However, these current implantation models are static in nature and do not mimic physiological consequence nor effective and high throughput prompt data collection practice. We aimed to investigate if these miRNAs functionally affected implantation, through both a) physiologically appropriate b) high throughput systems.

We have developed an assay, with the addition of a physiological like flow system using the IBIDI µ-Slide VI 0.4 ibiTreat as well as a more high-throughput assay using the fluorescently labelled spheroid approach. Human endometrial epithelial cells were transfected successfully with both a miRNA 151a-3p and 5p mimic and inhibitor, under static conditions for 48 hours and

then placed under flow for 24 hours. qPCR data identified increased expression of miRNAs following transfection ($P<0.05$). Following addition of BeWo spheroids under flow for 24 hrs post transfection, miRNA151a-5p mimic decreased implantation by 56% whilst miRNA 151-5p inhibition increased attachment by 13.6%, both relative to relevant non-targeting controls. Whilst preliminary, these data show an inverse effect of miRNA 151a-5p on implantation with cells placed under physiological flow. This replicated the impact observed in our static system.

When run as a time matched, static, high-throughput fluorescent based assay data showed no significant changes in attachment with miRNA 151a-3p transfection, however miRNA 151a-5p inhibition caused a significant decrease in percentage attachment, as previously shown. Collectively our data demonstrate the important role of miR151-3p and -5p in implantation in humans as well as more physiologically relevant and high throughput models to test the functional effect of molecules in implantation.

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72. The influence of female age and endometrial thickness on endometrial receptivity

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective: Displaced window of implantation (WOI) refers to a phenomenon where the receptive endometrial phenotype is reached before/after the standard timing. If embryo transfer (ET) is performed at the standard WOI timing in women with a displaced WOI, this may result in implantation failure. Endometrial receptivity analysis (ERA) determines whether the uterine lining is receptive to embryo implantation; this allows clinicians to perform personalised ET (pET) at the optimal time, thus improving clinical outcomes. We investigated whether female age or endometrial thickness are associated with changes to the timing of the WOI.

Materials & Methods: Retrospective data analysis of 1,683 ERA cases reported January 2018-July 2024. RNA was extracted from endometrial biopsies and processed by next generation sequencing (NGS), analysing 248 genes involved in endometrial receptivity. ERA results were given by a computational predictor as receptive or non-receptive (displaced WOI), based on each sample's transcriptomic signature. Only first endometrial biopsy cycles were included, where a hormone replacement therapy (HRT) protocol was applied, with biopsy timing between 115-126 hours post first progesterone intake (P+5).

Results: ERA testing revealed a decreasing trend in endometrial receptivity at P+5 with increasing female age (receptivity per age group: ≤35: 70.75% [341/482]; 36-38: 69.81% [289/414]; 39-41: 65.90% [288/437]; ≥42: 57.43% [201/350]). This finding was statistically significant ($p<0.001$). Furthermore, significant variations in receptivity were found between patient groups with different endometrial thicknesses. Patients with atrophic (<6mm) or hypertrophic (>12mm) endometria had statistically significant shifts in receptivity versus those with thickness within the normal range (6-12mm): 44.44% (8/18) vs. 56.99% (53/93) vs. 67.30% (1,058/1,572), respectively ($p=0.02$).

Conclusions: These results suggest that WOI displacement could be more frequent in older women and patients with endometrial thickness that falls outside the normal range.

155. Assessment of an immunological sperm separation method for use in bulls

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Royal Veterinary College, London, United Kingdom

Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Background: An effective method of sperm sex separation would have wide ranging application from livestock breeding to the study of sex-linked diseases. Previous reports identified the X-linked toll-like receptors 7 and 8 (TLR7/8) as useful targets for immunological sperm separation in animals using the TLR7/8 ligand Resiquimod (R848) to suppress X-sperm motility.

Aims: To assess TLR7/8 as targets for the separation of X- and Y-bearing spermatozoa.

Experiment 1
Thawed bull sperm were washed and fixed with 50:50 Acetone:Methanol for immunocytochemistry analysis. TLR7 expression was localised to the equatorial region of the sperm head.

Experiment 2
Thawed bull sperm were swum up in 0μM, 0.03μM or 0.3μM R848 supplemented medium for 60 minutes. The 'upper' 500uL and 180uL 'pellet' of medium were used for IVF. There were no significant differences in fertilisation rate across the 0.03μM [Control Upper: 77±6%; Control Pellet: 59±8%; R848 Upper: 59±11%; R848 Pellet 48±5% (n=3; mean±SEM)] or 0.3μM [C-Upper: 80±4%; C-Pellet: 65±2%; R-Upper: 41±11%; R-Pellet: 45±3% (n=2)] treatment groups, except for a significantly lower fertilisation rate in the 0.3μM R-Upper group compared to the 0.3μM C-Upper group ($p<0.01$; one-way ANOVA).

Experiment 3
DNA from individual embryos was extracted and embryo sex determined via endpoint PCR using primers to the *Amelogenin* gene. After sexing with 0.03μM R848 most embryos were male in both the R-Upper (82±27%, n=2) and C-Upper (85±10%, n=2) groups.

Experiment 4
When R848 supplementation was added during IVF the fertilisation rate was poor in both 0.03µM [Control: 80%; R848: 10%] and 0.3µM [Control: 82%; R848 0%] R848 groups.

Conclusions: Short-term R848 exposure did not appear to be detrimental to sperm health, although exposure during IVF should be avoided. Analyses are ongoing to assess the seperation efficiency and its application in other animal species.

SP1A ARCS Andrology Iwan Lewis-Jones Prize Session

46. Semen analysis outcomes of varicocele repair in non-obstructive azoospermic patients

Isabel Dighero[1], Giovanni Chiaraco[1], Anthony Emmanuel[2], Majid Shabbir[2], David Ralph[1], Philippa Sangster[1]

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Introduction: Nonobstructive azoospermia (NOA) is a complete absence of sperm due to the failure of spermatogenesis (1). It is the most severe condition on the spectrum of male infertility, affecting 10% of infertile men. Varicoceles, associated with progressive testicular damage and infertility, are found in approximately 5% of men with NOA (2). Whilst it has been show that repair of varicocele can induce spermatogenesis and increase sperm retrieval rates, the role of varicocele repair for patients with NOA remains to be fully understood.

Methods: We performed a retrospective observational review of patients with a clinical diagnosis of NOA and varicocele who underwent varicocele embolization and/or ligation between January

2017 and May 2023 in two large tertiary referral units. Data was collected from electronic records on demographics, hormone levels, semen analysis and surgical outcomes.

Results: 85 patients were included (median age 35.12 years). 73 (85.8%) underwent embolization, while 12 (14.9%) underwent ligation. 45 (53%) patients had additional infertility factors. A semen analysis was repeated after an average of 4 months, revealing the presence of sperm in 16 patients (24.2%). In 76.5% of symptomatic patients, symptoms related to varicocele improved following treatment. Of the patients who underwent microdissection testicular sperm extraction (mTESE), sperm was successfully detected in 42.2% of cases.

Conclusions: Repair of varicocele can return sperm to the ejaculate of men with NOA identifiable on post-op SA and at mTESE, and therefore has the potential to restore fertility. However, results should be interpreted with caution as varicocele repair does not stimulate spermatogenesis for most NOA patients with a varicocele identified. Work is now being undertaken to establish live birth rate in this cohort.

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240. Comparison of rapid sperm freezing to a novel vitrification method.

Anita Tran[1], Alison Campbell[2], Giles Watts[1], Sue Montgomery[2]

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Introduction: The standard method for human sperm cryopreservation uses toxic permeating cryoprotectants and a rapid method of suspension over liquid nitrogen vapour to gradually but uncontrollably reduce the temperature. While acceptable survival is achieved, it has remained at around 50% for many years, and little is known about the impact of permeating cryoprotectants on the viability of the sperm.

Methods: 11 samples were each split into two aliquots and cryopreserved by two Methods: a standard rapid freeze protocol, using SpermFreeze™ media (Microm) containing glycerol as a permeating cryoprotectant and a novel vitrification protocol. For the rapid freeze, the manufacturer's guidance was followed: semen was diluted 1:0.7 with the freeze media, loaded into CBS straws, sealed and suspended over liquid nitrogen for 20 minutes before plunging. The vitrification media comprised of HTF media (Fujifilm) with 0.1M trehalose (Sigma) and 0.1% HSA (FujiFilm). After semen was diluted 1:1 with the media, it was loaded into a shortened CBS straw and then submerged in a pre-cooled rapid-i™ straw (Vitrolife) and plunged. Full details of the warming procedure will be provided.

Results: Due to a difference in freeze volumes and dilution factors in each arm, it was not possible to compare motile concentration between the two groups post-thaw/warm. Therefore, survival was compared between the two groups by calculating a motility index (% progressive motility x velocity/100). There was no significant difference in the motility index post-thaw/warm in the 2 groups, with an average of 4.21 and 3.01 in the rapid freeze and vitrification groups, respectively (p=0.098).

Discussion: This novel vitrification technique achieved comparable survival rates across the 11 samples without the use of permeating cryoprotectants. This is a promising approach to improving the process of sperm cryopreservation without the need for toxic solutions.

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163. Obese and overweight sperm donors; do high BMIs impact recipient outcome?

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Objective: To investigate whether there is a correlation between high sperm donor BMI and patient treatment outcomes, with the aim of determining if BMI should be considered as an eligibility criterion to improve recipient outcomes.

Methods: All sperm donors, recruited by a UK networked clinic sperm bank, utilised in treatments from 2010-2024 were classified into five internationally recognised BMI categories. BMIs were recorded at recruitment alongside clinical assessment and semen analysis.

All cycles involving recipients under 38 years, with BMI <30 kg/m^2, undergoing fresh transfer or IUI were included. FETs and cycles cancelled before transfer/IUI were excluded. Outcome measures included fertilisation rates, clinical pregnancy, live birth, and miscarriage rates, analysed using Fisher's exact test.

Results: Outcomes of 1299 fresh IVF treatments and 1401 IUIDs, from 310 sperm donors, showed that 2PN fertilisation, CPR, LBR and miscarriage rates of 'obese' (30-39.9kg/m2) and 'overweight' (25-29.9kg/m2) donors were not statistically significantly different to those in the 'healthy' weight (18.5-24.9kg/m2) donor **Category** (p=0.05).

In each obese (94 ETs, 164 IUIDs), overweight (679 ETs, 627 IUIs) and healthy (512 ETs, 609 IUIDs) **Category**, fertilisation rates of 77.4%, 74.4%, 74.1%; CP/ET of 56.4%, 52.1%, 50.3%; CP/IUID of 18.9%, 18.8%, 18.9%; LB/ET of 53.2%, 48.2%, 47.1% and miscarriage rate 3.6%, 7.4%,7.0% were found, respectively.

Three 'underweight' donors (BMI<18.5kg/m2) were excluded due to insufficient data, and there were no 'severely obese' donors (BMI≥40kg/m2).

Conclusions: This analysis suggests that treatment outcomes are not influenced by sperm donor BMI, indicating that BMI may not be a necessary eligibility criterion for potential donors. However, due to the inability to account for all confounding variables, further studies incorporating logistic regression analysis are recommended. For this donor bank, detailed semen analysis and health assessments, irrespective of BMI, will continue to be the primary focus for donor eligibility.

140. The Battle of the computer-assisted semen analysis (CASA) systems

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Introduction/Objective: Evaluating semen quality is vital for diagnosing male infertility and guiding assisted reproductive technologies (ART). Traditional manual semen analysis, based on World Health Organisation (WHO) guidelines, involves subjective assessments of sperm concentration, motility, and morphology. However, this method is time-consuming and prone to human error, leading to variability. Recently, computer-assisted semen analysis (CASA) systems have emerged as alternatives, offering automated, objective, and reproducible evaluations. This study compares the performance of manual semen assessment with three CASA systems: CASA Lite (ExSeed), Lenshooke (Bonraybio), and SAMI (Andrology Consulting).

Methods: Between May and June 2024, 25 patients at a single centre consented to using their semen samples for training and validation. Semen assessments were performed according to WHO 2021 criteria by two trained scientific staff. The samples were simultaneously processed by all three CASA systems, with results recorded, verified, and anonymised. The manual assessment results were reported to patients, who could also request the CASA results.

Results: The mean percentage error compared to embryologist assessments for concentration was -21.29%, -29.69%, and +15.38% for CASA Lite, Lenshooke, and SAMI, respectively. CASA Lite and Lenshooke showed strong correlations with embryologist assessments of motility (Spearman's r=0.77 and 0.87), while SAMI showed a very strong correlation (r=0.87). Agreement

on overall diagnoses of "normal" or "abnormal" was fair, substantial, and moderate for CASA Lite, Lenshooke, and SAMI, with Cohen's Kappas of 0.29, 0.77, and 0.50.

Conclusions: The SAMI system was the most accurate compared to manual assessment, possibly due to using the same visuals. Bias in other systems might arise from using different slides, potentially introducing systematic errors. Non-systematic bias suggests random error, likely with manual counting, emphasising the need for systematic validation to prevent diagnostic errors.

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302. Males at risk of recurrent miscarriage can be accurately identified using a combination of alkaline and neutral sperm DNA fragmentation damage comet assays

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Objectives: This study aimed to explore the relationship between sperm DNA damage (SDF) and recurrent miscarriage by using two variants of the sperm comet assay tests: Exact® alkaline and Extend® neutral SDF tests (both from ExamenLab, Belfast, UK).

Methods: A total of 125 fertile donors and 100 patients with a history of spontaneous recurrent miscarriage provided semen samples for evaluation using both the Exact® test for total DNA fragmentation and also with the Extend® test for double strand DNA breaks only.

Results: Exact® demonstrated an area under the ROC curve (AUC) of 0.714, indicating a moderate ability to differentiate between fertile donors and miscarriage patients based on

sperm DNA integrity. In contrast, the Extend® assay showed a higher AUC of 0.890, suggesting a stronger predictive capability for miscarriage risk. To enhance the predictive power, both test results were combined using a logistic regression model, yielding an improved AUC of 0.921. This method provides the result in the form of a probability score, whereby 0.0 indicates no probability of miscarriage and 1.0 indicates very high probability of miscarriage (with 0.5 representing an equal probability of fertility/miscarriage).

Conclusion: This combined approach highlights the value of integrating the results of different SDF damage comet assay tests to accurately predict the risk of miscarriage. These findings suggest that SDF damage, as assessed by both neutral and alkaline comet assays, can serve as an important biomarker for evaluating reproductive health. The study emphasises the potential utility of assessing SDF damage by combining alkaline and neutral sperm comet assays in clinical practice to identify individuals at increased risk of miscarriage, warranting further validation in larger, more diverse cohorts.

SP1B BFS Early Career Clinician Prize Session

190. Female Fertility and Fertility Preservation: The Male Perspective

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Category

Psychosocial

Sub-Category

Clinical

Abstract

Introduction: Studies have shown that the majority of women are aware of ovarian reserve testing and fertility preservation. Additionally, the majority of women would consider undertaking oocyte vitrification to preserve fertility (1, 2). Data, however, around the views of men in the general population or about male partner's views on ovarian reserve testing and on female fertility preservation are lacking.

The objective of this study was to examine the male perspective on parenthood, ovarian reserve testing, and female fertility preservation.

Methods: A cross sectional survey was created using an online forum consisting of 32 questions. Men aged over 18 years old in the general population were eligible to participate after giving informed consent. The survey was disseminated through social media and a national online media publication.

Results: In total there were 277 responses. There were responses from all age groups. 51% of respondents were <40 years old.

85% of respondents believed parenthood was a priority.

76% of respondents were aware of ovarian reserve testing and 97% of respondents were aware of oocyte cryopreservation. 89% of respondents were supportive of a partner undergoing ovarian reserve testing and 84% of respondents were supportive of a partner undergoing oocyte vitrification. Responses were similar across all age groups, but awareness and support levels for ovarian reserve testing were lower in single men compared with men in relationships (58% vs 78% p=0.01 and 75% vs 90% p=0.01)

When asked about their likely reaction if their partner had a low ovarian reserve, 70% of respondents would prioritise family and fertility treatment over career issues and 64% of respondents would support oocyte vitrification.

Conclusions: Men's knowledge and awareness of ovarian reserve testing and oocyte vitrification is high and has improved over the past decade. They view parenthood as a priority and they are supportive of fertility preservation.

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318. The use of Machine Learning to predict Assisted Reproductive Technology treatment outcomes

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objectives: To develop a predictive model using various statistical and machine learning (ML) techniques to predict Assisted Reproductive Technology (ART) treatment outcomes, specifically clinical pregnancy and live birth, using (1) pre-treatment variables and (2) pre-treatment and treatment variables.

Methods: Patients that underwent their first ART cycle with a fresh embryo transfer between January 2022 and December 2022 were included in this retrospective study. Predictive ML models were developed on a sample of 242 first-time treatment couples using various linear and non-linear methods, including penalised logistic regression (LR), Random Forests (RF), AdaBoost using pre-treatment (e.g., age, anti-Mullerian hormone levels, body mass index, parity) and treatment variables (e.g., number of eggs collected, embryo quality, and number of embryos transferred). The models were trained and tested using an 80-20 split, with 10-fold cross-validation performed to tune hyperparameters. Model performance was evaluated using metrics such as Area under the receiving operator curve (AUC), F1-score, and balanced accuracy. Interpretability methods were applied to identify key predictive variables.

Results: RF-based models demonstrated the highest performance, with a balanced accuracy of 0.61, an AUC of 0.59, and F1 score of 0.48 for predicting clinical pregnancy, and a balanced accuracy of 0.65, an AUC of 0.77, and an F1 score of 0.48 for predicting live birth when both pre-treatment and treatment variables were used in the model. The best-performing linear models demonstrated a consistent performance across training and test sets, suggesting potential

generalisability to other datasets. Incorporating treatment variables improved the AUC performance of both linear and non-linear models by an average 12%.

Conclusion: Predicting ART outcomes using ML remains challenging, even when treatment data are used, due to the heterogeneity within the dataset. Expanding the dataset with additional relevant variables and external validation of the model is required to improve model performance and demonstrate clinical applicability.

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344. The Hidden Hazards of IVF: Are hospitalisations unseen and under-reported?

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Category

Other

Sub-Category

Clinical

Abstract

Introduction

As IVF cycle numbers rise, invariably clinical complications will too (1). Most providers in the private sector lack resources to offer hospitalisation; patients inevitably present to the NHS. Regardless of admission site, all serious adverse events require 12-hour HFEA reporting from identification, triggering host investigation (2).

We identified a notable rise in acute admissions of women with significant sequalae of fertility treatment, prompting exploration.

Objective: Clarify our experience of fertility treatment complications.

Highlight the nature of admissions and their severity.

Methods:

A retrospective tertiary NHS Trust review (July 2021 – June 2023) of acute gynaecology admissions following fertility intervention and case-series analysis was performed.

Results: 61 patients were admitted following fertility intervention with median age of 35-years-old (range 21-46-years-old). Fertility treating centre was the NHS provider for 23% (n=14/61), a UK private provider for 72% (n=44/61) and non-UK provider for 5% (3/61). Treatments were IVF 83.6% (n=51/61), medical fertility preservation 3% (n=2/61), elective/social fertility preservation 6.5% (n=4/61) and 1.6% (n=1/61) for each egg donation, ovulation induction, hysteroscopy, and Hystero-salpingo-contrast-sonography.

Admission ranged from 1-26 days (median=3). Diagnoses included moderate/severe OHSS 28% (n=26/61), pregnancy complications 18% (n=11/61), pelvic haematoma 11% (n=7/61), pelvic infection 11% (n=7/61), non-specific abdominal pain 6.5% (n=4/61) and urinary retention 3% (n=2/61).

All patients requiring escalation were admitted from private fertility providers, requiring pregnancy complication surgery 11.5% (n=7/61), OHSS-related compartment drainage 4.5% (n=3/61), intensive care admission 3.3% (n=2/61) and laparoscopic/ultrasound-guided drainage of infection 3.3% (n=2/61).

Conclusion: Case-by-case review revealed prolonged admissions, significant intervention, long-term morbidity, psychological and subfertility impacts of fertility treatment.

Transparency and regulation could clarify the true incidence of treatment complications, ensuring responsible reporting and practice. Holistic, Montgomery patient consent with education of reporting requirements would empower women's autonomy.

Guidance for acute providers is recommended, with an argument for a direct, national reporting system.

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337. Increased inflammation and altered immune function: novel findings in bone marrow adipose tissue from a pre-clinical model of polycystic ovary syndrome (PCOS)

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Category

Endocrinology

Sub-Category

Basic Science

Abstract

PCOS is a lifelong disease, and it is recognised that adipocyte tissue dysfunction is inherently linked to its pathophysiology. There are three main fat depots in the body: **Sub**cutaneous adipose tissue (SAT), visceral adipose tissue (VAT) and bone marrow adipose tissue (BMAT). In women with PCOS the SAT has larger adipocytes and increased inflammation. This is recapitulated in sheep that have been prenatally programmed to develop the hormonal/metabolic phenotype of PCOS[1]. PCOS-sheep can also be used as a clinically realistic model to examine other fat depots that are more difficult to access and in VAT there was no increase in inflammatory markers or adipocyte size. As the structure and function of BMAT in PCOS has not been examined we aimed to assess this in PCOS-sheep.

Pregnant Scottish Greyface sheep were treated with testosterone propionate or vehicle control from day 62 to 102 of pregnancy. The female offspring exposed to increased prenatal androgens in utero develop the features of PCOS. BMAT was collected from adult offspring at 30 months of age (PCOS-sheep n=4; Control n=6) and frozen for assessment of gene expression and then fixed for histological analysis.

The size of BMAT adipocytes was not significantly increased in PCOS-sheep when compared to controls (P=0.31). PCOS-sheep had increased expression of the inflammatory markers *TNF* (P=0.0128), *IL6* (P=0.0013) and *CD68* (P=0.0206). This suggests that BMAT displays features of both SAT and VAT. RNAseq of BMAT with Ingenuity Pathway Analysis highlighted significant increases in activation, recruitment and degranulation of leukocytes and metabolism of reactive

oxygen species, recruitment and migration of phagocytes and the immunogenic cell death signalling pathway.

These results suggest that in PCOS immune cells may be developing in a more inflammatory environment and they show functional alterations. This suggests a possible mechanistic link to the systemic adverse inflammatory environment in PCOS.

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47. The association between periconceptual maternal dietary patterns and miscarriage risk in women with recurrent miscarriages: a multicentre cohort study

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Objectives: To examine the association between periconceptual maternal diet and miscarriage risk among women with recurrent miscarriages.

Design: Prospective multicentre cohort study (Tommy's Net).

Setting: Three university hospital research centres in the United Kingdom.

Population: 1,035 women with a baseline history of two or more miscarriages.

Methods: We analyzed baseline dietary data from a 10-item Food Frequency Questionnaire (FFQ). For individual food Category analyses, we used multivariable Poisson regression following adjustment for maternal confounders and paternal dietary patterns. For whole diet analyses, ordinal principal component analysis (PCA) was used to identify common dietary patterns. Results were presented as relative risks (RR) with 95% confidence intervals (CI) and accompanying _p_-values.

Main Outcome Measures: Miscarriage rate, defined as the rate of spontaneous pregnancy loss (<24 weeks of gestation) relative to the total number of pregnancies (miscarriages and live births).

Results: High consumption of fruit and nuts (almonds and walnuts) was strongly associated with lower miscarriage risk (fruit RR 0.69, 95% CI 0.54 to 0.89, p=0.004; nuts RR 0.73, 95% CI 0.54 to 0.98, p=0.039). High red meat intake was associated with an 86% increase in miscarriage risk (RR 1.86, 95% CI 1.10 to 3.16, p=0.022). The association with miscarriage risk was unclear for other food groups, including fresh vegetables, white meat, fish, dairy, eggs, soya, and chocolate, due to imprecise point estimates. Through PCA, we identified three data-derived dietary patterns. Yet, no distinct relationship emerged between these dietary patterns and miscarriage risk.

Conclusions: A maternal diet rich in fresh fruits and nuts, but limited in red meat, is associated with a decreased miscarriage risk among women with a history of recurrent miscarriage.

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45. On the varicocele enigma: semen analysis outcomes in patients undergoing varicocele repair via surgical ligation or embolization

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Introduction: Varicocele has been established as a cause of impairment of spermatogenesis, however, the clinical benefit of repairing varicoceles remains controversial (1). Further, whether radiological embolisation or surgical ligation produce differing results remains contested (2). We aim to compare parameters of semen analysis (SA) pre- and post- either embolisation or ligation for repair of varicocele disease.

Methods: An observational retrospective cohort study was carried out in patients undergoing repair of varicocele via embolisation or ligation from January 2017 to April 2024 across two clinical centres. Included patients performed SA before and at 3-12 months after intervention. Primary outcomes were pre- and post-intervention SA parameters (concentration, motility, morphology). Statistical comparison of these parameters was performed using the Wilcoxon-Signed and Fisher's Exact tests. Adjusted p-values were generated using a linear mixed effects model.

Results: 166 patients (mean age 35yrs) underwent varicocele repair (43 ligation and 123 embolisation). 37 patients (22.3%) had received hormone therapy and 65 (39.2%) had other fertility risk factors. Median time to post-intervention semen analysis was 5.7 months (IQR 4-7.9). We identified a significant improvement in semen concentration, motility and morphology post-intervention ($p<0.0001$). This remains true when adjusting for hypogonadic patients who received hormone therapy ($p < 0.001$). **Sub**-group analysis identified no meaningful difference in semen outcomes between embolisation (mean change 5.95, standard deviation 19.9) and ligation (mean change 1.4, standard deviation 17.1).

Conclusions: Treatment of varicocele results in improvement in SA parameters, with a reduction in azoospermia and oligospermia patient numbers. This is true even when accounting for the benefit of hormone therapy for spermatogenesis. Regarding approach, there is no significant difference in SA outcomes from embolisation versus ligation. We add to growing evidence that varicocele repair is of benefit for improvement in semen parameters. Further, that embolisation is not an inferior approach for semen outcomes as traditionally believed.

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SP1C Nursing and Psychosocial Including BFS Nurse Prize Session

94. Artificial intelligence (AI) and digital health technology in fertility clinics: current practices, willingness and intentions for future implementation

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objectives: AI and digital health technologies in ART are gaining growing interest worldwide. Their potential use in several treatment stages, including gamete analysis, embryo selection, and prognostic predictions, has rapidly evolved (1-3). These technologies are promising to support clinical decision-making, enhance patient-centred care and improve operational efficiency, including pregnancy rates (1-3). However, limited evidence exists regarding their current and intended future application across clinics.

Methods: Cross-sectional, anonymous, online survey was disseminated via a professional fertility society website, email, and social media (February-August 2024). Eligibility criteria included being part of a fertility clinic. Survey questionnaire covered: clinic location, treatments offered,

AI and technologies used before and during treatment, perceived implementation benefits and barriers and future application intentions. Ethical approval was obtained.

Results: 291 people accessed the survey; 166 (57.0%) completed over 50% of questions and were included in analysis. Most clinics were in Europe (47.6%) or Asia (26.5%) and offered advanced ART, including IVF/ICSI (87.3%). Most clinics used AI and digital technologies, before treatment (75.3%), particularly telemedicine and patient portals, in administration (63.9%), nursing, education, consent (64.5%), and the laboratory (74.7%). 40.4% used it in ovarian stimulation, and 25.0% used Generative AI or Large Language models. Perceived benefits included enhanced data-management (53.4%), improved patient communication (50.7%) and satisfaction (47.9%), reduced errors (48.6%), and improved scheduling (46.6%) and outcomes (39.7%). Implementation challenges included integration difficulties (47.9%), financial constraints (41.1%), uncertainty about technology adoption (32.2%), data security/privacy concerns (29.5%), and staff resistance/limited skills (28.1%). Most clinics (73.6%) planned to adopt AI and digital technologies in the near future, particularly mobile-apps, patient portals, digital resources, electronic health records, laboratory selection/monitoring and information management/electronic witness systems.

Conclusions: AI and digital technologies are well-received, and clinics are willing to use them. Evidence-based guidelines and training are needed for safe, successful implementation.

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67. How does nurse-led sedation in reproductive medicine compare with nurse-led sedation in other medical specialties?

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Category

Nursing

Sub-Category

Clinical

Abstract

Sedation, a medical technique involving sedative medications to ease anxiety and pain during procedures, carries risks, including life-threatening complications. Initial guidelines published by the AMRC in 2001 have evolved, with significant updates in 2013 and 2021 emphasizing the need for formal training, timely recognition of complications, detailed record-keeping, and regular audits. The SEDLog app addresses these needs by allowing professionals to maintain electronic records of sedation cases, conduct audits, and provide anonymized national data on sedation practices in the UK, categorized by drugs used, monitoring methods, complication rates, and specialty.

Design: Cross-sectional study

Sample: 278 sedation practitioners from 103 hospitals/clinics reported 597 sedation cases between July 2023 and January 2023.

Methods: A descriptive and comparative analysis of sedation cases recorded in the SEDLog app was performed, focusing on nurse-led sedation in reproductive medicine compared to other disciplines such as cardiology, radiology, dentistry, theatres, and gastroenterology. Six parameters were analyzed: pre-assessment status, level of sedation, medications administered, complication rate, adverse events, and satisfaction score.

Results:

- Reproductive medicine accounted for 45% of cases.

- 98.1% of patients were pre-assessed.

- Moderate sedation was used in 81.9% of cases, the highest among specialties.

- Midazolam, Fentanyl, and Paracetamol were the top medications, with higher usage rates than in other specialties.

- Capnography compliance was 99.37%, with a low complication rate of 3.81% and only one adverse event (failed sedation).

- Satisfaction score averaged 4.37.

The low complication rate may be due to the generally healthy status of fertility patients and early respiratory compromise detection through capnography. Further research on nurse-led sedation in reproductive medicine, particularly with international comparisons, is recommended. The SEDLog app is a valuable tool for collecting data on sedation practices, indicating that nurse-led sedation in reproductive medicine is safe and effective.

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128. Developing a Safe and Inclusive Protocol for Fertility Treatment in Patients with High Body Mass Index (BMI): A Collaborative Approach

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Category

Nursing

Sub-Category

Clinical

Abstract

Introduction/Objectives: The prevalence of patients with high body mass index (BMI) is increasing steadily, yet individuals with a BMI >35 are traditionally excluded from fertility treatments due to concerns about sedation safety, reduced success rates, and increased obstetric risks. This study aimed to develop a protocol to provide safe and inclusive fertility care to patients with high BMI, addressing the challenges posed by their unique medical needs.

Methods: The protocol for offering fertility treatment to patients with a BMI >35 was developed in collaboration with anaesthetic and medical teams, incorporating guidelines from the Society for Obesity and Bariatric Anaesthesia (SOBA) and using the STOP-BANG scoring system to screen for obstructive sleep apnoea (OSA). Patients with BMI >30 underwent a pre-treatment video consultation with a senior anaesthetist to assess their suitability for sedation and to identify additional diagnostic needs. For patients with BMI >35, general practitioner (GP) clearance and counselling on increased obstetric risks were required. The perioperative care included specialized equipment and staff trained in managing high BMI patients, including high-flow oxygen systems, lift-assist stirrups, and emergency airway management protocols.

Results: The protocol allowed successful fertility treatment for three patients with BMI >35, who would have otherwise been excluded from care. The highest BMI was 40. All patients underwent successful egg collection and fertility treatment without major complications. The protocol also highlighted the potential for expanding treatment options to patients with even higher BMI through the exploration of spinal regional anaesthesia.

Conclusions: This study demonstrates that with careful planning and collaboration, fertility care can be safely extended to patients with high BMI. The findings suggest that such inclusive practices could become a standard, ensuring that more patients have access to fertility treatments regardless of BMI. Further research is needed to refine and expand these protocols for broader clinical application.

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303. Demographic characteristics, motivations, experiences, and attitudes of oocyte donors towards anonymity and post-donation relationships with donor-conceived offspring: a systematic review.

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Category

Psychosocial

Sub-Category

Translational

Abstract

Background: Previous reviews have extensively explored oocyte donation and the views of donors and recipients on the donation process[1,2]. This up-to-date systematic review of oocyte donors aimed to synthesize existing data on the demographic characteristics, motivations for donation, and views on anonymity and disclosure while emphasis was also given on the views of oocyte donors towards identifiability and post-donation relationships with donor-conceived offspring (DCO) .

Methods: A systematic search of English peer-reviewed studies of four computerized databases (PubMed, PsychINFO, Embase, and Web of Science) was conducted using an extensive search strategy and the data selection process followed the PRISMA 2020 guidelines .

Results: 42 studies were selected for data extraction including data from 14 countries and showed that most donors demonstrated positive attitudes towards oocyte donation with the key motivator for donations being the desire to help infertile couples, although many donors stated that financial compensation was the driving motivator .Views on identifiability varied, with many donors showing positive attitudes, others supporting the idea that even if anonymity was removed, they would still donate, whereas other donors valued guaranteed anonymity . Most donors were open to future contact with the donor-conceived offspring, while many were curious about the pregnancy outcome. Other donors stated that they would not initiate future contact with the offspring to avoid overstepping the recipient's parental role .

Conclusions: The influence of cultural background and societal norms was evident in donors' motivations and decisions on anonymity and disclosure, while differences were seen between donors from northwestern and southeastern countries . This review highlights the need for future research on the enhanced support to donors before and after the donation, on the improvement of education and communication strategies while the recruitment methods across different countries should be reexamined to ensure the long-term psychological well-being of donors and ethical practice of oocyte donation.

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260. "Male Infertility: An overlooked issue? Addressing awareness, ethnicity and information gaps in fertility care" – A prospective survey

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Category

Psychosocial

Sub-Category

Clinical

Abstract

Objective: Male infertility, contributing to nearly half of the fertility issues, is an underrepresented health concern with significant long-term implications[1,2]. In Leicester's diverse population, knowledge about male infertility is limited and overshadowed by a focus on women's health[3]. This project aims to assess men's understanding, awareness, and information needs regarding infertility to enhance equitable healthcare services.

Methods: A prospective survey was conducted at Leicester Royal Infirmary fertility clinics among male partners with abnormal semen analysis from 1st February 2024 to 31st August 2024. The survey collected data on demographics, knowledge of male infertility factors, their awareness and information provision. Data were analyzed using IBM SPSS software.

Results: The study included 20 participants: 60% (12/20) were White, 20% (4/20) Asian, 15% (3/20) Black, and 5% (1/20) from other ethnic backgrounds. Most (40%) were aged 31-35 years, with 45% holding a postgraduate degree. English was the preferred language for 85% of participants.

While all participants were aware of lifestyle measures to improve fertility, only 85% adopted these changes, particularly those with postgraduate degrees (100%, 9/9). Although 80% (16/20) of men were aware of the impact of systemic illnesses on fertility, understanding of sperm production frequency was lower at 55% (11/20).

Awareness of fertility treatments was higher among White (66%, 8/12) and Black participants (66%, 2/3) compared to Asian men (25%, 1/4). Only 60% felt adequately informed in clinics, but this was not affected by ethnicity, language, or education. P**references** for information delivery varied significantly: verbal communication was preferred by Asian participants (100%, 4/4), while written methods were favoured by Black participants (67%, 2/3) (χ^2=24.500, p=0.004).

Conclusion: This survey highlights gaps in knowledge about male fertility, particularly regarding sperm production and systemic illnesses. It emphasises the need for tailored communication strategies and greater promotion of lifestyle changes to improve fertility outcomes.

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221. Evaluating the role of the microbiome in fertility: awareness, practices, and beliefs among professionals and patients

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Category

Nursing

Sub-Category

Clinical

Abstract

Objectives: This study aimed to assess awareness, practices, and beliefs regarding the microbiome's role in fertility among fertility professionals and patients.

Methods: Two anonymous, cross-sectional online surveys were distributed via a Fertility Society website, email, and social media in August 2024. The professional survey assessed familiarity with microbiomes, perceived impact on fertility, and current clinical practices. The patient survey examined microbiome familiarity, engagement with healthcare providers, and interest in microbiome analysis in fertility treatments.

Results: 466 people accessed the survey; 149 patients (68.7%) and 30 professionals (62.5%) completed all questions and were included in the analysis.

Professional Survey: 100% were familiar with the gut microbiome; 96.7% the vaginal microbiome; 50% the endometrial microbiome. 93.3% believe the microbiome affects fertility; 46.7% included microbiome health in fertility assessments. 66.7% recommend probiotics: 50% advise prebiotics. 100% believe lifestyle impacts fertility and expressed interest in microbiome training. 13.3% and 26.7% refer patients for gut and vaginal microbiome analyses, respectively.

Patient Survey: 89.9% were familiar with the gut microbiome; 79.2% the vaginal microbiome; 34.2% the endometrial microbiome. 88.6% believe microbiomes impact fertility; 30.9% had discussed this with their clinician. 45.6% consumed probiotic foods; 44.9% take probiotic supplements. 85.9% wanted microbiome analysis as part of fertility treatment; 96.6% believed lifestyle changes could positively affect reproductive health; 55.7% had undergone ART procedures.

Conclusion: The study highlights significant interest in the microbiome's role in fertility among both professionals and patients, but there is a gap between belief and practice, with fewer than 50% of professionals incorporating microbiome health into fertility assessments. This underscores the need for education and the development of evidence-based guidelines for the integration of microbiome analysis in fertility treatments.

Limitations: The survey's sample size and self-selection bias may skew results toward those already interested in microbiome research. Studies with larger, more diverse populations are needed.

SP1D ARCS Pre-Reg Jean Purdy Prize Session

93. Giving patients the option to take home unused embryos.

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Introduction: Embryos can often be stored surplus to requirement following ART treatment. HFEA storage regulations now give patients the option of extending the storage periods of their embryos beyond the initial 10 year limit. Choosing to discard embryos can often be a difficult decision for patients to make and some may opt to continue storage even though they may never wish to use their embryos. There is an evolving discussion of whether fertility clinics could allow patients to collect their stored material for allowing the acceptance and closure of their assisted conception journey. The associated risk of patients collecting questionably live material should be considered.

This clinical service evaluation aims to determine a minimum time required for vitirified embryos to perish at ambient temperature, aiding in the development of a procedure for patients to collect their unused embryos.

Methods: Vitrified embryos were removed from storage and left at ambient temperature for one minute before warming following local procedures. Viability of embryos was assessed and recorded at zero hours, one hour, and 24 hours post-warm.

Results: Preliminary results show one minute of exposure to ambient temperature prior to warming was sufficient to hinder survival of embryos in subsequent warming processes.

Discussion and Conclusion: These findings suggest a minimum time required for embryos to be exposed to ambient temperature before being collected by patients. This instils a confidence in the possibility for developing procedures for collecting stored material, while allowing patients to make empowered, informed, personal decisions at this final stage of their assisted conception journey. Finally, it would be of interest to establish if other UK clinics have procedures in place for this process, and the proportion of patients that would be interested in this service.

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97. Clinical outcomes and morphokinetic development from pronuclear vitrification: a retrospective study

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: To compare reproductive outcomes between embryos frozen at the pronuclear (PN) and blastocyst stage. Additionally, to observe morphokinetic differences of PN thawed embryos compared with fresh embryo development.

Methods: Retrospective data from 1018 cycles between 2019 and 2023 were analysed (111 PN thaws, 907 blastocyst thaws). Live birth rate, clinical pregnancy rate, miscarriage rate, and multiple pregnancy rate were compared between PN thaw and blastocyst groups. For fresh cycle comparisons, patients undergoing a PN thaw between 2020 and 2023 were matched with fresh cycle patients based on age, number of PNs, cause of infertility, and type of insemination (IVF or ICSI). Embryo development was followed using a time-lapse incubator, and morphokinetic timings were compared between the two groups.

Results: Live birth rate (30.8% vs. 20.6%, $p = 0.030$) and clinical pregnancy rate (44.7% vs. 28.8%, $p = 0.001$) were significantly higher in the blastocyst thaw group compared to the PN thaw group. After adjusting for confounding variables, the PN thaw group had a lower adjusted odds ratio for live birth rate (0.48, 95% CI: 0.28–0.70) and clinical pregnancy rate (0.50, 95% CI: 0.32–0.79) compared to the blastocyst thaw group. A significant delay in time to 2-cell, 3-cell, 4-cell, and 8-cell was seen in the PN thaw group compared to the fresh control (all <0.05). All other morphokinetic time points did not differ significantly.

Conclusion: Patients with a PN thaw had a reduced live birth rate, and clinical pregnancy rate compared to patients with a blastocyst thaw. There is a delay in reaching 2-cell, 3-cell, 4-cell, and 8-cell compared to fresh development.

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242. Comparison of recovery rates between manual and automated vitrification using simulation beads.

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Category

Assisted Conception

Sub-Category

Basic Science

Abstract

Introduction: Vitrification is the method of choice for oocyte cryopreservation but it requires specialised training and is labour-intensive. Automated systems may provide a standardised approach, reduce variability, and be an advantage when large numbers of oocytes are to be cryopreserved.

Methods: A total of 196(140 µm diameter) beads were used to simulate the oocyte vitrification process to compare recovery rates between the manual method (Cryotop (Kitazato) and the automated method (GAVI, Genea Biomedx). Beads were vitrified in sets of 2, 3 and 4 in both groups to investigate the optimal number of beads per carrier device. In both methods the

manufacturer's recommended processes for vitrification and warming were followed. The results for bead recovery were compared between the 2 groups using the Fischer's exact test.

Results: Overall, significantly more beads were recovered using the manual method at 98% (87/98) compared to the automated method at 57.2 % (55/96) where $p<0.0001$. When 2 beads were vitrified per carrier device, there was no statistical difference between the recovery rates for the two methods at 41/50 (82%) and 45/50 (90%) for manual and automated respectively. However significant differences were identified when 3 and 4 beads were vitrified per carrier device. Recovery rates for 3 beads were 23/24 (95.8%) for the manual and 6/24 (25%) for the automated groups ($p<0.0001$). When 4 beads were vitrified per carrier device the recovery rates were 23/24 (95.8%) in the manual and 4/24 (16.6%) in the automated device ($p<0.001$).

Discussion: The results demonstrate that the Gavi results in good recovery rates when following the manufacturers advice of 2 oocytes per pod. However, it does have the potential to reduce time and variability when vitrifying large number of oocytes, but the current pod design does not facilitate this.

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187. Successful frozen embryo transfer following contamination of a sibling embryo with *Candida dubliniensis* during a fresh IVF cycle

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Introduction:

Candida species are responsible for 25.3% of microbial contamination in IVF/ICSI cycles[1], with most cases attributed to *Candida albicans*[2]. There are very few published reports of contamination involving *Candida dubliniensis*, particularly from vaginal origin.

Objectives:

This case report details the identification, management, and outcome of an embryo culture contaminated by *Candida dubliniensis*, highlighting the impact on IVF cycle management.

Methods: Fungal contamination of one embryo from a cohort of 11, cultured in individual microwells of a timelapse dish, was detected 2 days post-insemination by the presence of hyphae adhering to the zona pellucida. No signs of contamination were observed in the sibling embryos. The contaminated embryo was discarded, and the remaining 10 embryos were washed in clean culture media and placed in a new culture dish. Associated culture media and biological fluids were sent for mycological analysis. The patient underwent a high vaginal swab and was treated with a clotrimazole pessary. To mitigate risk, the treatment plan was adjusted to a freeze-all cycle. Infection clearance was confirmed before proceeding with a frozen embryo transfer.

Results: Mycological testing confirmed the presence of *Candida dubliniensis* in the culture media from the insemination dish. The vaginal swab cultured *Candida albicans*, confirming the patient as the contamination source (*C.dubliniensis* and *C.albicans* are highly related yeast species sharing phenotypic characteristics, meaning some testing laboratories do not distinguish between the two[3]). Three good-quality blastocysts were vitrified on day 6, and a Subsequent frozen embryo transfer resulted in a positive pregnancy test.

Conclusion: Timelapse monitoring and individual microwell culture enabled early detection and containment of fungal contamination, preventing its spread to sibling embryos. This case highlights the importance of high vaginal swabs in tracing the source of contamination and informing adjustments to treatment plans, thereby optimising IVF outcomes, including blastocyst development and implantation.

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51. Fresh vs frozen: how do donor and autologous oocyte cycles compare?

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: With the demand for donor eggs and elective oocyte freezing increasing, it is important to assess how blastulation rate (BR), pregnancy rate (PR) and live birth rate (LBR) compare between fresh and frozen donor and autologous oocyte cycles across different age groups.

Methods: Retrospective cohort study of 68,374 cycles (2,284 fresh-donor, 14,518 frozen-donor, 51,372 fresh-autologous and 200 frozen-autologous cycles) from 14 UK clinics (2011-2022). Patients were in <36, 36-37, 38-39, 40-42, >42 age groups. BR, PR and LBR were assessed. Chi-square test with adjusted odds ratio, confidence intervals and p-value were calculated.

Results: Between fresh and frozen donor cycles, BR was significantly higher in fresh cycles in <36yo (54.33%vs48.08%,p<0.001), 40-42yo (53.44%vs49.67%,p<0.001) and >42yo (51.60%vs47.67%,p<0.001). BR was comparable in 36-37 and 38-39yo (p>0.05). PR (<36:69.48%vs54.99 (p<0.001), 36-37:68.26%vs51.58% (p<0.001), 38-39:60.29%vs51.11% (p<0.001), 40-42:65.35%vs50.25% (p<0.001), >42:66.09%vs53.02% (p<0.001)) and LBR (<36:51.23%vs36.61% (p<0.01), 36-37:47.90%vs32.20% (p<0.01), 38-39:41.18%vs32.49% (p<0.01), 40-42:48.37%vs33.45% (0<0.01), >42:48.03vs33.46% (p<0.01) were higher in fresh cycles.

Between autologous fresh and frozen cycles, BR was significantly higher in fresh cycles in <36yo (47.24%vs36.40% (p<0.001)). PR was significantly higher in fresh cycles in all groups except >42 (<36:56.15%vs75.86%, (p<0.01); 36-37:51.30%vs8.33% (p<0.05); 38-39:45.40%vs18.75%, (p<0.001); 40-42:40.02%vs10.34%, (p<0.01)). LBR was significantly higher in frozen cycles in <36yo (39.52%vs61.11%, (p<0.01)) but not in remaining age groups.

Between frozen autologous and donor cycles, BR was significantly higher in donor cycles in 36yo (36.40%vs48.08%, (p<0.01) and autologous cycles in >42yo (59.83%vs47.67%, (p<0.001). PR was higher in donor cycles across all groups (<36:75.86%vs54.99% (p<0.001); 36-37:8.33%vs51.57% (p<0.001); 38-39:18.75%vs51.11%(p<0.001); 40-42:10.34%vs50.25% (p<0.001); >42:16.67%vs53.02% (p<0.001)). LBR was comparable in all groups (p>0.05), except in 40-42yo, donor eggs led to higher LBR (13.51%vs33.45% (p<0.01)).

Conclusion: For both donor and autologous cycles, fresh cycles would be recommended where possible, particularly for older patients using donor eggs. When frozen cycles are required, older women may benefit from using donor eggs.

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153. Clinical pregnancies following 74 mosaic embryo transfers.

Zoe Barnikel[1], Lucy Jenner[2], Sharon Corcoran[3], Iria Castro[4], Gina Aldis[5], Melanie Evison[6], Steven Eaton[7], Caroline Drew[8], Laura Carreto Ficher[9], Natalie Scott[10], Amy Barrie[2], Alison Campbell[2]

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objectives: Following the publication of reassuring data across the sector (1, 2), mosaic embryos are increasingly utilised for treatment in the absence of euploid alternatives. This study

reviewed the clinical outcomes following transfer of 74 PGT-A reported mosaic embryos. Outcomes were compared for low-level reported mosaic embryos (LLM; 20-40% aneuploidy) versus high-level mosaic embryos (HLM; >40-80% aneuploidy).

Methods: Clinical outcomes were reviewed for 74 mosaic blastocysts across 10 sister fertility clinics, following the same scientific protocols and using the same Genomics laboratory (CooperSurgical, UK). Transfers occurred between August 2017 – February 2024. The LLM and HLM groups consisted of 34 and 26 embryos, respectively. All patients underwent single blastocyst transfer.

Results: Of the 74 mosaic embryos, 35 (47%) resulted in positive hCG and 22 (30%) led to a clinical pregnancy, confirmed by foetal heartbeat at 7+/-1 week gestation. Positive hCG was achieved in 21/34 (62%) patients following transfer of LLM embryos and 10/26 (38%) for HLM.. These resulted in clinical pregnancy in 14/34 (41%) in the LLM group and 5/26 (19.2%) in the HLM group. Although the level of mosaicism shows a trend in outcomes, there was no significant difference in biochemical or clinical pregnancy rates between high/low level mosaics.

Conclusions: Results following mosaic FETs are in line with previously published findings and support the utilisation of mosaic embryos where there are no euploid alternatives. In cases where there is a choice, LLM embryos should be preferentially chosen over HLM. Patients considering the use of mosaic embryos should be counselled regarding the chances of success based on the level of mosaicism, and the expected outcomes of using such embryos including the increased risk of miscarriage. For those pursuing PGT-A following recurrent pregnancy loss there may be a preference not to utilise mosaic embryos despite their demonstrated potential.

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   Genes 2024, 15, 18. https://doi.org/10.3390/genes15010018

SP1E SRF PhD Prize Session

88. Asprosin as a new obesity-related mediator in hypothalamic signalling for female reproduction: insights from *in vivo* hypothalamic expression in diet-induced obese mice and *in vitro* GT1-7 neuron regulation studies

Dominika Wachowska[1,2,3], Kinga Przybylska[4,2], Urszula Nowak[1], Christelle Ramé[3], Patrycja Kurowska[1], Natalia Respekta-Długosz[1,2], Jean-Philippe Dubois[3], Edyta Rytelewska[1], Martine Migaud[3], Anna Błasiak[4], Joëlle Dupont[3], Agnieszka Rak[1]

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Category

Endocrinology

Sub-Category

Basic Science

Abstract

Objectives: Asprosin, a novel adipokine from the cleavage of the profibrillin-1 (*Fbn1*) gene by the furin enzyme, plays a role in the regulation of metabolic diseases and influences cellular processes by activating its cognate Olfr734 receptor. While its impact on male fertility and ovarian functions is known, its role in female upstream reproductive pathways remains unexplored.

Aim: This study examines asprosin/furin/Olfr734 expression in the hypothalamus of control (CTRL) and diet-induced obese (DIO) female mice, alongside asprosin's effects on the hypothalamic GT1-7 cells, focusing on GnRH secretion, signalling pathways, and hormone interplay.

Material & Methods: Firstly, hypothalami from C57BL/6J CTRL and DIO mice in estrus were collected to measure asprosin/furin/Olfr734 expression and serum samples for hormones (asprosin, E2, P4, leptin, insulin) and metabolic parameters analyses. Next, GT1-7 cells were treated with asprosin (1-100 nM) to measure GnRH secretion (15 and 30 min) and to assess kinases phosphorylation (PKC, PKA, STAT3, AKT, ERK1/2, AMPK), and cAMP levels at 10 nM over time (5-60 min). The influence of estradiol (E2), progesterone (P4), and kisspeptin-10 (1-1000 nM) on asprosin/furin/Olfr734 expression was also analyzed after 4 and 24 h of incubation. Statistical comparisons were made using Student's t-test or one-way ANOVA ($p < 0.05$), with correlations examined via Pearson's coefficient ($p < 0.05$).

Results: In DIO mice asprosin/furin/Olfr734 are differentially expressed in the hypothalamus compared to CTRL, with parallel correlations to serum asprosin levels. Furthermore, asprosin decreases GnRH secretion and mRNA expression in GT1-7 cells while modulating phosphorylation of key kinases and intracellular cAMP release. Notably, E2 upregulated asprosin/furin/Olfr734 at both mRNA and protein levels, reflecting the positive correlation between serum E2 and hypothalamic Olfr734 and furin *in vivo*.

Conclusion: These findings suggest that asprosin plays a modulatory role in hypothalamic signalling for female reproduction, influenced by metabolic status.

Funding: National Science Centre, Poland (project no. 2021/42/E/NZ4/00088).

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238. Modelling Macrophage-Endometrial interactions *in vitro* in the Human Endometrium

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Category

Uterus

Sub-Category

Basic Science

Abstract

Introduction

The human endometrium is a complex, multicellular tissue which is composed not only of structural cells such as epithelial and stromal cells, but also immune cell populations such as macrophages, which all interact synergistically in order to facilitate the decidual transformation required for successful implantation and pregnancy. However, little is known in humans about these cell signalling relationships, predominantly due to a lack of representative *in vitro* cell culture models which mimic the complexity of the native endometrial tissue.

Methods: We established a novel complex co-culture model system encompassing endometrial gland organoids, primary endometrial stromal cells and the THP-1 monocyte cell line within a specially designed 3D extracellular matrix (ECM) in order to gain insight into the macrophage-endometrial relationship during the secretory phase and decidualisation. Hormonal treatment with E2, P4 and PGE2 was used to induce decidualisation. Cell tracking, cellular quantification, EdU staining for DNA synthesis and immunostaining for ECM were used to characterise the cultures.

Results: This complex co-culture model, to some extent, recapitulates the cell composition and characteristics of the endometrial tissue architecture, with THP-1 monocytes residing within a dense stromal compartment surrounding endometrial gland organoids. Gland organoids and stromal cells showed enhanced growth and proliferation when compared with previously established co-culture model systems. Decidualisation conditions resulted in observed changes in cell morphology, with gland organoids demonstrating increased membrane thickness and endometrial stromal cells showing an increased cell aspect ratio and greater cell alignment. THP-1's remain stable within the model system for up to 4 days however, further optimisation is required for long term maintenance.

Conclusion: These findings provide a foundation for furthering our understanding of the intricate macrophage-endometrial signalling relationship, which could reveal the macrophage as a novel therapeutic target for the resolution of immune factor infertility.

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49. Proteomic insights into the role of omentin-1 in porcine anterior pituitary cell function and signaling pathways

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Category

Endocrinology

Sub-Category

Basic Science

Abstract

Objective: Omentin-1, an adipokine primarily expressed in visceral fat, is a key hormone in metabolic regulation, reproduction, and inflammation. Our recent studies revealed its presence in the porcine anterior pituitary gland (AP), suggesting a neurohormonal role in female reproduction. Here, we investigated the impact omentin-1 on the global proteome in pigs with different metabolic statuses: normal-weight Large White (LW) and obese Meishan (MS) pigs.

Methods: AP cells from both pig breeds were treated with 50 ng/mL omentin-1 for 24 h (n=4). Proteomic analysis was conducted using liquid chromatography-tandem mass spectrometry with tandem mass tags labeling. We examined the effects of omentin-1 (10, 50 ng/mL) alone and with GnRH (100 ng/mL) on LH release, cell proliferation, and apoptosis were validated using assays for hormone secretion (ELISA), viability (alamarBlue), proliferation (BrdU), apoptosis (caspase-3/7), cell cycle analysis (flow cytometry), and expression of key genes and proteins (*LHB*, cyclins, caspases, Bax, Bcl2, Fas, Fadd, Xiap, p53; RT-qPCR, western blot). Molecular mechanisms were explored using pharmacological kinase inhibitors for PKC, ERK1/2, AKT, AMPK, and STAT3 pathways. Statistical analysis used Student's t-test, one-way ANOVA, and Tukey's post-hoc test (n=5).

Results: Proteomic analysis identified around 7,000 proteins, 34 differentially expressed in LW pigs, mainly linked to the extracellular space, and 198 in MS, primarily in the cytosol and cytoplasm. Bioinformatics (DAVID, KEGG, Reactome platforms) revealed involvement in gonadotropins regulation, insulin receptor, immune response, and cell processes. In MS, proteins like LHβ, VDAC3, and cathepsin D were upregulated, while SARM1 and AKT were downregulated. In LW, RRAGD was downregulated, and in both breeds, SIX1 was downregulated. Functional experiments confirmed omentin-1 action on LH secretion, proliferation, apoptosis, and signaling pathways.

Conclusions: This study provides new insights into how omentin-1 regulates porcine pituitary function, emphasizing its role in hormonal regulation, metabolism, proliferation, and apoptosis.

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129. Extracellular vesicles from different endometrial receptivity states influence the early embryo transcriptome

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Category

Fertilisation and embryo

Sub-Category

Translational

Abstract

Introduction: Successful embryo implantation depends on the interplay between a receptive endometrium, a competent blastocyst, and embryo-uterine communication. Extracellular vesicles (EVs) play a critical role in this dialogue by transporting biomolecules between the endometrium and the embryo during the pre-implantation and implantation stages. The composition of endometrial EVs changes throughout the menstrual cycle, with distinct profiles in EVs derived from receptive and non-receptive endometrium. However, the precise effects of these endometrial EVs on blastocyst function during pre-implantation are not fully understood.

Aims: This study examined the effects of endometrial EVs from receptive, non-receptive, and non-reproductive sources on pre-implantation embryo analogues, focusing on their impact on function and transcriptome. The role of EV miRNAs in mediating these effects was also investigated.

Methods: The 3D JAr spheroids, mimicking the blastocyst, were supplemented with EVs isolated from receptive RL95-2 and non-receptive HEC-1-A endometrial cells, as well as non-reproductive HEK293 cells. The resulting transcriptomes of trophoblast spheroids and miRNA profiles of each EV type were investigated using RNA sequencing.

Results: Our findings demonstrated that EVs derived from receptive endometrium induced distinct transcriptomic changes in the embryo analogue compared to those from non-receptive endometrium or a non-reproductive control. These alterations primarily affected pathways linked to immune modulation, embryo implantation, and development, including Toll-like receptors (TLRs) and cell adhesion molecules (CAMs). While EV treatment did not impact embryo attachment to the endometrium in our model, we identified specific miRNAs within receptive endometrial EVs, such as hsa-miR-205-5p, hsa-let-7a, hsa-miR-200c, and hsa-miR-1283 as key regulators of these transcriptomic changes.

Conclusion: Our findings highlighted the critical role of receptive endometrial EVs in modulating pre-implantation embryo function. Receptive endometrial EVs promote a favourable environment for pre-implanting embryos, potentially enhancing implantation success. These results offer potential therapeutic applications of endometrial EVs in assisted reproductive technologies.

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185. Comparative Analysis of Testicular Organoids Derived from Cryopreserved vs. Fresh Tissue for Fertility Preservation

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Objective: To compare the viability and functionality of testicular organoids derived from cryopreserved and fresh bovine tissue, utilizing a cryopreservation method identical to that used for prepubertal human tissue. This study aimed to investigate the potential of testicular organoids as a fertility preservation strategy for prepubertal boys undergoing cancer treatment.

Methods: Testicular organoids derived from either cryopreserved or fresh immature testicular tissue (n=3) were cultured for up to 56 days and analysed on days 0, 7, 14, 28, and 56. Viability assays, organoid count and area measurements, and relative gene expression analysis via rt-

qPCR were conducted. We also quantified the expression of several key markers, for spermatogonial stem cells, Leydig cells, Sertoli cells, and pluripotency.

Results: Organoids derived from cryopreserved tissue exhibited significantly higher expression levels of the Leydig cell marker *StAR* (p=0.0020) and gonocyte marker *GFRa-1* (p=0.0096) at all time points compared to those derived from fresh tissue. However, no difference was observed in the expression levels of post-meiotic germ-cell markers. In addition, an initial increase in live, non-apoptotic cells was observed in organoids from cryopreserved tissue (p=0.0356). Viability remained relatively high across the 56-day culture period (over 60%), thus rendering this as the first long-term study of bovine testicular organoids.

Conclusion: The enhanced gene expression and viability observed in organoids derived from cryopreserved tissue may be attributed to the shorter processing time, as the cryopreserved tissue was immediately frozen after transport and initial tissue processing. In contrast, fresh tissue experienced extended processing times, including delays during transport, tissue processing, digestion, and seeding. However, the organoids generated exhibited the potential to rescue viability and expression levels during subsequent stages of culture. Collectively, these findings suggest that testicular organoids derived from cryopreserved tissue could offer a viable and clinically relevant option for long-term fertility preservation in prepubertal boys with cancer.

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123. Development and characterisation of novel FSHR inhibitors: potential therapeutic applications in contraception and menopause management

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Follicle-stimulating hormone (FSH) and its receptor (FSHR) are crucial for female reproduction, activating multiple signalling pathways including Gαs/cAMP/PKA and MAPK/ERK to regulate ovarian follicle growth, development and steroidogenesis. Emerging evidence indicates that FSH/FSHR may have additional extragonadal actions, specifically during perimenopause/menopause, whereby direct FSH/FSHR actions have been proposed to contribute to the development of osteoporosis, central adiposity, and Alzheimer's disease. Modulating FSHR activity may therefore offer potential therapeutic strategies for the development of alternatives to non-steroidal contraception methods and management/prevention of menopause-related comorbidities.

Objective: To develop and characterise novel FSHR inhibitors.

Methods: 84 small molecule compounds (SMCs) identified via AI were screened using a cre-luciferase assay to assess their ability to inhibit FSH-dependent activity in HEK293 cells expressing FSHR. Three promising SMCs were taken forward for further evaluation, assessing 1. their ability to inhibit FSH-dependent cAMP production using a live kinetic Glosensor cAMP assay, 2. impact on FSH-dependent ERK phosphorylation, 3. effects on FSH-dependent follicle growth and expression of *Cyp19a1(aromatase), Caspase3, Bcl2/Bax* genes in *in vitro* mouse follicle and ovarian fragment cultures.

Results and Conclusions: Three compounds (SMC48, -74, -80) showed the most potent inhibition of FSH-dependent cre-luciferase activity (>90% inhibition at 100μM), were selected for further study. These three SMCs also displayed concentration-dependent inhibition of FSH-dependent cAMP accumulation, achieving >90% inhibition at 100μM, with IC50s ~20μM. All three SMCs exhibited minimal ability to stimulate LH-dependent cAMP production, suggesting selectivity to FSHR. Interestingly, these compounds differentially modulated FSH-dependent ERK1/2 phosphorylation and ovarian follicle growth, suggesting potential signal and functional bias in their actions, with minimal impact on aromatase expression. This could be beneficial in developing non-steroidal contraceptives that prevent ovulation whilst maintaining oestrogen production.

PW3 Poster Walk

Abstracts presented in Rapid Fire Sessions on this day will also be featured in the Poster Walk, but the abstract itself is shown in the Rapid Fire Session in this publication and not repeated.

237. Importance of fertility awareness in Africa: A systematic literature review exploring fertility knowledge, attitudes, and behaviours in African population groups.

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Category

Psychosocial

Sub-Category

Basic Science

Abstract

Background: Globally, one in six people experience infertility, with higher incidence within the African population due to barriers in access, healthcare quality, and wider factors including environmental and socio-cultural.[1] Good fertility knowledge can play an important role in ensuring individuals and/or couples achieve their desired fertility intentions. Most studies on this topic, however, have focused on high-income countries. This research therefore aims to understand fertility knowledge, attitude and behaviours among the African population.

Methods: Global Health, MEDLINE, Web of Science PubMed, Scopus, and Google scholar databases were systematically searched for articles published between 2000-2024, in accordance with PRISMA guidelines. Peer-reviewed articles in English language covering fertility knowledge, attitude and behaviours were included if conducted in Africa. Articles were extracted and reviewed independently by two researchers, analysed, quality-assessed and categorised thematically.

Results: Search yielded 1939 articles of which 29 were included. Overall, findings studies showed that Africans place a high value on their fertility, with high aspirations towards parenthood, which is often perceived as fulfilment or destiny. Knowledge of ART and treatment options was low. There was also low knowledge of age-related fertility decline, menstrual cycle and ovulation. Although the attitude towards infertility and ART was mixed, there was more openness within the higher-socioeconomic demographics. Several factors were found to influence behaviour such as the importance of marriage, steady income, safe-housing, cultural beliefs and religion. Studies also highlighted several myths and misinformation. There was high

willingness to explore various options ranging from herbalists to religious, faith healers and traditional healers.

Conclusion: While strategies and policies to improve fertility awareness are being deployed globally, it is critical to consider the needs of lower- and middle-income countries. Findings can inform government policies aiming to improve education, minimise ART costs, improve health-equity and access; ultimately allowing people to achieve their desired family-building intentions.

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195. An observational study of the association between treatment protocol and pregnancy outcomes for 19,822 frozen embryo transfers

Pooja Desai[1], Treasa Joseph[2], Mohammed Khairy[3], Alison Richardson[4], Victoria Sephton[5], Adam Balen[6], Prof Arri Coomarasamy[7], Rima Smith[8], Tom Bamford[2]

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective: Despite the increase in FET, the most optimal priming protocol of the endometrium is still a matter of debate(1,2). The objective of this study was to compare the live birth rate (LBR) and miscarriage rate in patients <35 years of age undergoing frozen embryo transfer (FET)

using one of three different treatment protocols: natural, non-downregulated with oestrogen, and long downregulated.

Method: This multicenter retrospective cohort study included 19,822 FET cycles between January 2019 and June 2024 at 16 IVF clinics in the UK which were categorized into three groups based on the protocol used: natural (n=2156), non-downregulated with oestrogen therapy (n=12,229), and long downregulated (n=5437). The odd ratios for live birth and miscarriage were adjusted for embryo grade, age, BMI, smoking status, parity, and previous IVF cycles using logistic regression.

Result: LBR was lower in the natural group compared to the non-downregulated group (30.6% vs 38.2%; aOR 0.78; 95% CI 0.69-0.88; p<0.001). Similarly, the LBR was lower in the natural group compared to the long-downregulated group (30.6% vs 37.9%, aOR 0.77; 95% CI 0.68-0.86; p <0.001). The LBR was comparable between the long downregulated and non-downregulated groups (37.9% and 38.2%, respectively; aOR 1.03 95% CI 0.95-1.11; p=0.43). The miscarriage rates were lower in the natural group compared to both the non-downregulated (17% vs 18%; OR 0.87; 95% CI 0.76-0.99; p=0.04) and long downregulated cohort (17% and 22%; OR 0.71 95% CI 0.62-0.81; p<0.001). The average endometrial thickness was lower in natural cycles (8.8 mm vs. 10.1 mm).

Conclusion: The study reports a higher live birth rate in medicated FET cycles; natural cycles were associated with a lower miscarriage rate. This should be interpreted with caution since the number of natural cycles offered during this study period was low, and residual confounding would have affected the effect estimates.

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270. HSGAssistant: A System for Predicting Fallopian Tube Blockage by Integrating Multiscale Features from Hysterosalpingography Data

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Category

Oocytes and ovary

Sub-Category

Translational

Abstract

Infertility is a global issue, impacting millions of couples, and in many cases, female infertility is linked to fallopian tube blockages. Hysterosalpingography (HSG) is commonly used in medical practice to diagnose female infertility, especially for assessing whether the fallopian tubes are open or blocked. However, traditional HSG often struggles with poor image quality, which can obscure important anatomical details and complicate accurate diagnosis. Issues like low resolution, contrast, and blurring in HSG images can make it difficult to determine if the fallopian tubes are blocked, sometimes leading to misdiagnoses or delayed treatment.

To overcome these challenges, we developed **HSGAssistant**, a new diagnostic tool aimed at improving the accuracy of detecting conditions like tubal blockages. The system starts by using the YOLO algorithm to identify key structures within the HSG images. Next, the system isolates regions of interest (ROIs) by locating their center points and cropping them into 512x512 pixel squares. These cropped areas are then enhanced using a Multi-Scale Resolution (MSR) technique, processing the images at different scales, such as MSR512 and MSR729. This technique enhances the clarity and visibility of **Sub**tle structural features.

After enhancement, the images are segmented using a custom Multi-Channel Attention U-Net (MCAtt-U-Net) model, which utilizes attention mechanisms across multiple channels to focus on relevant diagnostic features, improving the accuracy of segmentation. The HSGAssistant system ultimately provides three outputs: initial diagnostics from YOLO detection, enhanced images from MSR at different scales, and precise segmentation results from the MCAtt-U-Net.

This multi-step approach not only streamlines the diagnostic process but also achieves an Intersection over Union (IoU) of 84%, significantly outperforming traditional methods. By integrating these advanced techniques, HSGAssistant shows great promise as a valuable tool in clinical practice, enhancing diagnostic accuracy and improving patient outcomes in managing female infertility.

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96. Euploid blastocysts that lead to Live birth have an optimal surface area, diameter and optimal pace of development.

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: The impact of blastocyst surface area and diameter at tSB and tB; and pace of development on LB remains unclear. The study's objective was to use AI to quantitatively determine the optimal embryo surface area and diameter of euploid blastocysts that lead to live birth.

Methods: Retrospective study including 97 time-lapse videos of euploid embryos with known live birth outcomes from January to December 2021. Embryo diameter and surface area were measured at start of blastulation (tSB) and at time of blastulation (tB) by an AI model (CHLOE-

EQ, Fairtility Ltd). Live birth (LB) outcomes were manually annotated by embryologists. An Optimal embryo surface area and diameter were determined by the highest live birth rate and the **Sub**optimal range was determine by a decreased Live birth rate. A comparison between the optimal and **Sub**optimal live birth rate was measured using chi-square.

Results: Moderately sized embryos were found to have higher LB outcomes. At tSB, optimal surface area was 11771-13577 um^2, while optimal embryo diameter was 120-129µm. LB rate for optimal embryo surface area was higher than for **Sub**optimal [Optimal 80% (20/25) vs **Sub**optimal 55% (40/72), $p<0.001$]. In addition, optimal embryo diameter had higher LB rates than embryos with **Sub**optimal diameter [80% (16/20) vs 52% (31/60), $p<0.05$). At tB, optimal embryo area was 15000-15643μm^2 and optimal embryo diameter 136-140µm. LB rate for optimal embryo surface area was higher than for **Sub**optimal 82% (14/17) vs 49% (36/73), $p<0.05$]. Optimal embryo diameter had higher LB rates than embryos with **Sub**optimal diameter (77% 20/26 vs 47% 30/64, $p<0.05$).

Conclusion: Embryos with an optimal surface area and diameter were slower than bigger **Sub**optimal embryos, $p<0.05$.Optimal vs small **Sub**optimal embryos were faster at critical time points $p<0.05$.

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346. Outcome of testicular sperm retrieval in obstructive and non-obstructive azoospermia.

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Background: Azoospermia, when no sperm is present in the ejaculate, often requires surgical intervention to retrieve sperm directly from the testes. The success of surgical sperm retrieval (SSR) is much higher in cases of obstructive azoospermia compared to non-obstructive azoospermia (NOA), however the aetiology of NOA may also help predict success (Punjani et al., 2021).

Objective: To determine the sperm detection and pregnancy rates for men undergoing testicular sperm retrieval, to see whether there is an association between the aetiology of azoospermia and surgical sperm retrieval outcome.

Methods: A retrospective clinical audit was carried out to analyse sperm detection and pregnancy rates in patients who underwent SSR between 2019 – 2023. 104 patients with obstructive and 210 patients with non-obstructive azoospermia were included. Pregnancy rates were determined from questionnaires sent to those who had undergone ICSI treatment. Minimum pregnancy rates were determined from all those contacted, assuming those who did not respond did not acheieve pregnancy. Maximum pregnancy rates were determined from all who responded.

All data was anonymised prior to audit.

Results: Sperm retrieval rates were significantly higher in the obstructive azoospermia group (100%$\pm$0%) than in the NOA group (48.7$\pm$4.6%) [$p<0.0001$]. Within the NOA group, sperm retrieval rates were 62% for AZF deletions (8/13), 53% for hormonal imbalances (18/34), 50% for Klinefelter's (11/22), 45% for idiopathic NOA (42/93), and 52% for "other" aetiologies (25/48).

28 patients responded to questionnaires regarding pregnancy rates. Pregnancy rates were 22.4 - 73.3% for obstructive, and 16.6 - 61.5% for non-obstructive azoospermia (minimum to maximum).

Conclusions: The results show an assciation between aetiology of azoospermia and SSR outcome, with Y chromosomal microdeletions showing significantly higher sperm detection rates than any other NOA **Sub**group.

This will provide patients with more information about prospective outcomes and permit a more informed prognosis.

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Testicular Sperm Extraction: How This Surgical Technique Has Improved the Management of NOA. Journal of Clinical Medicine. 2021 Mar 29;10(7):1374.

78. Does Dynescan technology have clinical potential for analysing human semen parameters?

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Objective: Semen analysis (SA) is vital for clinical evaluation of male fertility but is highly variable. Dyneval (Dyneval Limited, Scotland) developed the Dynescan semen analyser, measuring percentage progressive motility (PM%), mean swimming speed (μm/s) and concentration (M/ml) of sperm in semen over their lifetime. This technology could be adapted to assist current SA, to improve and enhance investigations of male infertility.

The aim of this project was to compare manual SA with the analysis of Dynescan technology, using human clinical samples.

Methods: Manual SA was performed on patient semen by competent clinical laboratory staff and results of PM% and concentration (M/ml) were directly compared to Dynescan analysis (*n=41*). Manual SA was performed following WHO guidelines [1]. 3μL semen was analysed in parallel via Dynescan technology, using a fixed-depth 20μm microscope slide. 6 replicates were recorded at 5-minute intervals (the Dynescan incubated samples at 37°C). 3μL prepared patient sperm was analysed in the sealed slide for 12 hours: the Dynescan stress test. Replicates were recorded at 10 minutes intervals, to evaluate how PM% changes following IVF insemination.

Results: Overall, Dynescan technology underestimated the values for PM% (average difference = 32%) and concentration (average difference = 57%) in semen, when compared to manual

SA reports. In the Dynescan stress test, PM% decreased consistently over 12 hours, with most sperm having zero PM% after approximately 10 hours.

Conclusion: Whilst Dynescan technology offers a new diagnostic test regarding semen longevity for andrology laboratories, the preliminary clinical data suggests it underestimates basic human semen parameters. It only assesses one field of view which is less accurate- the results provided will not be representative of the entire sample being assessed. However, the Dynescan stress test provides an indication into how semen motility changes over time, with potential to predict IVF success.

References

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136. High environmental contaminant load is associated with CATSPERZ downregulation and may impact stallion fertility

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University of Nottingham, Nottingham, United Kingdom

Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Introduction: The equine industry preferentially selects sires based on pedigree, performance, and conformation, with little concern given to fertility, despite equine sperm motility declining over time (1). We have previously shown equine testis to contain environmental contaminants (ECs). Here we explore if such contaminants impact key gene pathways associated to testicular health or sperm quality.

Methods: Whole RNA was extracted from equine testicles (n=6) and sequenced using NEBNext Ultra Directional II with polyA enrichment. A decoy aware host transcriptome was created using

the EquCab3.0 (GCA_002863925.1). RNA-Seq data was pseudo-aligned using Salmon v1.9.0 (2). Differential gene expression was calculated with DESeq2 (3). iDep software assessed reproductive gene ontology pathways with respect to EC load (low vs high). Statistical analysis included T-test or two-way ANOVA.

Results: When assessing high versus low EC load against gene expression, *CATSPERZ* and *RGL3* genes were downregulated in response to high total EC load ($P \leq 0.05$ and $P \leq 0.001$ respectively). Grouping of samples by Polyaromatic Aromatic Hydrocarbon (PAH) concentration showed the most significant clustering on principal component analysis compared with other chemical groups. *SRY* was downregulated with respect to high PAH load, specifically chrysene and Benzo[a]anthracene ($P \leq 0.05$). The androgen converting enzyme *HSD17B4* was upregulated in the presence of high Polybrominated diphenyl ethers (PBDE) concentrations ($P \leq 0.05$).

Conclusions: Declining sperm quality across all species is proposed to have an environmental aetiology (4). *CATSPERZ* downregulation could partly explain the decreasing sperm motility trends observed in equines, given its role in the sperm calcium ion channel. Furthermore, the anti-androgenic activity of PBDEs may be causing an upregulation of the *HSD17B4* enzyme as a compensatory response. Impaired equine fertility can have a significant economic and welfare impact, further research is therefore required to explore the extent to which ECs might perturb reproductive function on a genetic level.

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142. Sperm motility and cryptorchidism in a population of stud dogs: an update on 'adverse' temporal trends and its relevance to the human.

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Introduction: Declining human sperm counts over 70 to 80 years, alongside an increasing incidence of cryptorchidism are believed to have an environmental aetiology. We have reported similar temporal trends in a population of stud dogs manifested by a 26-year decline in sperm motility (1988-2014) and an increased incidence of cryptorchidism (1995-2014) (1). The current study was designed to determine if these temporal trends continue beyond 2014 to the present day.

Methods: Data on sperm motility (%) and cryptorchidism from a single laboratory was analysed in a population of UK breeding stud dogs (1988-2023; 4130 collection samples; 464 dogs). Breeds included Labradors: L, Golden Retrievers: GR and German Shepherds: GSD. A generalised mixed linear model (Genstat) was used to account for breed, age and year of collection (random effect: dog, dam, sire) and REML in R enabled heritability and permanent environmental influences to be calculated.

Results: An overall decline in motility over 35 years was observed ($P<0.001$, $R^2=0.23$, n=4120 collections/462 dogs). Between breeds, a decline was observed in L ($P<0.0001$, $R^2=0.36$, n=2124 collections/251 dogs), and GR ($P<0.05$, $R^2=0.13$, n=1536 collections/148 dogs) [Time: $P<0.001$, breed $P<0.001$, breed x time interaction: $P<0.001$]. In contrast, no decline was reported in GSD (n=460 collections/63 dogs). Genetic models suggest that permanent environmental effects rather than genetic and heritability influences, account for these temporal trends. Preliminary analyses of cryptorchidism across breeds indicate a significant 0.5% increase in prevalence per decade (1994-2023) [$P<0.0001$, $R^2=0.47$, across 17,306 males].

Conclusions: Since dog semen quality in L and GR breeds has declined across 35 years and the incidence of cryptorchidism has continued to rise over 19 years, we suggest that these data reflect an ongoing concern over environmental influences on male reproductive health. Although reasons underlying breed differences are uncertain, these data support similar temporal trends in the human.

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322. Measuring the male reproductive microbiome: a low biomass context.

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Background: The relationships between male reproductive microbiota, semen quality and fertility endpoints are ill-defined. The sensitivity and power of high-throughput sequencing creates multiple opportunities for bias, especially in the context of low microbial biomass (1). Some biological niches proposed to harbour distinct microbial communities have been refuted (2), highlighting the importance of establishing a biological signal distinct from contaminant DNA.

Methods: We quantified bacteria with qPCR, targeting the V4 region of 16S, or amplicons within GAPDH (host), ybbW (E. coli), or acul (E. faecalis). Mock communities were constructed from axenic cultures isolated from boar semen. DNA libraries were sequenced on an Illumina

NovaSeq 6000. Raw sequences were analysed with the Qiime2 (2023.2) platform and amplicon sequence variants (ASVs) were inferred using the Deblur algorithm (3).

Results: In 10ng of boar semen DNA we observed mean CT values for V4 of 18.0 (raw semen), and 25.6 (extended semen), relating to copy numbers of ~4.0 x 105 and 2500, above no-template thresholds (CT ~33.2). Amplification of contaminant DNA occurs during library preparation. Our mock contained bacterial concentrations ~10x greater than semen, yet contaminant taxa (eg: Ralstonia sp.) contributed to 22% relative abundance. In mock spiked semen, ASV counts reduced (~20,000 reads) for two members (E. faecalis, Staphylococcus sp). qPCR of E. coli (gram-) and E. faecalis (gram+) in both axenic and spiked semen samples of 1x105 and 1x106 cells showed copy number was directly proportional to spiked cell number, with a non-significant increase in copy number when spiked, suggesting that bias is not a result of differential DNA extraction due to sample matrix.

Conclusion: Semen microbiota is low in biomass. Mock Communities are essential to highlight taxa detection rate differences. Despite confirmation of microbes in this environment, more work is required to discern overlap with adjoining biological niches.

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178. Effect of 35.5 GHz millimeter waves on reproductive parameters of male Wistar rat

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

The increased usage and wide application of millimeter waves (MMW) in different spheres of public domain makes it important to have a better understanding of any possible health impacts caused by them. Mobile communication 5G bandwidth and weather broadcasting radar works on millimeter waves.

Objective: The aim of present study is to determine the effect of these radiations on the reproductive system of male Wistar rats. Animals were divided into three groups Control, Sham-Exposed, and Exposed with 6 rats in each group. The experimental group was exposed to 35.5GHz frequency for 2 hours/day for 60 days in a specially designed anechoic chamber. At the end of exposure, animals were sacrificed, cauda epididymis and testis were excised out and various sperm parameters sperm count, viability, morphology, and sperm mitochondrial activity were evaluated [1]. Testis morphometry (seminiferous tubular diameter and germinal epithelial height) were measured and histopathological analyses were done by Johnson scoring. Ultrastructure analysis of sperm morphology was done by Scanning Electron Microscope (SEM). For oxidative stress analysis, Lipid peroxidation, FRAP assay, SOD, Total SH levels were evaluated in sperm and testis homogenates. For the DNA integrity comet assay was performed on testis.

Results: showed a statistically significant decrease in sperm count and viability in exposed group animals. SEM analysis showed changes in sperm head morphology. Histopathological changes also showed significant changes in seminiferous tubules and alteration in spermatogenesis in exposed group. Lipid per oxidation in the testis and sperm also showed a significant increase in the exposed group. Further comet assay results also showed significant damage in exposed group.

Conclusion: Results indicated that long-term exposure to millimeter waves may affect male infertility.

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11. Pyogenic Granuloma Gravidarum: Does it recur in subsequent pregnancies?

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Pyogenic granuloma gravidarum (PGG) is a benign fibrovascular lesion arising during pregnancy. In this paper, we present a case of a lady in her third trimester of pregnancy with recurrent left epistaxis and a swelling in her left nostril. She was diagnosed with PGG via MRI and nasoendoscopy. The lesion was managed conservatively and the neonate was delivered smoothly at 36-weeks' gestation. Evidence shows that MRI is superior to CT in the assessment of soft-tissue masses, but there is a paucity of MRI PGG imaging in the current literature *1*. Our report shows that MRI imaging, together with the clinical context, is adequate to make a diagnosis of PGG. The vast majority of PGG cases arise in the oral cavity and surgical excision with desiccation at the base has been frequently reported as the preferred treatment option to minimise recurrence*2*. Our report is notable as a rare case of a nasal lesion that was allowed to involute with conservative treatment, hence avoiding the potential complications of surgical intervention. To our knowledge, this is the first published report to include a follow-up to a successful second pregnancy and delivery without the recurrence of PGG.

Key Takeaways for Obstetricians and all other Clinicians:

1. Clinicians should remember to include PGG as a differential diagnosis for a pregnancy tumour.

2. **A 'wait-and-watch' approach may be the superior treatment for PGG.** Our report is notable as a case of a nasal lesion that was allowed to involute with conservative treatment, hence avoiding the complications of surgical intervention.

3. **Patients with a history of pyogenic granulomas should be monitored and advised to maintain proper oral and nasal hygiene, especially during the final two trimesters of pregnancy.** However, this report demonstrates that this condition can be treated with no risk of recurrence in **Sub**sequent pregnancies.

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FRIDAY, 10 JANUARY 2025

PW4 Poster Walk

286. Investigation of effects of folate-depletion on human trophoblast stem cell regulation

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Category

Other

Sub-Category

Basic Science

Abstract

Background: While it is recognised that maternal dietary folate deficiency increases risk of neural tube congenital defects, it is less well known that folate deficiency also associates with pregnancy complications including fetal growth restriction[1]. Here we explore how folate availability regulates trophoblast, providing insights into the molecular pathways required for normal placenta development and informing the clinic about the impact of maternal folate deficiency on placental and fetal health. Using mouse trophoblast stem cells (TSCs) it has been demonstrated that folate depletion causes ectopic spontaneous differentiation of TSCs grown in stem cell maintenance media, and a tendency to differentiate to syncytiotrophoblast at the expense of other cell types [2]. A molecular role for folate metabolism in human placenta has not yet been studied.

Methods: BeWo, JEG3 and hTSCs were grown in standard conditions (6 μM folic acid) and in DMEM/F12 without folic acid. Effects on colony morphology examined by brightfield microscopy. Cell counts and viability on days 2,4 and 6 were determined by manual counting. qRT-PCR analysis was performed for expression of hTSC markers (*TP63*, *EGFR*, *GATA2*, and *TEAD4*) and expression of microRNAs from the trophoblast-specific C19MC cluster. Supernatant from folate-depleted adapted cells will be **Sub**jected to quantitative measurement of PSG protein secretion by ELISA.

Results: Proliferation is significantly reduced in both JEG3 and BeWo lines in response to folate depletion: cell numbers are reduced but no detrimental effect on cell viability are observed.

Conclusion: We provide novel insights into the role of folic acid in stem cell biology. Our translation of published studies in the mouse to the human context suggests divergent regulatory mechanisms. Our experimental studies, harnessing novel in vitro systems, provides additional benchmarks of these models, informing their utility in modelling embryo development and delivering improvements towards a more physiological model to study cell behaviour.

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3. Calcium versus cabergoline for prevention of ovarian hyperstimulation syndrome: a systematic review and meta-analysis

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Category

Oocytes and ovary

Sub-Category

Clinical

Abstract

Objective: To conduct the first-ever systematic review and meta-analysis evaluating calcium infusion versus cabergoline in preventing ovarian hyperstimulation syndrome (OHSS) among high-risk women undergoing assisted reproductive technology.

Methods: Six databases were screened from inception until April 1, 2024. The included randomized and non-randomized controlled studies were assessed for quality. The endpoints included the severity of OHSS and selected pregnancy-related outcomes. Endpoints were summarized as risk ratios (RRs) and 95% confidence intervals (CIs) in a random-effects model.

Results: Six studies were analyzed, including 1,687 patients (828 in the calcium group and 859 in the cabergoline group). The quality of the studies varied and reflected low risk and high risk of bias in two and four studies, respectively, according to the revised Cochrane risk of bias tool. No significant differences were noted between both groups regarding the rates of overall ($n = 5$, RR = 0.65, 95% CI [0.39, 1.07], $p = 0.09$), mild ($n = 4$, RR = 1.05, 95% CI [0.59, 1.89], $p = 0.86$), moderate ($n = 5$, RR = 0.41, 95% CI [0.15, 1.08], $p = 0.07$), and severe ($n = 6$, RR = 0.36, 95% CI [0.11, 1.22], $p = 0.1$) cases of OHSS. Leave-one-out sensitivity analysis of an outlier study revealed that calcium significantly reduced the occurrence of severe OHSS compared with cabergoline ($n = 5$, RR = 0.16, 95% CI [0.09, 0.43], $p < 0.001$, Higgins $I^2 = 0\%$). No significant differences were observed between both groups regarding the rates of clinical pregnancy ($n = 4$, RR = 0.97, 95% CI [0.88, 1.07], $p = 0.57$), ongoing pregnancy, live birth, and spontaneous abortion (Higgins $I^2 < 50\%$ for all).

Conclusion: Both agents yielded similar pregnancy-related outcomes. However, calcium infusion could potentially be more effective than cabergoline in reducing the rate of severe OHSS.

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19. Development of a 3D stem cell bioassay to test quality control of IVF

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Category

Other

Sub-Category

Basic Science

Abstract

Objective: To investigate mouse and human stem cell derived embryoid bodies' response to different culture media.

Background: The mouse embryo assay (MEA) is a toxicological bioassay used to assess embryotoxicity of media used in *in vitro* fertilization (1). There are concerns that it's insufficiently sensitive to **Sub**-optimal conditions, and that end-point interpretation is **Sub**jective. Stem cell-based assays are an established way to assess embryotoxicity (2). To date, stem cell-derived embryoid bodies are not used for the purpose of screening IVF consumables and reagents. P19 cells are shown to detect perturbances in media when assessed for growth and viability, but further optimization is needed to verify the sensitivity of a 3D assay.

Methods: P19 and NTERA embryonal carcinoma cells were prepared to form 2D (monolayer) or 3D (embryoid body) structures. Cells were treated with commercial sequential media (fertilization, cleavage and blastocyst) and compared to negative (αMEM) and positive (DMSO) controls. Viability was determined in 2D assays by resazurin reduction and by embryoid body growth in 3D assays.

Results: Cells responded most favorably to cleavage media in both assays.

Embryoid body growth comparison showed a significant difference (Kruskal-Wallis chi-squared = 92.091, df = 4, p-value < 0.001).

Viability was higher in fertilization media at 96h in 2D culture. Comparison of the 2D assay and blastocyst development in mice demonstrated that the 2D assay was equally sensitive to treatments ($F = 65.02$; $df = 2$; $p < 0.001$), with cleavage media showing the highest rates of resazurin reduction after 48 hours.

Conclusion: 2D and 3D assays were comparable to the MEA. Further optimization is required to verify results and ensure that the assay is sensitive to varying concentrations of media components. Optimized methods may facilitate an alternative assay for quality control and embryotoxicity testing in IVF, which could reduce the use of animals in research.

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167. Temporal trends in sperm concentration: a contrasting perspective from a single-centre review

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Introduction: Male factor infertility contributes up to half of infertility cases(1) and reports suggest a global decline in sperm quality(2–4). However, fertility trends can vary by region and population. Understanding local trends in sperm parameters is crucial for tailoring treatments and counselling.

Methods: We retrospectively analysed 18,306 semen analyses from 15,846 male patients at Merrion Fertility Clinic over 16-years (2008-2023). The primary outcome was sperm concentration (million/mL), with 2021 WHO criteria (<16million/mL) applied to identify **Sub**normal results(5).

Results: Sperm concentration increased significantly by 13.9%, from 62.9 million/mL in 2008 to 71.7 million/mL in 2023($p<0.0001$). The number of semen analyses performed increased by 23.6%, from 1020 in 2008 to 1262 in 2023. The proportion of **Sub**normal results remained consistent, with a mean of 21.2% samples showing **Sub**normal parameters. The mean age of men attending for investigation did not change significantly. In 2008, mean age was 36 years, whereas in 2023 mean age was 37.

Discussion: The observed increase in sperm concentration highlights regional differences in male fertility trends. While global reports indicate a decline(1–4), our findings suggest that localised factors such as socioeconomic status and lifestyle may impact sperm quality. Men attend the clinic privately, suggesting a higher socioeconomic class which can contribute to better health(6) and semen parameters(7–9). The ability to self-refer for fertility testing provides quicker access to care. A growing awareness of reproductive health, improved public health campaigns, and

lifestyle changes may also have positively impacted sperm quality, as smoking and alcohol consumption continues to fall in Ireland(10–12). These proactive health behaviours, coupled with lower environmental pollutant exposure in Ireland(13,14) may have positively contributed to overall better semen parameters. This study underscores that regional variations may challenge global reports on fertility trends.

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137. Beyond the Rainbow Bunting: Examining the Realities of UK Fertility Care for LGBTQ+ Individuals

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Category

Psychosocial

Sub-Category

Clinical

Abstract

Introduction

Recent legislative changes in the UK have led to an increase in LGBTQ+ individuals seeking fertility treatment. Fertility clinics have responded rapidly, targeting this group who often rely on these services as their sole option for biological parenthood. This study explores the experiences of LGBTQ+ patients within fertility care.

Methods: 15 semi-structured interviews were conducted with LGBTQ+ patients between 19/01/2024 and 22/08/2024 lasting between 40 and 90 minutes. Interviews were either paired (N=11) or individual (N=4). Interview transcripts were examined using thematic analysis.

Results: Interviewees comprised 24 lesbian cisgender women and 2 transmasculine individuals. The experiences discussed were with IUI (N=5), IVF (N=11) and fertility preservation (N=1).

Interviews highlighted cisheteronormativity (N=14), a lack of inclusive patient guidance (N=4) and paperwork (N=2) as well as explicit homophobic (N=5) and transphobic (N=2) discrimination from clinic staff. This included active discouragement from pursuing treatment as a transgender person by clinicians (N=1). Patients also noted a lack of competent mental health support during their treatment (N=5).

Many interviewees mentioned difficulties in the gamete donation process (N=9) with donor shortages, bureaucracy and a lack of counselling. Donor sperm was often sourced internationally (N=7) or via social media (N=3). Experiences with the latter pathways were mixed, including both positive "mutual aid" agreements and more problematic cases, such as donors pushing for "natural conception".

Cost was identified as a major barrier to accessing care (N=10) with some patients explicitly mentioning feeling financially exploited by their clinics (N=3). Some patients also highlighted a lack of knowledge from GPs (N=5) and discriminatory funding/treatment criteria (N=5). Additionally, patients mentioned a lack of LGBTQ+ inclusivity on clinic websites (N=3), instead relying on word-of-mouth to select a clinic (N=2).

Conclusion: LGBTQ+ patients face significant barriers in fertility care, including discrimination, high costs, and inadequate support, impacting their treatment experiences.

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236. Assessing Sperm Settling Time for Optimised Automated Intelligent Sperm Analysis using MOJO AISA.

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Objective: The World Health Organization[1] (WHO) recommends a pre-analysis 60-second delay for sperm to settle in a counting chamber. Accurate motility assessment requires that the

analysis begins immediately after the 'sample drift' ceases. Sample drift is common in wet preparation slides, exacerbated by robotic movements with high acceleration and velocity. To mitigate this, CASA systems often use fixed-depth slides to control sample flow, but these slides can cause Segre-Silberberg effect[2] sample inhomogeneity, leading to inaccurate measurements. However, previous studies indicate that settling time significantly affects concentration and motility measurements[3]. This study aims to find the optimal settling time pre-evaluation and if agitating a slide during CASA evaluation disturbs the stability of cells. Nevertheless, precise calibration is necessary to ensure accurate CASA results.

Method: A 10µl aliquot of semen was loaded on the slide with a coverslip. A timer was started while the drift was observed through CASA 'Manual capture' mode. The time for sperm to re-settle post-agitation was measured, and the effect of repeated agitation on sample stability was assessed.

Results: The key results show that the approximate settling time is 105 seconds, more than the standard WHO-recommended time. Between each interval of stage agitation, it takes an average of 10 seconds for the sperm to resettle. The findings are important for CASA systems calibration, which often move samples swiftly between positions. The study suggests that the waiting time between stage movements should account for sperm drift cessation to maintain measurement accuracy. These findings are crucial for CASA calibration, which moves samples rapidly between positions.

Conclusion: This study provides detailed sperm settling time data, potentially informing future updates to standardised protocols and improving accuracy for automated analysis techniques. Also, these results give precise timelines for calibrating CASA machines, increasing the analysis time whilst maintaining result integrity.

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275. A study to assess the impact of duration of progesterone administration for luteal support in frozen embryo transfers in an IVF clinic on implantation and clinical pregnancy rates.

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective: Progesterone (P4) for luteal phase support is important for successful embryo transfer (ET), facilitating a favourable environment for implantation, maintaining pregnancy and optimising live birth rates. The P4 regime for frozen embryo transfers (FETs) in our clinic is to commence P4 pessaries vaginally (400mg three times daily) from 08:00hrs and then schedule the ET on the sixth day of P4 administration. For patients whose ET is scheduled in the morning, they have a shorter duration of P4 compared to patients in the afternoon. This study aims to determine if the scheduling of ET (am/pm) relative to the duration of administration of progesterone affects the implantation and clinical pregnancy rate (CPR).

Methods: All FETs undertaken in one clinic between 1st April 2023 and 31st March 2024 were reviewed. All women were advised to commence P4 at 08:00hrs and their ET performed on the sixth day of P4 administration. Data was collected regarding the timing of the ET (am/pm), and the cycle outcome (implantation and clinical pregnancy rate).

Results: Of the 419 women who underwent an FET, 196 had their ET in the morning (before 1pm) and 223 in the afternoon (after 1.30pm). In the morning ET group, 106/196 (54.1%) had a

positive pregnancy test and 87/196 (44.4%) a clinical pregnancy. In the afternoon ET group, 117/223 (52.5%) had a positive pregnancy test and 86/223(38.6%) a clinical pregnancy. These differences were not statistically significant (p=0.77 and p=0.23 respectively).

Conclusion: Although not statistically significant, it was felt that the 5.8% difference in clinical pregnancies between the two groups was clinically significant. As a consequence, we are trialling a more personalised approach of advising patients scheduled for an afternoon ET to commence P4 at 12:00hrs instead of 08:00hrs and are prospectively collecting data on implantation and clinical pregnancy rates.

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339. Ensuring Future Fertility: Fertility Preservation Services for Children and Adolescents

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Category

Other

Sub-Category

Clinical

Abstract

Background: Fertility Preservation (FP) is recommended for all paediatric oncology patients, with no lower age limit, as per NICE guidelines (1). However, complexities in pubertal development, capacity assessment, and consent pose challenges in the paediatric setting (2). Recent data show a 20.5% referral rate to FP for paediatric oncology patients, with deviations in FP provision from NICE guidance observed (3,4).

The application of FP for children and adolescents in practice and barriers faced require further exploration.

Objective: To investigate the experience of fertility treatment providers when offering FP to under-18-year-olds.

Methods: An online questionnaire was written and distributed at the Annual Fertility Preservation Conference (Edinburgh, May 2024) and sent to UK and Ireland fertility treatment centres.

Results: Of 20 responding clinicians, 85% (n=17/20) offer FP to under-18-year-olds. 41% provide FP from infancy (n=7/17), others reported minimum age and pubertal stages (starting 12-years-old) or weight (50kg).

FP was offered for oncology and benign disease through sperm or oocyte cryopreservation 78.9% (n=15/19), ovarian tissue cryopreservation 63.2% (n=12/19), testicular tissue cryopreservation 47.4% (n=9/19), onco/microTESE 36.8% (n=7/19) and ovarian transposition 36.8% (n=7/19).

Key challenges in practice were patient counselling 66.6% (n=12/18), funding 55.6% (n=10/18), and for 50% (n=9/18) managing ethical dilemmas, parent versus child expectation and consent.

Treatments were not offered for many reasons, namely policy and network failings, funding, clinical staff training and clinic or laboratory infrastructure. Notably 70% (n=14/20) wished to expand FP services and 56.3% (n=9/16) reported no current forwarding referral pathway when they cannot offer a suitable FP treatment.

Conclusion: This survey provides insight into varied provision of FP to under-18-year-olds and the difficulties experienced by treatment providers. We propose collaborative working with a review of referral pathways, funding, and guidance to ensure access to FP is equitable, not precluding any child.

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16. Localisation and characterisation of the endocannabinoid system in the human male reproductive tract: A systematic review.

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Introduction: The endocannabinoid system (ECS) comprises various endocannabinoids, including N-acylethanolamines (NAEs) and 2-arachidonoylglycerol (2-AG), interacting with receptors such as CB1R, CB2R, TRPA1 and GPR55 to modulate cell function. ECS regulatory enzymes include NAPE-PLD (synthesising NAEs), DAGLA (synthesising 2-AG), FAAH (hydrolyse NAEs), and MGLL and ABHD2 (hydrolyse 2-AG). This study aimed to review articles investigating the ECS localisation and characterisation in human male reproductive tissues.

Methods: A PRISMA systematic review was conducted on PubMed and Scopus. Removal of duplicates, screening and eligibility was done. Included articles were any study investigating the ECS localisation and characterisation in adult male reproductive tissues.

Results: After retrieving 1172 articles, 5 met the eligibility criteria. Receptors CB1R and CB2R is localised in Leydig cell cytoplasm, where CB2R-A is 100-fold higher in testicular compared to peripheral tissues. NAPE-PLD is higher than DAGLA in Leydig and Sertoli cells, with MGLL abundant in Sertoli cells. In germ cells, CB1R is located in the nuclei of primary spermatocytes. However, CB2R and ABHD2 is located in the cytoplasm of all germ cells except primary spermatocytes. DAGLA is present in the nuclei of all germ cells, and FAAH active in post-meiotic germ cells. Furthermore, CB1R, CB2R, TRPA1, GPR55 and FAAH is localised in the prostate, seminal vesicles and/or vas deferens, predominantly around nerves, secretory epithelium and smooth muscle.

Conclusions: The ECS may modulate Leydig and Sertoli cell signalling, potentially mediated through NAEs given specific binding to CB2R-A and higher expression of NAPE-PLD. In spermatogenesis, the ECS may have stage-specific roles in modulating nuclear and intracellular signalling, meiosis and maturation, potentially mediated through 2-AG given the presence of DAGLA and FAAH. Furthermore, the ECS may modulate mechanisms of seminal fluid secretion and ejaculation in male accessory glands. However, there is a paucity of knowledge on the ECS in human male reproductive tissues.

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298. Impact of fertility preservation strategies on reproductive outcomes in women with BRCA1/2 mutations and breast cancer: A systematic review and meta-analysis

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Category

Other

Sub-Category

Clinical

Abstract

Background: Breast cancer is a significant health concern, particularly for women with BRCA1 and BRCA2 gene mutations. These young women, undergoing cancer treatments, face the risk of fertility loss. However, it remains uncertain how fertility preservation success rates in this population compare to the general female population.

Objective: This study aimed to assess fertility preservation success rates in women with breast cancer carrying BRCA1/2 mutations, evaluate reproductive outcomes, examine long-term ovarian function, and compare these success rates to those in the general population.

Methods: A comprehensive literature search was conducted across PubMed, Embase, and Medline databases from January 1, 2000, to June 30, 2024. Keywords included "BRCA1," "BRCA2," "breast cancer," "fertility preservation," "oocyte cryopreservation," and "embryo

cryopreservation." Studies involving women with confirmed BRCA1/2 mutations and breast cancer were included. Meta-analyses were conducted using a random-effects model, and heterogeneity was assessed using the I^2 statistic.

Results: Out of 277 initial records, 10 studies were included in the qualitative synthesis, with 5 meeting criteria for meta-analysis. A mean of 13.2 oocytes were retrieved (95% CI: 12.5-13.9), and 6.4 embryos were frozen (95% CI: 5.9-6.9). Live birth rates were favourable, with an overall risk ratio of 1.45 (95% CI: 1.10-1.90). Younger women and those using embryo freezing demonstrated higher live birth rates. The mean time to pregnancy was 12 months (95% CI: 11-13 months), with low complication rates. Long-term ovarian function, assessed by Anti-Müllerian Hormone (AMH) levels, remained in the normal range at 2.10 ng/mL (95% CI: 1.9-2.3).

Conclusion: Fertility preservation methods in women with BRCA1/2 mutations and breast cancer show promising outcomes, with success rates comparable to the general population. Embryo cryopreservation and younger age at preservation are associated with better reproductive outcomes. Long-term ovarian function appears preserved, suggesting fertility preservation is a viable option for this group.

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125. Family formations in ART treatment in the UK

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Category

Other

Sub-Category

Translational

Abstract

Objective: This report explores how ART access, treatment and outcomes differ between different family structures in the UK.

Methods: We analysed all treatment cycles by family type recorded on the HFEA Register since 1991, with a particular focus on cycles undertaken in 2018-2022.

Results: We will describe how treatment experiences vary between single patients, patients in same sex relationships, and patients in mixed sex relationships. This includes data on reciprocal IVF treatments (also known as shared motherhood) - the first time such has been explored on a UK-wide level. This report will discuss how birth rates vary between family structures, and how the age at which people in different family types pursue fertility treatment has changed. Rates of NHS funding will also be described, as well as the variation in such between UK nations and regions.

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39. Cellular and molecular evaluation of the therapeutics potential of quercetin to reverse aspirin- induced male reproductive dysfunction.

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Background: Infertility, a major health problem, affects approximately 10–15% of couples, with 40% attributed to male partners across the world (1). Studies have reported that aspirin can induce reproductive toxicity, hence leading to infertility (2).

However, quercetin, a natural product and food supplement, has been shown to possess anti-inflammatory and antioxidant properties (3). Hence, this study aimed to determine quercetin's cellular and molecular evaluation on aspirin-induced male reproductive dysfunction.

Materials and Methods: Thirty five Wistar rats weighing 200-230g was divided into seven groups as follows.

Group A received normal saline (control).

Group B rats receive corn oil

Group C was administered with quercetin 30mg/kg.

Group D was administered with quercetin 60 mg/kg

Group E was given aspirin 50mg/kg

Group F was given aspirin 50mg/kg with concurrent administration of quercetin 30 mg/kg.

Group G was given aspirin 50mg/kg with concurrent administration of quercetin 60 mg/kg.

The study lasted for 56 days on the 57th day, the rats were sacrificed, and both testes were excised for histology and immunohistochemical, while caudal epididymis was use for sperm analysis. Data analysis were done using graph pad prism.

Result: The study found that animals in aspirin-induced groups showed a decrease in sperm count, motility, and morphology when compared to the quercetin group and control group. Also aspirin administered rats showed testicular germ cells degeneration which was improved in the treatment and control group. In addition there was increase in protein 53 and decrease in protein retinoblastoma expression intensity in group of rats exposed to aspirin only when compared to rats in control and treatment groups.

Conclusion: With this result, the potential of quercetin as a therapeutic agent can **Sub**stantially improve aspirin-induced male reproductive dysfunction.

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162. Our experience in diagnosing and treating Isthmocele in previous failed In-vitro Fertilization cases in a tertiary centre in Kuwait

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Category

Uterus

Sub-Category

Clinical

Abstract

Introduction: The incidence of isthmocele, a complication arising from caesarean sections (CS), is on the rise, posing challenges to fertility due to its association with infertility[1]. Transvaginal (TV) ultrasound is the primary diagnostic tool; however, hysteroscopy is preferred[2]. This data represents our clinical experience in diagnosing and managing isthmocele in individuals with a history of failed in-vitro fertilization (IVF) at New Mowasat Hospital, Kuwait.

Aims: Efficiency of utilising TV ultrasound for isthmocele diagnosis

Effectiveness of versa point cauterisation in correcting isthmocele and its outcome in treating recurrent IVF failure.

Investigate the correlation between isthmocele incidence, number of CS and duration of secondary infertility.

Methods: Cohort includes patients with secondary infertility (2-12 years) following multiple CS (1-4) and those with recurrent IVF failures (2-9). Retrospective analysis of patients undergoing hysteroscopic isthmocele correction and IVF outcome, between 2020 and 2022.

Results: Eight cases underwent successful hysteroscopic correction, with TV ultrasound accurately diagnosing isthmocele in all instances, corroborated by hysteroscopy. Versa point was used to cauterise the isthmocele in all cases. Following the correction, six (75%) patients proceeded with IVF treatment. Post-treatment, 83.33% achieved pregnancy through IVF, resulting in a 50% live birth, after their initial IVF attempt. One case experienced a biochemical pregnancy, another at 8-week miscarriage, while one case did not conceive after one IVF cycle.

Versa point cauterisation eliminates the cavity, addresses fluid accumulation, strengthens scar tissue, and promotes re-epithelialisation and improves IVF outcomes.

Conclusion: 2D ultrasound demonstrates 100% effectiveness in isthmocele diagnosis. Hysteroscopic correction exhibits promises in addressing secondary infertility and IVF failures, irrespective of the duration of infertility or the number of CS deliveries, even though repeated CS deepens the isthmocele cavity. Further research with larger cohorts is essential to validate these findings and explore the treatment's efficacy in managing caesarean scar syndrome.

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282. Efficacy, safety and acceptability of a vaginal tampon for the collection of biospecimen samples: a systematic review and meta-analysis.

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Category

Other

Sub-Category

Basic Science

Abstract

Background: Self-collected vaginal tampon samples have the potential to enhance screening and diagnostic rates for various gynaecological conditions(1)(2). Although menstrual tampons have been shown to identify various gynaecological abnormalities as biospecimen collection devices, their routine use is currently limited, likely due to their novelty and insufficient data on their validity(1).

Objective: To assess whether self-collected vaginal tampons, as biospecimen collection tools, are comparable to current gold-standard methods in terms of efficacy, safety, and acceptability.

Methods: A systematic review was conducted in accordance with PRISMA guidelines and was prospectively registered with PROSPERO (CRD42022374857). Comprehensive searches were performed across PubMed, MEDLINE, Cochrane Library, Scopus, and Web of Science to identify eligible studies. All primary studies evaluating the acceptability, efficacy, or safety of vaginal tampons as a biospecimen collection device, compared to other conventional collection methods, were included.

Results: 34 studies were eligible for inclusion in the meta-analysis. Comparative analysis between tampon-based and conventional sampling methods for the detection of HPV, Neisseria gonorrhoeae, Chlamydia trachomatis, and Trichomonas vaginalis demonstrated no significant difference in detection rates across all organisms. Self-collected vaginal tampon specimens were widely accepted, reported benefits included lower pain scores, increased willingness to use, convenient accessibility (particularly in developing regions), and avoidance of embarrassment. Additionally, vaginal tampon collection methods were regarded as less traumatic and were associated with a reduced risk of bleeding compared to other collection techniques.

Conclusion: No significant differences were found between tampons and gold-standard collection methods in the detection of viruses and infections tested. The integration of menstrual tampons into clinical practice could help overcome barriers to healthcare access and increase participation in screening, essential for preventing avoidable gynaecological conditions and their associated long-term complications.

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119. Differences in bull semen microbiota between different collection times

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Objectives: It is difficult to obtain bull semen samples completely free of bacteria. Bacterial contamination can occur at various stages of semen collection and processing, and depends on numerous factors including bull preputial hygiene, dilution of semen samples, packaging, and storage (1). The main aim of this study was to evaluate differences in the occurrence of bacteria in ejaculates collected from the same bulls at different times.

Methods: Bacterial DNA was extracted from semen samples from 20 dairy bulls at three time points: 96 (T1), 48 (T2) and 24h hours (T3) after previous collection for 16S rRNA sequencing . Analysis of 16S rRNA sequencing data was performed using the NextFlow pipeline ampliseq v2.2.0 (https://github.com/nf-core/ampliseq).

Results: In total, 4837 ASVs were identified across all the samples, with 402 different genera identified; 228 at T1, 254 at T2 and 306 at T3. The number of bacteria differing by > 1% were similar in relative abundance between collection points. In total, 14 genera were present at all collection times, three were present at two collection times, and three, four, and three genera were present on only one occasion. At T1, *Bacteroides, Serrata, Pantoea*, were identified, at T2 *Wolbachia, Prevotella, Peptococcus, Alloprevotella*, and at T3 *Streptococcus, Staphyloccocus, Mycoplasma*.

Conclusions: Although there were no differences in the number of bacterial genera, there were differences in the identified bacteria between the different collection times. A 16S sequencing is important for identifying specific bacteria, such as *Mycoplasma*, which can severely compromise the health and welfare of dairy cattle, while the financial impact on affected herds can be significant.

Keywords: Bull semen, bacteria, 16S sequencing, collection time

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273. Cross Border Reproductive Health Research 2024: Global Insights from Patients Seeking IVF Treatment Abroad

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Category

Nursing

Sub-Category

Basic Science

Abstract

Objectives: Globally, the availability and costs of IVF treatments varies by country, and some patients explore international options (1-2). This study aims to understand patients seeking IVF treatment internationally, including motivations, past treatment experience, treatments sought, destination preferences, research methods, and information needs.

Methods: Cross-sectional, anonymous, online survey of patients seeking IVF abroad, disseminated via fertility websites, email to fertility services **Sub**scribers, and social media (January-June 2024). 1,189 respondents across 118 countries completed the survey, with 871 (73%) from 15 countries in Europe, North America and Australasia. **Sub**group analyses were performed by country of origin and treatment experience.

Results: Overall, cost was the most cited reason for seeking treatment abroad (41%) —seen in the UK and Ireland (67%) and North America (84%) — followed by prohibitive legislation (35%) —predominant in Germany, Austria and Switzerland (61%), Denmark, Sweden and Norway (52%), France (52%), and Italy (46%) — and treatment availability (35%) —predominant in the Netherlands (44%) and Australasia (57%). Most respondents (60%) had experienced at least 1 round of IVF treatment in their home country (51%) or abroad (29%). Australasians had the highest level of experience (88%) and North Americans the least (58%). Most respondents (76%) sought a single treatment type: most commonly IVF with donor eggs (51%), followed by IVF with own eggs (48%). Preferred destinations were Spain (60%), Greece (34%) and Denmark (23%), with variation by country of origin. Most respondents use Google (74%) to seek clinics abroad, cited Google reviews as their most trusted source of information (46%), but struggled to find information for international patients (56%), treatment costs (55%) or treatment success rates (50%).

Conclusions: Patients seek IVF treatment abroad primarily for cost and treatment availability reasons, but most have unmet information needs. IVF treatment providers would benefit from reviewing their online presence and identifying information gaps.

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Reproduction Update [Internet]. 2020 Nov 25;27(2):213–28. Available from: https://doi.org/10.1093/humupd/dmaa047

290. Improvement of mouse spermatozoa freezing at -80°c with antioxidants

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Sperm cryopreservation is the most common method to maintain a great number of mutant mouse lines. However, the use of liquid nitrogen (LN2) for freezing presents considerable problems in terms of cost, safety and accessibility. For this reason the storage on semen samples at -80° in ultra-freezers has been increasingly used in recent years, with evident advantages: it does not require dedicated space, it is cheaper and it is available even in small laboratories (1). Here, a new -80° freezer prototype, (Tecniplast S.p.A) was tested, in combination with new antioxidants, aimed to reduce the membrane damages and oxidative stress.

In detail, B6N and B6J spermatozoa were cryopreserved using the CPM method (2) directly at -80°C (3). The effect of ascorbic acid 2-O-alpha-glucoside (AA2G) spermatozoa treatment, during the freezing or thawing, was evaluated through a qualitative (motility, vitality and acrosomal reaction using SCA System) and functional analysis (IVF), after 1 and 6 months.

In terms of fertilisation rates, after six months, in B6N there is an increase in IVF of 50% at freezing (p=0,026) and 150% at thawing (p=0,026), while in B6J of 75% (p=0,0497) and 120% (p=0,037) respectively, also associated with greater vitality, demonstrating how the addition of

AA2G gave significant advantages mitigating physiological and functional damage due to cryoprocedures over time. In the wake of this data, an alternative antioxidant to be tested will be Epigallocatechin gallate (EGCG), an important polyphenol of natural origin; the percentages in IVF increase from 54% to 74% with a p=0.029.

These results may help to design new protocols or optimise those already validated by promoting the use of antioxidants in freezing at -80° as they have a significant effect on reducing oxidative stress, making spermatozoa qualitatively comparable to freezing in LN2 (1).

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175. Impact of mycotoxin exposure during in vitro oocyte maturation on blastomere nucleation and expression of H3K27me3 in early bovine pre-implantation embryos

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Deoxynivalenol (DON) and zearalenone (ZEA) are prevalent mycotoxins in cattle feed, though usually present at low concentrations on the farm environment. This study examined the combined effects of DON, its metabolite deepoxy-DON (DOM-1), and ZEA during *in vitro* oocyte maturation (IVM) on early embryo development, using representative values previously isolated

from bovine follicular fluid (1). Oocytes were exposed for 24 h during IVM to two mycotoxin concentrations reflecting ovarian follicular levels: TI (DON 100ng/ml, DOM-1 60ng/ml, ZEA 0.1ng/ml) and T2 (DON 200ng/ml, DOM-1 120ng/ml and ZEA 0.5ng/ml). The control group was 0.2% vehicle (methanol). Following *in vitro* fertilization (19 h), presumptive zygotes were cultured for 25 h and resultant early embryos were examined for blastomere nucleation status (DAPI staining) and H3K27me3 (a repressive epigenetic mark that is gradually removed from fertilization to embryonic genome activation) protein expression by immunofluorescence and confocal microscopy. Data was generated from three replicates. Cleavage rate was not affected by treatment (Control[n=64]: 81.77±8.11%, T1[n=62]: 87.37±4.09%, T2[n=56]: 86.71±6.78%, (ANOVA P=0.794)). Mycotoxin exposure did not affect the rate of embryos exhibiting nuclear aberrations in blastomeres including binucleation (Control: 29.37±2.98%, T1: 36.55±2.83%, T2: 35.71±7.14%, (Kruskal-Wallis P=0.469)), multinucleation (Control: 3.81 ± 1.91%, T1: 0.00±0.00%, T2: 7.14±7.14, (Kruskal-Wallis P=0.350)), no visible nucleus (Control: 16.07±5.67%, T1: 11.36±3.78%, T2: 9.52±2.38%, (Kruskal-Wallis P= 0.836)) and micronuclei (Control: 29.04±3.45%, T1: 32.88±8.05%, T2: 10.96±5.64%, (ANOVA P=0.089)). Likewise, mycotoxin treatment did not affect fluorescence intensity for H3K27me3 in 4-cell (Kruskal-Wallis P=0.891) and 8-cell (Kruskal-Wallis P=0.684) embryos regardless of blastomere nucleation status. This *in vitro* model suggests that low levels of DON, DOM-1 and ZEA reflecting physiological mycotoxin exposure of cattle at farm level are insufficient to induce a detrimental effect on early embryos using the present markers of embryo quality.

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207. The association of embryo morphokinetics and embryonic ploidy status

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objectives: The aim of this research project was to investigate associations between embryonic ploidy status and embryo morphokinetics that can be observed on the Time Lapse Incubator.

Methods: Retrospective study derived from 80 IVF and ICSI cycles at the Wolfson Fertility Centre. Between January 2018 and December 2023. All embryos were cultured in a Time Lapse incubator and biopsied for preimplantation genetic testing for aneuploidy using next-generation sequencing. Embryo morphokinetics analysed included the time of pronuclear appearance (tPNA; when first appearance of both pronuclei), time of pronuclear fading (tPNF; when both pronuclei were no longer visible), cleavage time to the 2-, 3-, 4-, 5-, 6-, 7-, 8- and 9-cell stages (t2, t3, t4, t5, t6, t7, t8 and t9, respectively), time of the beginning of compaction (tSC), time of the beginning of blastulation (tSB), timing of formation of full blastocyst (tB).

Results: Overall, 383 embryos from 64 patients were included in the analysis. Significant delays in tSB and tB were observed in aneuploid embryos compared to euploid embryos (tSB, mean = 97.8, 95%CI [96.1-99.5] vs mean = 95.9, 95%CI [94.1-97.7], p = 0.01269; tB, mean = 110, 95%CI [108-112] vs mean = 107, 95%CI [106-109], p = 0.03533). Additionally, tPNA was significantly delayed in aneuploid and euploid embryos compared to low level mosaic embryos (p = 0.0076 and p = 0.0101, respectively). No statistical differences were observed in the remaining morphokinetic parameters.

Conclusion: Findings show that aneuploidy affects preimplantation embryo development, resulting in delayed development. However, the overlapping confidence intervals between groups indicate that morphokinetics alone cannot determine ploidy status. The results of this study suggests that embryo morphokinetic assessments using the TLS, although informative, cannot fully replace PGT-A for identifying embryonic ploidy status.

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147. Short insemination of oocytes results in comparable laboratory outcomes and improved workflow.

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Introduction: During standard IVF insemination, oocytes and spermatozoa are co-incubated for 16–18 hours. However, several studies have reported long-term incubation (LTI) may produce high levels of reactive oxygen species (ROS) which can affect the interaction of gametes and the quality of embryos [1, 2]

To minimise this, short insemination (IS) 1-6 hours has been utilised. A meta-analysis of eight trials involving 733 women showed higher clinical and ongoing pregnancy rates following SI compared to LTI. However, the trials involved were of low quality and small sample sizes, and only one trial reported the live birth rate [3]

Method: A retrospective data analysis of all patients having SI at a single centre from April - August 2024 was performed. Laboratory KPI's were compared against the Vienna consensus competency and benchmark values.

Result: Of 141 mature inseminated oocytes, 99 resulted in 2PN (70.2%), 2/141 1PN (1.4%), 6/141 3PN (4.3%).99/99 cleaved (100%), 67/99 created a blastocyst (73.6%), 37/99 (37.4%) were categorised as 'good' blastocysts.

Among 141 SI mature oocytes, 99 (70.2%) were 2PN, 2 (1.4%) were 1PN, and 6 (4.3%) were 3PN. All 99 2PN oocytes cleaved, with 67 (73.6%) forming blastocysts, and 37 (37.4%) categorised as 'good' blastocysts.

Conclusion: The SI protocol met all 6 measured Vienna consensus competency values and 4 out of 6 benchmark values. Due to the limited number of embryo transfers performed, implantation data were not compared. These results suggest that SI is an effective alternative to LTI. Adopting SI altered the laboratory workflow and resulted in staff working four longer days rather than 5,

ensured PN formation was not missed and allowed same day rescue ICSI in the event of no 2nd polar body extrusion by 5 hours post insemination

However, further research is necessary to assess its impact on implantation and live birth rates.

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189. Development of an argumentation-based Decision Support System (DSS) for personalising IVF stimulation protocols: integrating clinical guidelines, expert insights, and patient preferences

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Category

Other

Sub-Category

Translational

Abstract

Introduction/Objective: This study presents an argumentation-based Decision Support System (DSS) for stimulation protocols in IVF clinics, integrating clinical guidelines, doctors' insights, patient preferences, and individual patient data such as hormone levels and AMH. The system assists clinicians in making evidence-based decisions by structuring arguments into three

categories: (1) guideline-based arguments, (2) expert opinions, and (3) patient preferences and data. The objective is to generate ranked recommendations evaluated through attack and support relationships, providing quantified values for each. The system ensures complete transparency by offering clear justifications for each recommendation, using the ESHRE guidelines for ovarian stimulation as the primary source during testing. The development was inspired by the metalevel argumentation frameworks proposed by Kökciyan et al. (2021)[1].

Methods: The DSS was developed by embedding the ESHRE guidelines into a knowledge base, alongside capturing doctor inputs, patient preferences, and individual patient data. The framework weighs different arguments based on their source. Guideline-based arguments were given higher default weights, while doctor inputs and patient data had adjustable weights based on relevance. Attack and support relationships were quantified to assess recommendation strength. The system ranks recommendations by computing a relative value, allowing clinicians to compare and select the most appropriate option, with justifications provided for transparency.

Results: The DSS successfully integrated multiple knowledge sources, providing a structured, transparent, and justifiable approach to IVF protocols. It generated tailored recommendations, balancing clinical evidence, expert judgment, patient preferences, and individual data, contributing to personalised medicine in fertility treatment. Initial evaluations showed the system reduced decision-making time and improved confidence in protocols. The system's potential to standardise care and improve outcomes across diverse patient populations was particularly noted.

Conclusions: This DSS offers significant advancements in managing IVF protocols. Further validation is needed to explore its full potential in improving clinical outcomes and patient experiences.

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115. Re-biopsy for accurate genetic diagnosis in embryos with no DNA and non-informative results in PGT-M

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Introduction: Preimplantation genetic testing for monogenic disorders (PGT-M) offers an option for carriers of single-gene diseases to test and transfer embryos that are free from inherited conditions. Approximately 2.1% of embryos tested with PGT-M fail to be diagnosed due to non-informative results and undetected DNA. Re-biopsy and reanalysis could increase the number of embryos available for transfer by identifying embryos that are both euploid and unaffected for the specific genetic condition.

Objectives: To evaluate whether re-biopsy for PGT-M cases where the first biopsy did not yield a result has the potential to provide additional embryos for transfer. We also assessed transferable embryo rate in re-biopsies for different maternal age groups.

Methods: This retrospective study was performed between May 2022-May 2024 using trophectoderm re-biopsies received for PGT-M cases (n=49) that had at least one embryo with initial no-diagnosis result (62 embryos). Samples underwent whole genome amplification, followed by Karyomapping and analysis with BlueFuse Multi software (Illumina, USA).

Results: Embryos that underwent re-biopsy had 92% (57/62) diagnostic rate, with 37.1% (23/62) receiving a transferable result. From the untransferable embryos (n=34), 26.5% (9/34) were euploid but affected for the monogenic disorder, 38.2% (13/34) were unaffected but aneuploid, and 35.3% (12/34) were both aneuploid and affected. For women <35, 52.8% (19/36) of embryos were suitable for transfer. However, for women ≥35, just 19% (4/21) of embryos were transferable. Among the embryos that could not be transferred, 47.1% (8/17) were unsuitable due to aneuploidy alone. In contrast, only 23.5% (4/17) of embryos were untransferable due to aneuploidy in women <35.

Conclusions: Our study showed that re-biopsies almost always provided genetic diagnoses, thereby potentially increasing the number of transferable embryos. Additionally, women <35 showed a higher probability of obtaining transferable embryos after re-biopsy, likely due to lower aneuploidy prevalence, suggesting promising outcomes for this patient group.

279. Retrospective cohort study of secondary care sub-fertility referrals in the East Midlands Teaching Hospital

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Category

Psychosocial

Sub-Category

Clinical

Abstract

Introduction: Infertility affects 1 in 7 couples in the UK, with NHS funding eligibility based on factors such as female age, BMI, ovarian reserve, smoking, and prior parental status[1,2]. Due to limited data available in the literature, this study aims to assess the demographics of those referred to fertility clinics and their funding eligibility, with a focus on Leicester's diverse local ethnic population.

Methodology: This retrospective cohort study analysed 880 referrals to secondary care fertility clinics from 1st August 2022 to 31st August 2023, using local database information. Exclusion criteria included single women, those seeking other gynaecological treatments, and women already pregnant. Data analysis was performed using SPSS software.

Results: The median female age was 33 years (IQR: 29-37). Ethnic distribution was 49% White, 40% Asian, 6% Black, 4% other, and 1% not stated. Most couples had been trying to conceive for 2-5 years, with no significant ethnic variation. Among the study population, 39.2% were overweight (BMI ≥ 25), with 17% having a BMI ≥ 35. Higher BMI rates were observed among Whites and Asians (X^2=33.264,p=0.032).

PCOS was most prevalent in Whites and Asians, while reduced ovarian reserve was more common in Black and other ethnic groups. Male **Sub**fertility was higher in Whites and Asians. Raised BMI (26.5%) and prior child status (44.1%) were the main reasons for NHS funding ineligibility.

Conclusion: This retrospective study provides insight to the current demographics of the population seeking fertility treatment. Interestingly, 40% were of Asian ethnicity, 27% had

raised BMI above 30, indicating the need for awareness about self-help/community support for weight reduction and 44% had previous parental status. Considering the current NHS delays post-pandemic, it is important to disseminate education and awareness about life style factors and fertility funding in the local population to improve outcomes and reduce cost implications[3].

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103. Evaluation of a deep-learning algorithm for embryo selection

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Background: Ideally, the blastocyst with the highest implantation potential should be selected for transfer to optimise treatment outcomes. Blastocyst selection algorithms are commercially available to support this selection process by ranking blastocysts based on their likelihood of implantation. Earlier machine learning algorithms, such as KIDScore™ D5 (Vitrolife, Denmark) require human input via morphological and morphokinetic annotations of time-lapse footage. IDAScore® (Vitrolife, Denmark), a recently developed fully automated deep learning algorithm does not require human intervention. IDAScore® could potentially improve standardisation in

blastocyst selection and laboratory workflow. However, its predictive performance may differ when used in new clinical environments and patient populations.

Objectives: We aimed to externally validate the performance of IDAScore® v1.0 and v2.0 in predicting the likelihood of implantation on day 5/6 against an established selection algorithm, KIDScore™ D5.

Method: Algorithm scores of 636 blastocysts from 185 patients, including discarded and transferred blastocysts, were retrospectively collected in this monocentric study. The area under the receiver operating characteristic (ROC) curve (AUC) was determined for each algorithm to determine their predictive performance.

Results: When analysing all blastocysts, the AUC was comparable between IDAScore® v2.0 (0.913), IDAScore® v1.0 (0.897) and KIDScore™ D5 (0.890) ($p>0.05$ for all paired comparisons). For blastocysts with known implantation data only (291 blastocysts), lower AUCs were obtained for all models, but with comparable performances (IDAScore® v2.0 =0.778, IDAScore® v1.0 = 0.737, KIDScore™ D5= 0.744, $p>0.05$). IDAScore® v2.0 also achieved reasonable sensitivity (89.5%) and specificity (73.7%) at the optimum cut-off score of 4.05 (scale 0 to 9.9).

Conclusion: We demonstrate IDAScore® v2.0 has good model performance and can predict implantation at least as well as the established selection algorithm, KIDScore™ D5. IDAScore® v2.0 could increase laboratory efficiency although large prospective studies are required to validate potential effects on clinical outcomes in different clinical environments and patient populations.

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311. Morphokinetic study of embryo development based on sperm selection method using CHLOE as an artificial intelligence (AI) analysis tool.

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: Embryos fertilized with sperm selected using the Zymot-ICSI (CM) device have faster, and more synchronized cell division rates compared to embryos fertilized with sperm obtained using conventional techniques. The Sperm-Slow (SS) medium is used to select mature sperm, but its impact on embryo kinetics remains less understood. Integration of AI in embryo assessment has shown promise in enhancing the success rates of assisted reproductive technologies. In this study we have evaluated whether the sperm selection method influences embryo morphokinetics and implantation scores, using CHLOE as an AI tool for analysis.

Methods: Retrospective study analysing 581 embryos in culture between July and August 2024. Embryos were cultured in GERI (Genea Biomedx) using global Total-LP medium (Life Global Group). Embryo development was analysed using the CHLOE AI system (Fairtility) and the potential of implantation was provided through the EQ-Score (1-10). Embryo grading was performed using Gardner's criteria. Patients were classified into 3 study groups: swim-up (SU), SS or CM.

Results: Statistical differences were observed for t4, t5, tSB, tB and tEB between the sperm selection techniques. Although statistical differences were not observed in blastocyst expansion or inner cell mass quality, trophectoderm quality was better in the SS group ($p<0.05$). Additionally, embryos from SS group had higher EQ-scores ($p<0.001$). When only analysing good quality embryos, kinetic division was faster in t4, and t8 the SS group ($p<0.05$). Trophectoderm quality was also higher in the SS group and statistical differences were observed between the CF and the SS sperm selection group. Embryos from the SS group showed higher EQ-scores ($p<0.05$).

Conclusion: Differences in morphokinetic timings were observed based on the sperm selection technique. Resulting embryos developed faster when sperm when sperm was selected using the SS medium.

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278. Patient experience using medroxyflurane (Penthrox) inhalational analgesia within the ambulatory gynaecology setting

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Category

Uterus

Sub-Category

Clinical

Abstract

Objectives -To evaluate women's experience of Medroxyflurane (Penthrox 99.9% 3mL) inhalational analgesia within the ambulatory gynaecology setting.

Methods: A single centre retrospective patient evaluation study was performed to evaluate the efficacy of Penthrox within the ambulatory gynaecology setting (June 2022-July 2023). All participants completed a post-procedure symptom questionnaire, with visual analogue pain scores recorded.

Results: In total, n=219 ambulatory procedures were included; n=179 hysteroscopic, 5 manual vacuum aspiration (MVA) and 35 'other'. Indications for Penthrox during hysteroscopy included patient anxiety, previous discomfort and discomfort during this index procedure. Overall, 9 (4.1%) procedures were not completed, with cervical stenosis, patient request and loss of hysteroscopic view reasons indicated. Pain score **Sub**-analysis according to hysteroscopic procedure was as follows; endometrial biopsy (EB)(n=59; 33.3%; median pain score (PS)=3 [95% CI 1-3]), EB+intrauterine system insertion (IUS) (n=30; 16.8%; PS=3[1-3]), myomectomy (Myosure/Bigatti)+/-IUS (n=5; 0.6%, PS=2[0-5]), polypectomy (Myosure/Bigatti)) +/-IUS (n=41; 22.9%, PS=3[2-5]) and polypectomy 'other method') +/-IUS (n=19; 10.6%, PS=4[3-6]). The median pain score for MVA was (n=5; 0.6%, PS=2[0-7]). No significant difference in pain score was measured between diagnostic (n=63; PS=3[2-4]) and interventional (n=70; PS=4[2-4]) hysteroscopy procedures (p>0.05).

Conclusion: Penthrox appears an effective analgesic for diagnostic and operative hysteroscopy procedures. Further prospective, comparative data, including overall patient satisfaction assessment, is required. The potential value for women requiring early pregnancy complication management is important.

170. The relationship between ploidy status, female age, morphology, and day of blastulation in frozen single embryo transfers

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Background: The low success rate of assisted reproduction technology (ART) is commonly attributed to the transfer of aneuploid embryos. Therefore, euploid embryo transfer (ET) could theoretically improve its efficacy. We investigated the associations between euploidy and maternal age, embryo developmental rate, and blastocyst morphology. **Sub**sequently, for patients who underwent euploid ET, we investigated the associations between clinical outcomes and the same variables.

Methods: A retrospective, single-centre cohort study of patients who received ART treatment. This study included 4448 biopsied embryos and 736 **Sub**sequent frozen-thawed euploid ET. Primary endpoints were euploidy rates, implantation rates (IR), and live birth rates (LBR). Age was analysed as a categorical variable. Blastocyst morphology was evaluated with Gardner classification.

Results: 44.9% of biopsied embryos were euploid. Embryos from younger mothers, with better morphology and faster development (Day 5) were strongly associated with euploidy. Following euploid ET, overall IR and LBR were 68.1% and 53.3% respectively. Advanced maternal age (AMA) was not associated with poorer clinical outcomes. Day 5 embryos had significantly higher IR (70.4% vs 57.0%) and LBR (55.9% vs 40.6%) than Day 6 embryos. Morphology showed mixed associations with clinical outcomes, but Grade 1 “inner cell mass (ICM)” on Gardner classification had significantly higher IR (72.0% vs 52.5%) and LBR (57.5% vs 32.5%) compared to Grade 3.

Discussion: Our results showed that faster-growing embryos were associated with euploidy and better clinical outcomes compared to slower-growing embryos. AMA did not produce worse

clinical outcomes once a euploid embryo was obtained, despite obtaining one would indeed be more challenging. Blastocyst morphology showed mixed associations, but the "ICM" grade demonstrated favourable associations with both ploidy and clinical outcomes, which contrasted with varied opinions in the literature.

Conclusion: Developmental rate and ICM grade demonstrated statistically significant associations with ART outcomes, establishing them as potential markers of ART success.

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146. Access to real-time embryo development has a positive impact on overall IVF patient treatment experience

Ahmed Amer[1,2], Lynae Brayboy[1], Alexa Zepeda[3], Teodora Popa[3,4], Lauren Ryan[3], Chloe He[1,5], Katie Rankin[3], Christina Hancock[3], Madison Bailey[3], Hannah Coffey[3], Oana Paun[3], Rufus Morgan[3], Rami Wakim[3,6], Andrew Thomson[3,4], Muhammad Fatum[3,4], Cristina Hickman[1,3]

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: To evaluate the impact of having access to visual information and embryo development in real time on patients undergoing IVF treatment.

Methods: An electronic survey was conducted via video call with patients who have given their consent for communication. 10 women (and their respective partners when applicable) completed the survey from November 2023 to August 2024.

The survey contained questions on their experience using an AI-embryo development viewer in real-time. The questions were multiple choice and graded on a scale of 1-5, with free text for them to express any other information.

Results: Most patients (90%) considered having access to real-time development of their embryos had a positive impact on their understanding of IVF, with 1 patient feeling neutral about it. One patient stated that it was "very reassuring to be able to follow things myself. If I was anxious, I could just look".

Most patients felt empowered (83%). One stated: "This also meant that communication with my embryologist was easier as I had done my own research and could follow what she was telling me".

Most patients (75%) considered it was "Better to manage the week-long wait prior to transfer". One stated that it "Felt I had something to hold onto".

All patients (100%) considered the experience added value to the verbal communication with the embryologist. When we mentioned one of her embryos was fragmented, she could see which one we meant and she felt like "friends were checking in on me, I didn't feel alone".

All patients considered having real-time access to their embryos developing had a positive effect and value on their overall treatment experience (100%).

Conclusion: Access to real-time embryo development has a positive impact on the overall IVF patient treatment experience and adds value to the information provided by embryologists.

RF4 Rapid Fire Poster Session

154. Establishment of an oviductal explant co-culture system to improve oocyte maturation success in dogs

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Background: The domestic dog *(Canis Lupus Familiaris)* is a useful translational model for the study of many human diseases, including certain sex-linked diseases. Assisted reproductive technologies, such as *in vitro* maturation (IVM) and fertilisation (IVF), can be useful - in combination with other assisted reproductive techniques - to skew the sex of offspring born. However, currently the efficiency of these techniques in dogs is low.

Aims: To determine whether an oviductal co-culture system could improve the efficiency of *in vitro* maturation in dogs.

Methods: Reproductive tracts were collected from routine bitch spays with owner's consent. 500µM thick oviductal explants were generated using a tissue chopper and 3 explants per well were cultured at 38.5°C, 5% CO_2, 5% O_2 in 1mL of synthetic oviductal fluid medium, supplemented with a range of hormones. After 24 hours, the culture medium was refreshed, and oocytes were added in co-culture for 72 hours.

Hoechst staining was used to assess the nuclear maturation of oocytes at the end of culture (Germinal Vesicle [GV]; Germinal Vesicle Breakdown to Telophase I [MR]; Metaphase II [MII]). Explant viability was assessed via an Alamar Blue assay, and the explants were fixed for histological analysis. Spent culture medium was collected to extract extracellular vesicles (EV) for microRNA sequencing.

Results: The oviductal explants retained the expected histology at the end of the co-culture period and were confirmed to be metabolically active. Whilst there were no significant differences in the proportion of GV-, MR-, or MII-staged oocytes in the co-culture group, there was a trend towards more MII-staged oocytes in the co-culture group (10.8±0.86% vs. 18.8±2.76% [Mean±SEM]; p=0.051; n=3).

Conclusion: Co-culturing immature dog oocytes with oviductal explants may increase the proportion of oocytes reaching the MII stage *in vitro*. Further repeats, EV isolation and analysis of cytoplasmic maturation markers are ongoing.

85. Digital sperm motility and morphology characteristics correlate as potential predictors for two pronuclei and blastocyst formation using SiD v2

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Objective: To evaluate the correlation between SiD version 2 motility features and morphology parameters with the successful formation of two pronuclei (2PN) and progression to the blastocyst stage.

Materials And Methods: We analysed 127 ICSI sperm samples using SiD v2 software (IVF2.0 Ltd, UK). We examined seven motility parameters, focusing on speed, trajectory, and head movements. Additionally, we proposed nine morphology variables, looking at structure, shape, and other physical traits. We calculated descriptive statistics for all 16 variables to understand distribution. Using Pearson's correlation coefficient, we investigated how these variables related to successful 2PN and blastocyst development.

We generated heat maps illustrating the strength and direction of correlations. Then, we used hierarchical algorithms to explore potential variable clustering, using $p<0.05$ as being statistically significant.

Results: Our analysis revealed connections between sperm traits and embryo development. Some movement patterns linked to the sperm's ability to reach and fertilise the egg showed connections with 2PN formation, though others did not reach statistical significance. Some shape-related features correlated with both 2PN formation and blastocyst development, highlighting their importance in predicting embryo potential.

Positive correlation with 2PN formation included sperm perimeter (r = 0.20, p = 0.023), fullness (r = 0.20, p = 0.022), and length (r = 0.22, p = 0.012). A key movement characteristic also correlated strongly (r = 0.25, p = 0.005). For blastocyst development, the sperm's rotation angle (r = 0.18, p = 0.042) met significance. These findings suggest that certain sperm features could help predict embryo development, allowing for improved sperm selection in assisted reproduction, over current techniques.

Conclusion: These findings suggest that digitally visible motility and morphological sperm features could be valuable predictors of embryo viability. Whilst morpho-kinetic features showed promising trends, further research with larger sample sizes are needed to fully establish their predictive value.

References

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122. Impact of Oocyte Quality as assessed by an AI model on morphokinetic patterns and resulting embryo scores.

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Objective: Assess morphokinetic development of embryos derived from donor oocytes classified into quality groups by an AI oocyte quality (OQ) model.

Methods: Retrospective study including 1296 donor oocyte images (2021-2023). Following ICSI, oocytes were evaluated using an AI model (CHLOE-OQ, Fairtility Ltd) and placed in four groups based on score: Group A OQ score: ≥6.0, Group B: 3-5.9, Group C: 0.001 to 2.9, and Group D with a score of 0. Morphokinetic development of the embryos derived from the four distinct groups

were assessed using ANOVA test. Binary logistic regression (AUC) was performed to assess the prediction of blastulation by the OQ model. Mean OQ score of transferred blastocyst and non-transferred blastocyst was analyzed with a two-sample t-test.

Results: The morphokinetic events prior to the start of blastulation (tSB) were most associated with the highest scoring oocyte quality group (Group A) ($p<0.05$). Overall development rates from embryos derived from Group D, the lowest oocyte quality scoring group, from tPNa (time to pronucleus appearance) to tSB were slower ($P< 0.05$) than embryos resulting from oocytes in the other higher quality scoring categories. tPNf, t2, t3, t4, t5, t6, t7, t8, t9, tM, tB and tEB did not present statistically significant differences between embryos that originated from different oocyte quality groups. The mean OQ Score of transferred blastocysts was higher than the mean OQ Score of non-transferred blastocysts (7.7 ± 1.6 vs 6.9 ± 2.3, $p<0.001$). AI OQ score was not correlated with number of follicular stimulation days, AMH level and BMI. The OQ model was found to be predictive of blastulation ($AUC=0.67$, $p<0.001$).

Conclusion: The OQ model was predictive of blastulation in a frozen-thawed donor oocytes program with higher quality scored oocytes resulting in faster developing embryos prior to tSB. AI oocyte grading tools can assist in selecting the highest quality oocytes.

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131. The use of scanning electron microscopy (SEM) on an *in vitro* placental spheroid model of embryonic attachment

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Category

Uterus

Sub-Category

Basic Science

Abstract

Introduction: *In vitro* modelling of embryonic attachment has evolved, with increasing emphasis on the use of placental spheroids. Prior studies suggest that multicellular spheroids in *in vitro* culture more accurately replicates the morphology and physiology of represented tissue than

traditional 2D models (1). Human choriocarcinoma derived BeWo cells are routinely utilised to form 3D spheroids to model early-stage blastocyst attachment onto the endometrium. Scanning electron microscopy (SEM) has the potential to enhance our understanding of the cellular characteristics and interactions that occur during this process. Therefore, this study aimed to utilise SEM for visual confirmation and detailed analysis of placental spheroid attachment to an endometrial monolayer within an *in vitro* model of embryonic attachment.

Methods: BeWo placental cells were cultured in Sphericalplate 5D® microwells and incubated for 72 hours to form placental spheroids that mimic blastocyst size (50-150µm). Concurrently, Ishikawa cells were cultured on coverslips until a confluent monolayer was achieved. BeWo spheroids were then transferred onto the Ishikawa monolayers and incubated for various time intervals (1, 2, 4, 6 and 8 hours). Samples were then stabilised and fixed with 2.5% glutaraldehyde (*N=3*). After additional fixation and alcohol dehydration, coverslips were coated with gold (AU) and imaged using IT-700HR SEM (JEOL). Detailed morphological evaluations of spheroid were then conducted, with measurements of spheroid taken at each time point (*N=10*).

Results: SEM analysis confirmed the attachment of BeWo spheroids to the endometrial monolayer at the earliest incubation time point (1 hour). Evidence of placental spheroid invasion and migration into the endometrial monolayer was observed at **Sub**sequent time points (2, 4, 6 and 8 hours), with notable increases in spheroid circumference.

Conclusion: SEM has significantly enhanced the confirmation of attachment and provided a more detailed analysis of 3D multicellular placental spheroids in in vitro embryonic attachment models.

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245. The impact of calcium ionophore, for artificial oocyte activation, on embryo morphokinetics, is affected by patient age

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Introduction: Calcium ionophore may be used to improve embryo development in patients of previous poor outcome. The effect this may have on embryo morphokinetics is currently unknown.

Methods: Retrospective data was analysed for patients having at least two ICSI cycles, one with and one without artificial oocyte activation from January 2020 - November 2022 Patients with total failure of fertilisation were excluded. Data was compared in 2 age groups, <38 and age ≥38. Categorical data such as fertilisation, embryo utilisation and pregnancy rates were analysed using a chi-squared test. Average morphokinetic timings at each stage were analysed using an unpaired t-test.

Results: There were no significant differences observed in fertilisation rates, or blastocyst utilisation rates in patients <38, with and without artificial oocyte activation (AOA). However, the positive pregnancy rate was significantly higher at 28.2% for the AOA group (n/n), compared to 0% in the control (n/n) (p=0,0045). In the older age group, utilisation rate was significantly higher in the AOA group (75/119) compared to 41/90 in the controls (p=0.0167). In addition, differences were observed in the morphokinetic timings with and without AOA in the two age groups. In the <38 group there were significant differences in the average timings of tPNf (p<0.05), tSC (p<0.05) and tM(p<0.05). However, in the ≥38 age **Category**, the only significant difference in morphokinetic timings was at the t3 stage (p<0.05).

Discussion: The differences in morphokinetic timings in younger patients correlate with embryonic genome activation, whereas this was not observed in older patients. The mechanism of action of AOA appears to differ with patient age and this may be useful in determining the most appropriate group for AOA treatment. This also coincides with a significant increase in pregnancy rate in this group, which was not observed in the older patient group.

RF5 Rapid Fire Poster Session

29. LC-MS profiling of the urine metabolome in adverse early pregnancy outcomes

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Category

Pregnancy outcomes

Sub-Category

Basic Science

Abstract

Background: Approximately 20% of all pregnancies are lost in the first trimester and a further 2% are ectopic (EP) (the leading cause of maternal mortality in early gestation) [1,2]. Symptoms of pregnancy loss and EP (bleeding+/-pelvic pain) are extremely common, but often indistinguishable from live normally sited pregnancies (LNSP). Pregnancies that will not progress (non-viable or EP), defined together as combined adverse outcomes (CAO), can be devastating for the sufferer, necessitating multiple hospital attendances and invasive tests. Therefore, it is of paramount importance that new non-invasive tests are developed to improve diagnostic accuracy in early pregnancy. Here, we investigate the urine metabolome to identify novel biomarkers of pregnancy outcome.

Methods: This study included 354 pregnant participants with abdominal pain and/or vaginal bleeding at ≤10 weeks of gestation. A urine sample was collected prior to diagnosis of pregnancy outcome; LNSP, (n=160), miscarriage (n=93), pregnancy of unknown location (PUL, n=47), or tubal EP (tEP, n=54). Urine was analysed by LC-QTOF-MS, and relative metabolite abundances underwent statistical analysis.

Results: Six metabolite abundances were found to differ significantly between the four pregnancy outcomes. Taurine was significantly higher in the LNSP group compared to miscarriage, PUL and tEP. When miscarriage, PUL and tEP were combined into a CAO group and compared to LNSP, eight metabolite abundances were significantly different. Taurine demonstrated modest predictive accuracy (AUC=0.70, CI=0.64-0.75) for differentiating LNSP from CAO.

Conclusions: The urine metabolome could offer novel pregnancy outcome biomarkers. Taurine levels are known to increase during pregnancy [3], but its utility as a biomarker has not been explored previously. A diagnostic test to confirm LNSP and thus rule out potentially life-threatening outcomes could significantly reduce patient anxiety and avoid unnecessary repeat procedures. Such a test may be especially impactful in the fertility setting, where patient anxiety and expectation are already heightened.

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271. Enhancing Clinical Accuracy in Vaginal Microbiome Quantification: A Comparative Evaluation of Quantitative PCR and Sequencing Methods

Courtney Povey[1], Clement Coudereau[1], Ana Isabel Barrio Pedraza[2], Graciela Kohls[2], Elena Labarta[3], Juan Antonio García Velasco[2], Dagan Wells[1,4], Antonio Capalbo[5], Katharina Spath[5]

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Category

Other

Sub-Category

Translational

Abstract

Objectives: The vaginal microbiome's role in ART is gaining attention, as dysbiosis, a shift from beneficial to less favourable bacteria, may be linked to adverse outcomes. Evidence remains controversial due to inconsistent methodologies, highlighting the need for reliable diagnostic methods. This study compares qPCR with two common metagenomic sequencing methods to identify the most reliable approach for precise species-level quantification of the vaginal microbiome.

Methods: qPCR employed specific assays to target the 22 most common vaginal bacterial species. 16S rRNA sequencing involved comprehensive analysis of all nine hypervariable regions, using six primer pairs to cover these regions. This approach contrasts with the typical analysis of selected regions, enabling a thorough exploration of differences between them. Shotgun sequencing involved whole genome sequencing of total DNA. These methods were tested on two sample sets: ten artificial mixtures of gDNA from 13 vaginal bacterial species, mixed in various proportions, and DNA from vaginal swabs of 56 ART patients.

Results/Discussion: For artificial gDNA mixtures, qPCR showed high accuracy in detecting and quantifying bacterial species. Results closely matched theoretical values, with high correlation ($r=0.98$; $p<0.0001$) and minimal deviation of 2.1±2%. In contrast, sequencing methods had lower accuracy for species-level detection (16S:$r=0.43$-0.79; shotgun:$r=0.53$; $p<0.0001$), frequently misclassifying both beneficial Lactobacillus and dysbiotic species. This is concerning for clinical settings, as emerging data suggests varying impacts of these species on microbiome health. In clinical samples, variability between hypervariable regions and shotgun sequencing was expected due to challenges in species-level detection. However, even at the genus level, there were misclassifications: one eubiotic sample was wrongly labelled as abnormal, and two highly dysbiotic samples were misclassified as normal, one dominated by Streptococcus and the other by Gardnerella.

Wider implication: This study highlights method variability in vaginal microbiome analysis and shows that qPCR delivers greater accuracy than sequencing techniques.

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84. Spatial transcriptomics identifies dysregulated pathways within endometrium of adenomyosis, endometriosis and fibroids

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University of Liverpool, Liverpool, United Kingdom

Category

Uterus

Sub-Category

Translational

Abstract

Objectives: Adenomyosis, endometriosis and fibroids (AEF) affect a third of women worldwide, causing menorrhagia, chronic pain and **Sub**fertility. This study interrogated transcriptional differences in AEF endometrium to elucidate pathogenic pathways.

Methods: Endometrial functionalis biopsies were obtained from 36 women, with a diagnosis of either AEF condition or none (control). Digital-Spatial-Profiling and whole-transcriptome analysis was performed. Data analysis included differential gene expression (DEG) comparison, functional enrichment analysis, immune cell deconvolution analysis, and ligand-receptor signalling.Statistical analyses were adjusted for a false discovery rate <0.05. Immunohistochemistry was performed on the same samples to identify T cells (CD3+/CD8+ or CD3+/CD4+) and progenitor cells (CD34+).

Results: There were 79 significant DEGs between adenomyosis and control endometrium, 5 between endometriosis and control endometrium and 127 between fibroid and control endometrium. Compared to control endometrium, DEGs in adenomyosis were associated with cell growth and proliferation (*OAZ2, RASSF4*), fibroids with immune cell generation (*CARD11*) and both exhibited downregulation of oestrogen-signalling gene *SULT1E1*. DEGs in endometriosis were associated with gene regulation (*ZNF43*) and mitotic processes (*ANKFN1*).

Functional enrichment analysis identified positively enriched terms relating to olfactory signalling in endometrial immune cells from adenomyosis and fibroid groups . Mitochondrial protein-containing complex was positively enriched in endometrial epithelial cells from endometriosis and fibroids groups.

Cell-cell communication differed in fibroid endometrium; immune cells were the top sender and epithelial cells were the top receiver cell types, with loss of the expected stromal-epithelial cell talk. Different proportions of T cells and progenitor immune cells between groups was confirmed with immunostaining.

Conclusions: This study provides cell-type specific comparative transcriptional differences pertaining to the secretory endometrial functionalis from women with AEF compared to control endometrium. Pathway analysis revealed novel insights into the underlying pathogenic mechanisms within AEF endometrium, and cellular interactions specific to immune cells within

fibroid endometrium. This bodes potential for developing fertility-sparing treatment targets.

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145. Molecular fertilisation check in preimplantation embryos: an interplatform comparison between targeted NGS and SNP-array-based approaches

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Background: Detecting abnormal ploidy constitutions in apparently euploid embryos, as part of preimplantation genetic testing for aneuploidy (PGT-A), reduces likelihood of failed implantation/miscarriage. Conversely, identifying normal ploidy constitution in embryos with atypical pronuclear (PN) patterns could rescue otherwise non-transferable embryos.

Aim: To evaluate targeted next generation sequencing (NGS) as an alternative to single nucleotide polymorphism (SNP)-array for ploidy status analysis.

Methods: Interplatform comparison was performed using two independent sets of embryos showing atypical PN patterns (0PN, 1PN, 2.1PN, 3PN) collected May 2019-May 2024. NGS-based ploidy analysis was performed using a custom SNP panel (357 loci) and proprietary bioinformatic pipeline for analysis. Sequencing was performed on Ion-Chef™ and Ion-S5 System instruments. Ploidy status classification was performed using SNPs b-allele frequencies (BAF) information. SNP-array-based approach involved HumanKaryomap-12 kit and NextSeq550 instrument. Proprietary algorithm used genome-wide BAF patterns expected for diploid, haploid, and triploid samples. Both methods were validated preclinically using cell-lines and embryo re-biopsies with known ploidy status.

Results: After ploidy analysis, results for NGS vs. SNP-array were: 0PN: 84.9% (90/106) vs. 93.2% (41/44) diploid, 10.4% (11/106) vs. 4.5% (2/44) haploid, and 4.7% (5/106) vs. 2.3% (1/44) triploid. 1PN: 48.9% (46/94) vs. 40.7% (24/59) diploid, 44.7% (42/94) vs. 52.5% (31/59) haploid, and 6.4% (6/94) vs. 6.8% (4/59) triploid. 2.1PN: 66.7% (10/15) vs. 62.5% (5/8) diploid and 33.3% (5/15) vs. 37.5% (3/8) triploid. 3PN group: 25.8% (8/31) vs. 26.1% (6/23) diploid and 74.2% (23/31) vs. 73.9% (17/23) triploid. There were no haploid results for 2.1PN/3PN embryos. No significant differences between NGS and SNP-array were reported (chi-squared).

Conclusions: NGS performed similarly to SNP-array, thus supporting its use as an accurate and cost-effective method for identifying ploidy abnormalities. Furthermore, our results demonstrate that manual PN assessment does not always correlate with genetically determined ploidy status, highlighting the need for a reliable analysis platform.

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333. Prediction of IVF clinical outcomes using multi-modal deep learning on tabular data and ultrasound images

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Category

Assisted Conception

Sub-Category

Translational

Abstract

Objective: To assist clinical decision-making in IVF clinics by developing a novel prediction tool for pregnancy outcomes capable of analysing multi-modal datasets comprising morphological information from ultrasound (US) images, extensive quantitative tabular data and clinician reports collected for each patient during their IVF treatment.

Methods: A retrospective patient study is conducted, analysing over 1,500 US images and data from over 500 patients undergoing fresh and frozen embryo transfer (ET) cycles. Data included

age, endometrial thickness, oocytes collected, outcome following egg collection, protocol, embryo culture and grading, and over a dozen more patient-level variables.

The Contrastive Language-Image Pretraining (CLIP) model is used for the classification task of predicting pregnancy outcomes at each stage of IVF treatment, combining morphological features from ultrasound images and patient data such as age, 2PN, oocytes collected, embryo stage, embryo grading and stimulation dosages among others (1, 2). Shapley values are used to calculate the marginal contribution of each patient-level parameter to improve model interpretability and assist clinicians in their decision-making.

Results: A multi-modal AI platform is developed that is trained on text, quantitative and US image data collected from each patient during IVF treatment. Uni-modal classification using machine learning algorithms such as XGBoost and Support Vector Machines yielded accuracy of over 80% in predicting outcomes. Multi-modal classification performed significantly better across the validation set indicating the utility of incorporating different data modalities for predicting IVF outcomes using a deep learning approach. Full results will be available at presentation.

Conclusion: A novel multi-modal AI platform capable of processing various data modalities collected in IVF clinics is designed to make predictions on pregnancy outcomes, at each stage of IVF treatment. The importance of patient-level parameters such as oocytes collected, 2PN, and other factors are evaluated at each step in parallel with morphological information obtained from US images.

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PW5 Poster Walk

250. Alternative use of vitrification warming media to successfully thaw previously slow frozen Pronuclear (PN) human embryos.

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: A clinical need to assess use of an alternative media due to a shift in freezing methods away from slow freezing and towards vitrification would leave cryopreserved embryos without a validated thawing option.

To determine if an alternative media product would provide similar post thaw survival and blastocyst formation from slow frozen pronuclear (PN) human embryos.

Methodology: Patients who consented to research with cryopreserved PN embryos were allocated to this study and sibling embryos split into 2 groups: original media (control group) and alternative media (test group).

The methodology for both groups was kept the same: 5-minute incubation in each of the 3 solutions at ambient (room) temperature. Surviving PN's were cultured individually in a Timelapse incubator and assessed on day 2, 3, 5 and 6. Embryos were graded according to national grading scheme developed by the Association of Clinical Embryologists (ACE) in 2016 and ratified by Association of Reproductive Scientists (ARCS) in 2020.

Results: A total of 43 PN embryos were thawed, with 21 in the control group and 22 in the test group, both showing an 81% survival rate. On day 3, good quality embryos (≥6/3/3) were observed: 13 in the control group and 16 in the test group. On day 5, good quality blastocysts (≥2BB) were observed: 7 in the control group and 9 in the test group. By day 6, overall good quality blastocyst formation was 71% in the control group versus 83% in the test group.

Conclusion: The alternative product available will provide similar post thaw survival rates to ensure patients who have PN or early cleavage stage embryos frozen a validated method to thaw their embryos with the same (or improved) success. Further studies are needed to assess clinical pregnancy and live birth outcomes.

References

325. Considerations of Fertility in Elite Sportswomen

Ariadne L'Heveder[1,2], Rachel Roberts[2], Amal Hassan[3], Lorraine Kasaven[1,2], Srdjan Saso[1,2], Timothy Bracewell-Milnes[1,4], James Nicopoullos[1,4], Meen-Yau Thum[1,4], Helen O'Neill[5,6], Noel Pollock[3], James Brown[7], Benjamin Jones[1,2,4]

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Category

Other

Sub-Category

Clinical

Abstract

Introduction: Women are participating in professional and recreational sports in increasing numbers,[1] with the Paris Olympic Games 2024 seeing full gender parity amongst athletes for the first time.[2] Elite-level exercise levels alters menstruation[3] and may have negative effects on fertility.[4-7] Importantly, the optimal age for fertility is likely to coincide with the age of peak performance for many. It is therefore crucial to be able to counsel athletes on the effect of age upon reproductive outcomes, the impact of VIPA on reproductive health, including assisted reproduction, and the implications of fertility treatments.

Objective: This narrative review summarises the evidence of the impact of elite-level exercise on reproductive function and fertility outcomes, and reviews reproductive choices for athletes, including oocyte cryopreservation.

Methods: Key MeSH terms were searched for in MEDLINE, Google Scholar and Cochrane Database of Systematic Reviews.

Results: Relative Energy Deficiency in Sport (REDs) is fundamental in understanding the impact VIPA has on reproductive function.[8] Chronic low energy availability (EA) affects physiological mechanisms including menstruation and reproduction. Rates of oligomenorrhoea and amenorrhea in athletes have been quoted as high as 79%,[9] Above a certain threshold, increasing intensity of exercise may have a negative effect on fertility[4-7] particularly if there is insufficient EA. There is limited conflicting data regarding assisted fertility outcomes in athletes, but excessive VIPA may have a deleterious effect.

Conclusion: Elite-level exercise affects menstruation and may negatively impact fertility, which is likely to be due to low EA. Restoring energy balance may re-establish menstruation and enhance fertility, while some individuals may need fertility treatment. Athletes wishing to wait until after retirement to conceive may consider oocyte/embryo preservation. Whilst athletes must be given evidence-based information on reproductive health, they remain underrepresented in exercise-related research, and there is insufficient evidence regarding assisted reproductive outcomes and oocyte preservation in athletes.

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22. The availability, accuracy, and uptake of home semen analysis tests

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Objectives: To identify published accuracy data for all commercially available home semen analysis tests, compare this with the accuracy reported in manufacturer advertising, and identify their uptake by the target population.

Methods: A systematic search of PubMed, Medline (Ovid), Embase, and CENTRAL was undertaken in March 2022 and updated in July 2024 using the keywords "home semen analysis." Databases were searched from inception until July 2024. Online markets, smartphone app stores and ChatGPT-4o were also searched using relevant keywords. Studies were included if they were a publication on the accuracy of a commercially available test or device used at home to undertake semen analysis; or a study of any design assessing the uptake of home semen analysis tests by men in any setting. "Mail-in" semen tests were excluded.

Results: A total of 211 publications were screened following database searches and duplicate removal. Following review of 36 full-text articles, 13 studies were included. 11 additional studies/reports on test accuracy were identified directly from manufacturers. This resulted in a total of 23 studies/reports assessing home semen analysis test accuracy and a single publication on the uptake of home semen analysis tests. The latter US study found that 10.1% of patients attending a fertility clinic had used a direct-to-consumer semen analysis test. 27 available home semen analysis tests were identified in total.

Accuracy between the manufacturer's advertising could only be compared with manufacturer reports or publications for 11 available tests, where three publications were independent from manufacturers. For four tests the accuracy advertised by the manufacturer was higher than the accuracy data presented in a publication or manufacturer report (SpermCheck® Fertility, SwimCount™, FertilMARQ, YO® Home Sperm Test).

Conclusions: Home semen analysis tests need further evaluation of their clinical and cost-effectiveness before they could be recommended for use in clinical practice.

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90. Distinct Morphokinetic Patterns Predict Viability of Abnormally Fertilized Embryo

Balsam AL Hashimi[1,2], Elena Linara-Demakakou[1], orla Green[1], Bhavna Raikundalia[1], Trina Shah[1], Darren Griffin[3], Kamal Ahuja[1], Nick Macklon[1]

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

To date, most studies assessing the value and use of embryo morphokinetics have been carried out following 2PN fertilization (1). However, since embryos with abnormal pronuclei numbers at fertilization can still progress into viable blastocysts and successful live births, there is a need to

assess morphokinetic parameters in this context too and understand how ploidy status may alter these (2,3).

In this single-centre, retrospective analysis of 106 ICSI derived blastocysts classified as abnormal at post fertilization check, morphokinetic evaluations were evaluated alongside the results of PGT-A test distinguishing between haploid, diploid, and polyploid samples.

Among fourteen 3PN embryos that were confirmed as diploid the average time from insemination to second polar body extrusion (tPB2) was 6.7±3.4h, with 79% showing normal polar body(2PB) extrusion, 14% chaotic, and 7% reabsorbed. All completed full extrusion; three embryos were euploid. 46 polyploid 3PN embryos, tPB2 was 5.2±2.1h., with 15% normal extrusion, 17% chaotic, 19% reabsorbed, and 48% showing no extrusion. The p-value between diploid and polyploid embryos was 0.044.

Fourteen diploid 1PN embryos had a tPB2 of 4.6±0.78h with 100% normal 2PB extrusion; eight were euploid. Eleven haploid 1PN embryos had a tPB2 of 6.3±2.8h, all with normal extrusion. The *p*-value between the groups was 0.024.

Finally, 21 diploid 2.1PN embryos had a tPB2 of 4.7±0.9h, with 100% normal 2PB extrusion and no haploid or polyploid cases reported

The study found no significant differences in morphokinetic parameters between ICSI and IVF after mitosis.

tPB2 timing and polar body extrusion patterns emerged as promising biomarkers for identifying viable embryos from abnormally fertilized oocytes. Refining screening protocols for polyploid embryos has the potential of reducing the need for invasive testing to identify non-diploid embryos, lowering PGT-A costs and potentially expanding treatment options for patients with limited embryos or atypical fertilization

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283. Pathology Portal: A Novel Interactive Education Portal for Reproductive Science, Clinical and Veterinary Medicine.

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Category

Other

Sub-Category

Basic Science

Abstract

Objective: Over recent years, reproductive medicine and assisted reproductive technologies have embraced the application of digital technologies and artificial intelligence (AI). As AI-guided approaches continue at a rapid pace, it is helpful to have constructively aligned resources available for training and reference. In 2022, the Royal College of Pathologists (RCPath) and Health Education England launched the 'Pathology Portal' to provide an online learning resource and reference library for pathology trainees across seventeen specialties. Regarding fertility, the Portal includes dedicated areas for Reproductive Science, Genetics, Virology and Veterinary Pathology.

Methods: To provide useful resources for Reproductive Science, key areas of learning were identified from the curricula for the Scientist Training Programme (STP) and Higher Specialist Scientists in Training (HSST) for Reproductive Science (Embryology and Andrology). Following approval, digital images were obtained from routine clinical work. This content was developed and uploaded with editorial oversight. This allowed access and engagement for trainees and trained healthcare professionals with an interest in Reproductive Science, both from the UK and internationally.

Results: To date, over 100 editors have uploaded over 5,700 resources of digital content to the Pathology Portal. Over 4,000 users have accessed the Portal and there have been over 200,000 independent launches of content. The Reproductive Science area of the Portal includes images of oocytes at different stages of fertilisation, zygotes and preimplantation embryos, with detailed descriptions for each image.

Summary: The Pathology Portal has proved to be a valuable educational resource, which is freely available to trainees and healthcare professionals. The next steps are to expand the Reproductive Science area and those of related specialties such as Genetics, Virology and Veterinary Pathology. Contributions can include e-learning, video, audio, images, web links, documents and articles on a range of **Sub**jects, with the aim of sharing knowledge, insights and expertise.

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222. Evaluating Concordance Between AI-Based and Traditional Embryo Selection Methods: A Comparative Study

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Category

Other

Sub-Category

Translational

Abstract

Introduction: The use of artificial intelligence (AI) has gained attention for its potential to enhance objectivity and consistency in embryo selection. Studies indicate that AI can match or surpass traditional assessments in predicting implantation (1,2,3). However, concerns over algorithm transparency and AI's ability to capture **Sub**tle nuances leave embryologists cautious (4). Evaluating the alignment between AI and human evaluations is essential for addressing these concerns.

Objectives: This study evaluate the concordance between two AI-based blastocyst selection tools, iDAScore (Vitrolife, Sweden) and EMA (AIVF, Israel), and traditional morphology-based selection.

Methods: In this retrospective study, 404 embryos from 67 IVF/ICSI cycles, initially selected through morphology assessment at Bridge Clinic (BCL), were re-ranked using iDAScore and EMA. Using the Friedman test, these AI rankings were compared with embryologist rankings to determine the degree of alignment.

Results: A clinical pregnancy rate of 24.6% and 55.6% per embryo transferred was achieved for fresh and frozen cycles respectively. There was no significant difference between the rankings provided by BCL, iDAScore, and EMA (P=0.064). Similarly, no significant differences were observed when comparing BCL with iDAScore (P=0.579), BCL with EMA (P=0.898), or EMA with iDAScore (P=0.058). One or both AI systems agreed with BCL's top-ranked embryo 83% of the time, with all three systems in agreement 57% of the time. Of the 27 patients who had unsuccessful fresh embryo transfers, four out of seven patients achieved a clinical pregnancy with a **Sub**sequent frozen embryo transfer. In one case, both AI systems ranked the successful embryo as their top choice, unlike BCL.

Conclusions: AI tools like iDAScore and EMA show high concordance with traditional assessments, offering potential as complementary embryo selection tools. This preliminary study supports future randomized controlled trials to compare manual and AI selection methods using the Area Under the Curve (AUC) to assess implantation predictability.

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295. Does a poorer quality embryo from donor oocytes have a higher implantation potential than a better quality embryo from a patient's oocytes?

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: Embryo quality is a decisive factor in the success of IVF treatments. Many studies support this and also demonstrate that embryos from donor oocytes have higher pregnancy rates than those from infertile patients. These rates become similar when preimplantation genetic testing(PGT) is performed on the latter. Even so, embryo quality still concerns patients who do not want to transfer embryos of quality B (according to Gardner's Criteria). Our objective is to analyze whether an embryo of inferior quality from donated oocytes has a different implantation rate compared to a euploid embryo of better quality from the patient's own oocytes.

Methods: A retrospective study analizing single frozen embryo transfers(FET) of euploid embryos from 296 cycles during 2022 and 2023. We studied pregnancy rates in relation to embryo quality(Gardner Criteria: BTAA, BTAB, BTBA, BTBB) and oocyte origin. Only women age was considered, which was between 35-39 years for patients and under 35 for donors.

Results: The pregnancy rate is not affected when transferring euploid embryos considered of good quality by the embryologist(p>0.1). However, we detected significant differences when analysing embryos from patients(p<0.01). We observed that the determinant factor is trophectoderm quality(57% BT6AA, 71.42% BT6BA, 47% BT6BB). No statistically significant differences were found between blastocysts from egg donation and those from patients for the following qualities: BT6AA(p=0.88) and BT6BA(p=0.86). Likewise, with embryos BT6BB(p=0.16), although the tendency was that the pregnancy rates were better in the egg donation group. No statistically significant difference was observed when BT6BB were transferred from egg donation compared to one of "better" quality from a patient.

Conclusions: Once we have a euploid embryo, the pregnancy rate does not depend either on the quality of the embryo transferred(only good quality embryos considered) or on the origin of the oocyte.

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304. Enhancing microfluidic sperm sorting: The role of media in maximising progressive motility.

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Category

Sperm and testes

Sub-Category

Translational

Abstract

Objective: Microfluidic devices are increasingly being integrated into fertility clinics due to their potential to retrieve highly motile sperm from human samples. However, the influence of different media on the efficiency of these devices to sort highly motile sperm remains unclear.

Methods: In this study, human sperm samples were collected from volunteers and underwent motility testing following WHO guidelines to establish baseline values. Aliquots of each semen sample were then processed through a SpermAlign device, with different media applied to each. Samples were incubated for 30 minutes at 37°C before collecting the sorted sperm for further motility testing.

Results: The average raw sample motility was 71%, with 53% of the sperm showing progressive motility. Hawksley Sperm Wash significantly increased total motility to 93%, with 85% of the sperm moving progressively. Similarly, Hawksley HTF+HSA elevated motility to 84%, with 73% progressive motility. Sigma Nutrient HamF10 media boosted motility to 80%, with 71% progressively motile cells. In contrast, Earles salt, a general culture medium, achieved 75% total motility, with only 55% of the sperm showing progressive motility.

Conclusions: These findings indicate that media composition plays a crucial role in the sorting capabilities of microfluidic devices. By identifying and optimising specific components, it may be

possible to develop a specialised microfluidic medium that further enhances the proportion of progressively motile sperm sorted by these devices, potentially improving outcomes in assisted reproduction techniques.

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210. Investigating the effect of embryo thaw and biopsy for ploidy status on ART outcomes.

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Aim/ Objective: To evaluate the impact of double-thaw, double-biopsy, and ploidy status on pregnancy outcomes after in vitro fertilization with preimplantation genetic testing for aneuploidy (PGT-A).

Methods: This is a single-centre retrospective study in which couples or individuals undergoing assisted reproduction treatment between 01/01/20 and 31/12/21 where PGT-A was performed were recruited. Exclusion criteria included recurrent pregnancy loss, severe male factor, uterine factor infertility, body mass index>35 kg/m^2 or donor oocyte use. Statistical analysis was conducted using binomial logistic regression.

Results: One hundred six patients underwent 145 single, frozen, blastocyst transfers; 136 transfers were performed with a euploid embryo, and 9 embryos transferred had no-result PGT-A report. A total of 6 (4.14%) embryos underwent double biopsy and 66 (45.5%) had a double freeze/ thaw cycle. The post-thaw survival rate was 99.5% and the embryo damage rate was 1.02%. Increasing the number of freeze/thaw cycles per embryo was associated with an increased likelihood of having positive hCG (OR 2.197, 95% CI 1.067 - 4.524) and achieving live birth (OR 3.047, 95% CI 1.514, 6.133), but with

a reduced likelihood of experiencing early pregnancy loss (OR 0.231, 95% CI 0.059 - 0.903). Embryo ploidy status did not appear to influence positive hCG or live birth rates but was statistically significant in predicting early pregnancy loss rate (OR 1.995, 95% CI 1.090 - 3.653); no-result embryos had almost 2 times higher odds to lead to an early pregnancy loss than euploid embryos.

Conclusion: Although it is unconventional to twice thaw/warm and twice biopsy a blastocyst, our results indicate that outcomes are not compromised. Additionally, focusing on a euploid embryo transfer can help reduce early pregnancy loss risk. The small sample size of no-result embryos transferred is a limitation of the study, with future considerations of continuation of data collection and analysis.

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156. Advances in histone methyltransferase SMYD3 control of oocyte maturation and quality

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Introduction: SMYD3, a histone methyltransferase, has been identified as epigenetic controller of both histone and non-histone **Sub**strates. No conclusive evidences recognized for SMYD3 the involvement in both oogenesis and early embryo development (1).

Objective: This research investigates, specifically, the effect produced by SMYD3 inhibition on oocyte maturation by studying the interference on the early and late pathways mediating the

gonadotropin (hCG) stimulatory activation of somatic compartments (follicle walls and cumulus cells).

Methods: Ovine early-antral follicles (EA) were matured using the follicle-enclosed-oocytes (FEO) system to reproduce *in vitro* a system of meiotic maturation strictly gonadotropin-dependent (2). The effect of SMYD3 inhibitor (iSMYD3) was assessed on oocyte nuclear stages, MII oocytes parthenogenetic activation, somatic MAPK1/3 early activation and SMYD3 protein level.

Results: FEO remained quiescent (100% GV) in the absence of hCG while its supplementation promoted the completion of meiosis in 59% of them (MII). The iSMYD3 was able to induce *per sè* the resumption of meiosis (67% GVBD) that, however, completed only when hCG was added (73% MII). Of note, all MII oocytes obtained in the presence of iSMYD3 exhibited a poor quality (parthenotes >8-cells: 29% hCG *vs* 0% in both iSMYD3±hCG: $p<0,05$). In the presence of iSMYD3 meiosis resumption occurred without MAPK1/3 pathway activation in follicle wall even when hCG was added. On the contrary, hCG triggered FEO maturation through the early MAPK1/3 activation and a progressive decrease in SMYD3 protein levels in both EA somatic compartments.

Conclusions: Overall, the present results identify SMYD3 as a gatekeeper of the meiotic cell cycle control interfacing with MAPK1/3 pathways gonadotropin activation in follicle wall. In addition, this study highlights the urgency of further deepening the molecular targets of SMYD3 action in view of the discovered methyltransferase role in defining oocyte developmental competence.

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157. What factors affect intrauterine insemination outcomes?

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective: Intrauterine insemination (IUI) is not routinely offered on the NHS, so I undertook an audit to examine the success of the procedures and if any factors provided an improved chance of pregnancy.

Methods: I used data from 110 IUI procedures in a clinic between January 2021 and December 2023. The data available was used to look at the different factors that influence the procedure's success and compare those undergoing a medicated cycle versus a natural cycle and using fresh sperm versus frozen sperm.

Results: I found that in this facility, 18.82% of patients achieved a pregnancy. The biggest reasons patients chose IUI were those in same-sex relationships and single females. Furthermore, most pregnancies (93.75%) occurred within 3 cycles, and all pregnancies were achieved within 6 cycles.

The pre-treatment factors that influenced success are age under 35, healthy BMI, AMH greater than 5, and a greater number of follicles on mid-treatment scan. However, there was no correlation found for the size of the leading follicle or thickness of the endometrium.

When comparing medicated and unmedicated cycles, patients were more likely to cancel a medicated cycle and more likely to become pregnant in an unmedicated cycle. Therefore, it appears that it is better to opt for an unmedicated IUI procedure. However, fewer patients opted for the medicated procedure, so this is not reliable, and more data is required. Despite a similar discrepancy in number of patients using fresh sperm versus frozen sperm, they exhibited similar pregnancy outcomes.

Conclusion: The general success of an IUI procedure was 18.82% and several factors increased the likelihood of pregnancy, including young age, healthy BMI, and AMH over 5. However, due to the small sample size, more data is required to confirm the results suggesting that unmedicated cycles are more likely to result in pregnancy.

68. The adipokine Fibronectin Domain Containing 4 (FNDC4) alters granulosa cell glucose uptake and theca cell lipid content in vitro, and inhibits follicle growth in cattle in vivo.

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Introduction. Dairy cattle undergo a period of post-partum anestrus because of the energy demands of milk production. To meet the energy expenditure, adipose tissue is mobilized, and changes in peripheral concentrations of adipokines occurs, some of which have direct effects on the ovary. One example is the 'exercise hormone' irisin, which inhibits steroidogenesis in bovine granulosa and theca cells in culture. Irisin belongs to the Fibronectin Domain Containing family, which includes a second secreted adipokine, FNDC4. The receptor for FNDC4, ADGRF5, has been detected in the ovary, and FNDC4 has been implicated in controlling cancer cell proliferation, including ovarian cancer. Its role in normal ovarian physiology is unknown.

Objectives: We tested the hypothesis that FNDC4 in present in the ovary and affects granulosa and theca cell function *in vitro* by employing well-established serum-free bovine cell culture systems with physiological concentrations of insulin (0.2 ng/mL), and an *in vivo* follicle injection model.

Results: We detected FNDC4 in follicular fluid, and at lower concentrations in large follicles compared with small follicles. Messenger RNA encoding ADGRF5 was detected predominantly in theca cells and also in the corpus luteum and oocyte. Recombinant FNDC4 increased glucose uptake and *GLUT1*, *GLUT3* and *GLUT4* mRNA abundance in granulosa cells but not in theca cells. FNDC4 decreased lipid content in theca cells but not granulosa cells. Steroid secretion, cell viability and proliferation were not affected by FNDC4 in either cell type. Injection of FNDC4 directly into emerging dominant follicles (8mm diameter) of an induced follicle wave caused a

reduction of the diameter of that follicle over the **Sub**sequent 3 days whereas sham injected follicles continued to grow and they ovulated.

Conclusion: These data suggest that FNDC4 modulates bovine glucose and lipid metabolism and may negatively affect follicle development.

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246. Comparison of the stages of embryo arrest in patients with and without the use of AOA

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Introduction: Calcium ionophore is commonly used to improve embryo development in patients of previous poor outcome and has been shown to improve blastocyst utilisation rates. However, it is not clear at which stage in embryo development this rescue effect occurs. Studying this may provide insight into the mechanism of action and further knowledge that can be applied to patient selection criteria.

Methods: Retrospective data was analysed for patients having at least two ICSI cycles, one with and one without artificial oocyte activation from January 2020 - November 2022. Patients with total failure of fertilisation were excluded. The arrest rates at each stage from tPNf was compared in the AOA and control group for t2, t3, t4, t5, t6, t7, t8, t9, tSC, tM, tSB and tB. For each stage the results were compared using a Fishers exact test.

Results: There were no significant differences detected in the early cleavage stages of t2, t3, t4, t6, or in the later stages of t9 and Tsc. The earliest significant difference in arrest rate were found at t5 (p=0.0465) with 222/242 and 167/195 in AOA and control groups respectively, progressing to this stage. The most significant difference in arrest rate between the AOA and control groups

occurred t7 (p=0.0068) with 212/242 progressing to here in the AOA group compared to 151/195 in the controls. In the later stages there were also significant differences in arrest rates at tM (p=0.0532) and tSB (0.0247).

Discussion: These results suggest that the effect of AOA may occur after t4 when the original embryonic cells are undergoing their third round of division. This may coincide with embryonic genome activation and may also be a useful tool in identifying patients who may benefit from the use of AOA, based on when embryo arrest occurred in their previous cycles.

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244. Two Year Experience of an In-House Genetic Counselling Service in a Fertility Unit: An Audit

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Kings Fertility, London, United Kingdom

Category

Other

Sub-Category

Clinical

Abstract

Background: Genetic counselling (GC) is vital in reproductive medicine, offering prospective parents insights into the benefits, risks, psychosocial implications and limitations of genetic testing. To meet the growing demand for genetic testing and personalised genetic guidance, an in-house GC service was established at Kings Fertility.

Objectives: This audit aimed to evaluate the impact of the in-house GC service on patient care, emphasising the need for a dedicated service within a fertility unit.

Methods: Patient data over a two-year period (beginning January 2022) was reviewed, focusing on the number of consultations and the distribution of consultations by indication. Additional contributions to service delivery outside direct patient care were also analysed.

Results: A total of 760 patients accessed the GC service, with 815 consultations conducted. One average 8 consultations took place per week with 59 (7%) patients requiring more than one consultation.

Consultation Types: 64% (n=520/815) were pre-test consultations for Pre-implantation Genetic testing (PGT) for Aneuploidy (PGT-A).

19% (n=153/815) were post-PGT-A consultations.

6% (n=46/815) were consultations for PGT for Monogenic Disorders/ Structural Rearrangements.

11% (n=96/815) was for personal/family history of genetic disorders or carrier genetic testing.

Service Contributions: The genetic counsellor also supports patient and staff queries, participates in multi-disciplinary meetings, contributes to clinician education and oversees genetic results delivery, averaging 5 ad hoc results communications weekly.

Conclusion: The audit indicates that the GC service is increasingly in demand, with patient volumes rising. The number of pre-PGTA and general GC appointments is on the rise, leading to efforts to mainstream certain services and train a genomics nurse. The in-house service has improved patient care by allowing timely access to expert genetic advice which helps patients make informed decisions on their reproductive journey. This audit was a first step in highlighting the benefit of a dedicated GC service within the fertility clinic.

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326. Long-term reproductive outcomes after Fertility Preservation in women with Turner syndrome

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Study Question: What are the long-term reproductive outcomes in women with Turner syndrome (TS) following fertility preservation (FP)?

Background: Only 20% of women with TS have spontaneous menarche and 10% conceive spontaneously (1). Predicting reproductive outcomes in these individuals is challenging but identifying those who could benefit from FP is clinically important. It has been suggested that patients with TS have accelerated loss of oocytes, which has motivated the uptake of FP.

Methods: A retrospective study of TS patients who underwent fertility preservation in our tertiary university hospital between 2008 and 2018. Patients were identified from a dedicated FP database and previously reported data (2). We assessed their baseline characteristics and ovarian reserve parameters prior to ovarian stimulation, the number of spontaneous pregnancies and outcomes and utilisation of cryopreserved oocytes.

Results: A total of 10 women with TS (mean age 20.9 y [15-30]) underwent egg freezing. The main ovarian reserve parameter was AMH, mean value 8.15 (range 3.05- 21.30) pmol/L. 10.9 on average (4-15) eggs were cryopreserved.

Six patients had spontaneous conceptions during 10.7 (7-16) years follow-up. The remaining 4 have not tried to conceive or are using contraception. There were 3 live births, 4 miscarriages, 2 terminations of pregnancy, and one patient who was 20 weeks pregnant at the time of data collection. No patients returned to use their frozen gametes.

Conclusion: In this cohort of menstruating women with TS, ovarian stimulation had satisfactory outcomes, but none have returned to use stored gametes. Importantly, all those who desired pregnancy have conceived naturally. These findings question the need for FP strategies in this cohort. This study is an initial step in evaluating the benefits of an invasive procedure in light of the questionable threat of infertility.

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Mar;111(3):505-509. doi: 10.1016/j.fertnstert.2018.11.010. Epub 2018 Dec 28. PMID: 30598170.

301. Automated total cryo management platform enables new insights into patient engagement and account compliance

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Category

Other

Sub-Category

Clinical

Abstract

Objective: To gain insight into account compliance over time with respect to cryopreserved samples.

Methods: Data were retrospectively analysed from an automated cryo management platform - 418,895 patient accounts from 122 US clinics, 2015 to 2024. Data were extracted from the automated cryo management platform database - a live feed of clinic information – and encrypted. Logic was created to develop calculations utilising the coding language Structured Query Language (SQL). Total accounts charged were compared with accounts paid or closed to generate the engagement rate (% compliant accounts). Data were analysed by engagement rate by tissue type to identify trends and differences.

Results: An inverse relationship was identified between storage duration and account compliance. The percentage of compliant accounts was calculated within 2yrs of the freeze date and at >14yrs storage. This fell from 92.6% to 61.5% for oocytes, 89.4% to 48.1% for embryos, and 82.3% to 41.0% for sperm. Patients with stored oocytes are least likely to allow their accounts to fall into non-compliance, with 49.2% of accounts maintaining storage and payments beyond 14yrs. Non-compliant accounts exceed compliant accounts after 6-8yrs storage for sperm, but this does not occur until beyond 14yrs storage in embryo accounts and is not observed with oocyte accounts. Additionally, engagement in those having exclusively interacted

with the platform exceeded those whose first freeze date preceded platform implementation at their clinic at each storage point examined.

Conclusions: Data held by automated cryo management platforms permits rapid and accurate review and analysis of cryo storage and cryo management metrics. Non-compliant accounts are an increasing issue for fertility centres. Automated total cryo management and cryo billing platforms allow new insights into patient behaviours and engagement. These can be leveraged to improve clinic policies, support cryo consent regulations and help identify and address accounts at highest risk of non-compliance.

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330. A systematic literature review and meta analysis to establish whether Rescue IVM and Rescue ICSI should be routine practice in cases of low/failed maturation and/or fertilisation

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

80% of eggs collected during IVF are mature, with 60-80% fertilizing. However, 5-15% of IVF cycles experience low or failed oocyte maturation and/or fertilization rates. Rescue ICSI and IVM have been proposed to address these issues. In October 2023, the HFEA's 9th code of practice allowed rescue ICSI, which previous versions had not.

This study aimed to evaluate the feasibility, efficacy, and safety of Day 0 rescue ICSI and IVM. A PRISMA review was conducted using PUBMED and **References** from 1992 to 2023. Day 1 rescue ICSI studies were excluded.Primary outcomes were clinical pregnancy rates, with secondary measures including fertilization, polyploidy, and malformation rates.

For rescue IVM, 24 studies (7183 cycles) were reviewed. Rescue IVM oocytes demonstrated compromised competence, with cleavage rates of 57% (MI to MII: 2094/3676) and 68% (GV to MII: 567/836), blastulation rates of 21% (MI to MII: 183/889) and 16% (GV to MII: 58/366), clinical pregnancy rate of 19% (MI to MII: 11/57), and miscarriage rate of 67% (GV to MII: 2/3). Pre-vitrification maturation rate was 63% (24/38) compared to post-vitrification (59%, 19/32), and survival rates were higher pre-vitrification (95%, 38/40 vs. 82%, 32/39). Rescue IVM improved clinical pregnancy (56% vs 47%, $p<0.001$) and live birth rates (65% vs 48%, $p<0.001$) for patients with fewer than 9 mature eggs.

For rescue ICSI, 14 studies (2475 cycles, 1377 transfers) were included, showing pooled fertilization (68%, 11022/16101), polyploidy (6%, 949/15287), clinical pregnancy (45%, 620/1377), implantation (30%, 647/2124), and malformation rates (0.3%, 2/711). Early rescue ICSI resulted in 709 live births, with no elevated malformation risk.

While live birth rates may be lower than for non-rescue oocytes, rescue IVM and ICSI should be offered routinely in cycles with fewer than 9 normally fertilized zygotes, potentially leading to 1714 additional live births per year in the UK.

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253. Embryo siblingship assessment during routine preimplantation genetic testing represents an important new quality control measure, with capacity to avoid serious diagnostic errors

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Category

Other

Sub-Category

Clinical

Abstract

Background: Despite high accuracy with preimplantation genetic testing (PGT), diagnostic errors can occur if embryo biopsy specimens are contaminated or if embryos from different patients, or biopsies from different embryos, are accidentally mixed up. The rate of such errors is unknown.

Methods: A couple underwent PGT due to a chromosomal translocation. Five blastocysts were biopsied and tested using a highly validated next-generation sequencing method. The relative amount of DNA from different areas of the genome were calculated, revealing chromosome losses/gains. Additionally, thousands of DNA polymorphisms were genotyped. The tested polymorphisms boost the accuracy of aneuploidy detection and provide an additional quality control, revealing contaminated samples and confirming whether embryos attributed to a particular couple are genetically related (siblings), as expected.

Results: Four embryos were found to be chromosomally abnormal. The fifth specimen gave a normal female result, and the associated embryo would therefore have been eligible for transfer. However, polymorphism siblingship analysis revealed that the sample was not genetically related to the other tested embryos. A thorough review of witnessing records and videos of laboratory procedures revealed no evidence of an accidental mix-up of samples/embryos from different patients. DNA fingerprinting of members of the embryology and genetics teams, carried out in parallel, demonstrated that the sample was genetically identical to one of the embryologists. It could therefore be deduced that the cells taken from the embryo had failed to yield a result and the tube containing the specimen had been contaminated. The true genetic status of the embryo remained unknown.

Conclusion: PGT methods which also confirm sibling relationships between embryos provide an additional layer of quality control, with the capacity to identify sample/embryo mix-ups and avoid misinterpretation of PGT results caused by rare DNA contamination. The utilisation of such methods represents an important advance in patient safety.

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213. E-cigarettes and assisted conception: a rapid evidence review to inform a value-based clinical commissioning policy update

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Category

Assisted Conception

Sub-Category

Translational

Abstract

Objective: Whilst the negative effects of smoking combustible cigarettes on reproduction are well documented, the impact of e-cigarette use remains less well understood. This rapid evidence review aimed to:

- Identify and summarise current research on the effects of e-cigarette use on assisted conception.

- Explore policy decisions in other regions regarding the commissioning of assisted conception in e-cigarettes users, as well as published guidance from relevant advisory bodies.

- Inform updates to the Assisted Reproduction Value Based Clinical Commissioning Policy being undertaken by NHS North East and North Cumbria (NENC).

Methods: Multiple databases were searched using key terms to identify relevant systematic reviews and recently published primary research. These were reviewed and summarised. No relevant meta-analyses were identified. Additionally, publicly available commissioning policies published by other Integrated Care Boards (ICBs), as well as guidance from advisory bodies such as NICE and OHID were accessed online and reviewed.

Results: Findings were inconclusive, with a lack of robust human studies available and no meta-analyses. It is suggested that there are likely to be some harms associated with e-cigarette use in both men and women pre-conception and during pregnancy, even when e-cigarettes are nicotine-free (1-10). Potential harms included reduced sperm count, impaired implantation, and increased SGA risk. NICE and OHID have refrained from making any specific recommendations, and different ICB areas take different positions regarding access to assisted conception for e-cigarette users (11, 12).

Conclusion: There is a lack of consensus in this area and more robust evidence is needed. Decisions must also consider the risk of mixed messaging given that e-cigarettes are currently recommended by NICE and OHID as a stop smoking aid for adults nationally. NHS NENC decided that the updated policy will not exclude access to assisted conception for e-cigarette users, but this will **Sub**ject to review as new evidence emerges.

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159. Calabash chalk consumption during pregnancy: harmless or harmful? A systematic review

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Category

Pregnancy outcomes

Sub-Category

Basic Science

Abstract

Title: Calabash chalk consumption during pregnancy: harmless or harmful? A systematic review

Authors: David Bahibanda, Paul J McKeegan

Objective: Calabash chalk (CC) is a geophagic material commonly consumed by pregnant women to alleviate nausea and vomiting, particularly in African and Asian communities. However, guidance available to the public and medical professionals on its consumption is lacking. This study aimed to evaluate current understanding of the health implications of CC consumption during pregnancy through systematic review of published literature.

Method: A structured search strategy yielded 408 results using EBSCOhost Medline, which were screened in adherence to PRISMA guidance. 382 articles were identified as irrelevant, while the remaining 26 manuscripts were included following full-text review by two independent reviewers.

Results: The included studies report that CC can provide micronutrients, but poses significant negative health implications affecting gestational parents and their unborn children, attributed partly to contamination of CC with toxins lead and arsenic. Long-term consequences include organ damage; disruption of foetal central nervous system development; reproductive issues linked to primary and secondary infertility; and impaired bone formation. Short-term effects include nutritional deficiencies; heightened pregnancy symptoms; and complications in pregnancy progression and foetal development, which potentially increase the risk of requirement for caesarean section delivery.

Conclusion: While much of the research on CC consumption advises against its use, existing literature is limited and insufficient to completely rule out any potential health benefits, with variability in CC composition, inconsistency of study design and reliance on animal studies reducing overall reliability. However, as reports consistently indicate potential health risks, we emphasise caution in CC consumption, in line with existing research and guidance. Ongoing work is focussed on communicating this information with the lay public, aiming to help raise awareness among vulnerable groups, whilst advocating for further research to be conducted.

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219. Immune signatures of reproductive failure: a comparative analysis of unexplained recurrent implantation failure and pregnancy loss

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Category

Pregnancy outcomes

Sub-Category

Basic Science

Abstract

Objective: To investigate systemic immune mediators during the implantation window in women with unexplained recurrent implantation failure (uRIF) and unexplained recurrent pregnancy loss (uRPL).

Methods: This prospective cohort study included women with uRIF (≥3 failed embryo transfers) and women with uRPL (≥2 pregnancy losses <24 weeks), all without identifiable anatomical or systemic causes, and fertile controls (FC). Serum samples collected during the mid-secretory phase were analysed using Luminex-multiplex-assay to quantify 65 immune, coagulation, and tissue homeostasis factors. Comparative statistical analysis between groups was performed using t-tests or Mann-Whitney U tests, based on normality testing.

Results: Analysis of analyte levels from 32 patients including FC (n=15), uRIF (n=9), and uRPL (n=8) revealed distinct immunological profiles associated with each group.

Compared to FC, uRIF exhibited elevated levels of the chemokines CXCL16 and CXCL5 involved in leucocyte migration to tissue, and decreased levels of the cytokine IL-18. A pro-thrombotic tendency was observed in uRIF with reduced Protein C and Tissue Factor levels alongside elevated D-dimer. Additionally, matrix metalloproteinase MMP1, crucial for tissue remodelling, was markedly increased in uRIF.

Conversely, uRPL displayed a globally **Sub**dued profile compared to fertile controls, with diminished levels of several immune and inflammatory mediators (Serpin, EN-RAGE/S100A12, CCL22, CRP), Protein C, and MMP1.

Direct comparison between uRIF and uRPL highlighted further immunological distinctions. Women with uRPL exhibited significantly lower levels of immune mediators (S100A9, EN-RAGE/S100A12, CCL22, CXCL5, S100A8), coagulation factors (angiopoietin, thrombopoietin), and MMP1, suggesting a more suppressed immune and remodelling profile in uRPL compared to uRIF.

Conclusion: This study reveals distinct systemic immunological disturbances associated with uRIF and uRPL. In uRIF, a pro-inflammatory environment and coagulative dysregulation may hinder successful implantation. In contrast, uRPL has a comparatively **Sub**dued immune and tissue remodelling profile, potentially impeding placentation. A multi-pathway approach to diagnosis is vital to identify personalised therapeutic targets.

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32. Risk of Cancers associated with the use of ovulation induction agents for the treatment of Infertility

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Background: There is a scarcity on evidence on the carcinogenic risk associated with the use of ovulation induction agents (OIAs) for the treatment of infertility. We aimed to appraise the observational and interventional studies that describe the correlation between OIAs and the risk of developing various cancers in patients receiving treatment for infertility.

Materials and Methods: PubMed/MEDLINE, SCOPUS, Embase and Cochrane Library were searched from inception to July 2023. The interventional and observational studies that assessed the risk of cancers following the use of OIAs for the management of infertility were considered for this review. The studies included OIA combined with any other technique were excluded. Jonna Briggs Institute Checklist was employed to assess methodological quality of included studies. The synthesised evidence was narratively summarized as the data were highly heterogenous.

Results: A total of 29 studies out of 4624 records from different parts of the world were included in this review. There was conflicting evidence on the risk of breast cancer, ovarian cancer, endometrial cancer, and uterine cancer. However, there was a significantly increased risk of non-Hodgkin lymphoma and thyroid cancer. In contrast to this, there is a significantly reduced risk of colorectal cancer associated with the use of OIA among infertile women.

Conclusion: The current evidence suggests that there is no clear evidence on cancer risk associated with the OIA use among those with infertility. Further research is needed with a special emphasis on specific OIA and its time of administration in a diverse set of population.

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248. Hysterosalpingogram Vs Laparoscopy for diagnosis of tubal factor in female infertility

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Category

Uterus

Sub-Category

Clinical

Abstract

Introduction: Infertility is a critical aspect of women's health. According to the WHO, infertility affects approximately 10-15% of couples worldwide. Hysterosalpingography (HSG) and laparoscopy are diagnostic techniques used to assess female tubal and pelvic factors that could contribute to infertility. Although HSG is first line investigation for evaluating tubal issues, laparoscopy is regarded as gold standard.

Objective: Comparison of HSG and laparoscopy results in detecting tubal abnormalities to evaluate female infertility and determining the diagnostic value of HSG for assessing fallopian tube conditions.

Method: Data collected retrospectively from online electronic data system over the period of last 5 years, on demographics, obstetric history, duration of trying to conceive, chlamydia screening, transvaginal scan (TVS) prior to HSG, HSG and laparoscopy results.

Results: Out of 183 women who underwent HSG as part of fertility investigations, 92.9% did not require laparoscopy as HSG showed bilateral fill and spill. Among the 13 women who had both HSG and laparoscopy, 46.2% had concordant results i.e. bilateral or unilateral tubal block, while 53.8 % had different findings. 5 out of these 13 women, had HSG showing unilateral or bilateral block whereas laparoscopy showed bilateral fill and spill. One woman had bilateral fill and spill on HSG however, laparoscopy showed unilateral block. Notably, this demonstrated a false positive and false negative rate of 38.5% and 7.7% respectively.

The majority of women, 55.19% were aged 30-40 years and investigated for primary infertility, with 66.12% trying to conceive for more than two years. Additionally, 86.89% had undergone TVS before HSG. Good compliance noted on chlamydia screening prior to HSG as 99.5% women had test done.

Conclusion: Both methods are complementary in the comprehensive evaluation of female infertility. While laparoscopy remains the gold standard, HSG is valuable primary investigation for predicting tubal factor infertility and is also a cost-effective diagnostic modality.

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56. Understanding patient perceptions of emotional support and clinic culture: key factors shaping the fertility treatment experience.

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Category

Psychosocial

Sub-Category

Translational

Abstract

Objective: Assess the perceived levels of support in fertility clinics to highlight the need and demand for more emotional support.

Explore how patients perceive emotional support and clinic culture in the context of fertility care, and gather qualitative data from patients to highlight best practice and areas for improvement.

Method: This study involved surveying 210 global respondents undergoing fertility treatment. Employing an online survey format, disseminated within my online support communities (approx. 7,000 individuals), the study incorporated both qualitative and quantitative questions. Responses were collected across two distinct periods, 2019 and 2023, providing a comprehensive understanding of patients' emotional experiences over the 4-year interval.

Results: The study highlights a stark gap between the emotional support fertility clinics claim to provide and what patients actually experience. While clinics tout their supportive care, patients rated it only 4.8 out of 10. Additionally, 58% of patients doubted that their clinic had a genuinely supportive culture among all staff, revealing a clear disconnect.

The study also shows a decline in perceived support from 5.3 out of 10 in 2019 to 4.6 out of 10 in 2023, despite increased awareness of the emotional challenges associated with fertility

treatment. This downward trend questions the effectiveness of efforts to improve emotional care.

Qualitative responses from participants revealed a recurring theme: patients felt like they were part of a production line, mere numbers in the clinic's system. A significant 66% of respondents wanted more accessible support services.

Conclusion: This study's findings reveal a gap in emotional support provision despite extensive research on the emotional health impact of IVF and highlights the critical need for clinics to re-evaluate and reinforce their emotional support infrastructure, ensuring it aligns with patient expectations and contributes positively to their overall experience.

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138. Tumour necrosis factor alpha in follicular fluid in women with diminished ovarian reserve

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Objective: Tumour necrosis factor alpha (TNF-α), a critical regulator of inflammation, is thought to play a multifaceted role in proliferation and atresia of follicular cells (1). Animal studies have implicated TNF-a in immune-mediated ovarian follicle loss and diminished oocyte quality (2). Few studies have investigated TNF-α in the follicular fluid (FF) of women with diminished ovarian reserve (DOR)(3). We aimed to study this cytokine in women undergoing oocyte retrieval (OCR) for fertility treatment.

Methods: This was a prospective case-control study comparing TNF-α in the FF of women with DOR (n=48) defined as an AMH of <8pmol/L, compared with the FF of women with normal ovarian reserve (NOR) (n=64), defined as an AMH of 8-20pmol/L. Women undergoing OCR aged

between 18 and 38 were eligible. Women with high ovarian reserve (AMH>20 pmol/L), a body mass index (BMI)>30kg/m^2) or a history of endometriosis were excluded. FF TNF-α levels were assayed using a human cytokine/chemokine array on the Luminex platform.

Results: The mean age (36±2.9 years) and mean BMI (24kg/m^2)was comparable in both groups. The mean oocyte yield was 5 (range 1-13) in the DOR group and 10 (range 2-20) in the NOR group (p<0.001). FF levels of TNF-α were elevated in DOR (11.26±11.09 pg/ml) compared to NOR (6.9±5.6 pg/ml; p=0.02). Spearman r correlation analysis showed a strong negative correlation between FF TNF-α levels and retrieved oocyte number (r= -0.38, 95% CI -0.56 to -0.16; p=0.0006), AMH (r= -0.34, 95% CI -0.53 to -0.2; p=0.0025) and AFC (r= -0.29, 95% CI -0.49 to -0.07; p=0.0095).

Conclusion: Unexplained premature DOR is a poorly elucidated and challenging infertility aetiology. Understanding how ovarian follicular inflammatory pathways contribute to DOR may help identify those at risk and impact clinical protocol by facilitating individualized patient counselling.

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73. Harnessing Artificial Intelligence on Day 3 of development for predicting blastulation rates.

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Objective: To determine if an AI support tool can predict blastocyst development on day 3.

Methods: Retrospective study consisting of 5022 time-lapse embryo videos collected and analysed between February 2022 to August 2024 from a single private clinic. Videos were assessed by CHLOE-EQ (Fairtility, Israel), an AI embryo quality score that provides a value between 0.0 to 10.0 at 68 hours post insemination (hpi) indicating the blastulation potential of the embryo. Blastulation was defined as reaching tSB (time to start of blastulation). Two binary logistic regression tests were performed. Initial analysis was to assess the predictive value of CHLOE-EQ at 68hpi on blastulation overall. The second binary logistic regression was calculated to evaluate the predictive value of CHLOE-EQ at 68hpi on blastulation at 116hpi (day5). Furthermore, embryos were divided into 5 embryo quality groups based on scores at 68hpi: Very Low (0-0.5), Low (0.5-3) Fair (3-6), High (6-9) and Very High (9-10). Chi-square test was performed to determine the significant difference between groups.

Results: Overall, 56% (2830/5022) of the resulting embryos became blastocysts. Upon further analysis, 82% (2309/2830) reached this stage by day 5 (116hpi). CHLOE-EQ at 68hpi was predictive of overall blastulation (AUC=0.92) and blastulation on day 5 (116hpi) (AUC=0.80). Blastocyst development rate in each embryo quality score grouping at 68hpi was the following: Very low 3% (36/1368), Low 33% (122/373), Fair 50% (190/378), High 68% (468/689) and Very High 91% (2014/2214). There was a significant difference across all groups ($p<0.001$).

Conclusion: Results demonstrate that this AI model can predict at 68hpi the probability of an embryo reaching the blastocyst stage at day 5 (116hpi) and at any given time. The ability to predict blastulation by day 3 of development has many advantages. This allows the embryologist to manage patients' expectations, decision making and workflow processes within the laboratory.

293. The influence of ejaculation frequency on the semen quality of patients undergoing pre-oncology cryopreservation or routine diagnostic semen analysis

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Background: Frequency of ejaculation has been reported to effect semen quality in patients undergoing treatment for infertility however the effect of cancer is less well evidenced. This project therefore investigates how ejaculatory frequency influences semen quality in both routine semen analysis and oncology fertility preservation patients.

Aims: To investigate whether ejaculatory frequency of oncology fertility preservation and diagnostic semen analysis patients affects sperm quality.

Method: Semen analysis and ejaculatory data were collected from both groups attending for either routine semen analysis or pre-oncology treatment semen cryopreservation. Statistical analyses were performed on a range of parameters using analysis of variance (ANOVA) and independent samples T-tests ($p < 0.05$).

Results: There was no significant difference between frequency of ejaculation and the total progressive motile sperm count in both patient groups. There was a significant reduction in total progressive motile sperm count in oncology patients compared to their diagnostic counterparts,. Progressive motility, sperm concentration and ejaculate volume also showed statistically significant differences between patient cohorts depending on their ejaculation frequency.

Conclusion: The findings of this study indicate that frequency of ejaculation does not influence sperm quality in relation to total progressive motile count. It does, however, demonstrate that frequency of ejaculation can affect individual sperm parameters, depending on the patients' health status. Furthermore, this study shows that oncology patients have a lower total

progressive motile count, prior to any oncological treatment, compared to diagnostic semen analysis patients. Further studies may consider exploring other lifestyle factors and their influence on sperm parameters as an inexpensive and potentially effective method of improving male fertility.

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343. Risk reducing elective gonadectomy in Complete Androgen Insensitivity Syndrome (CAIS) -An opportunity for fertility preservation?

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Category

Oocytes and ovary

Sub-Category

Clinical

Abstract

Study question/Objective: To report gonadal tissue cryopreservation following bilateral gonadectomy in a patient with CAIS, evaluate fertility trends in patients with CAIS and propose risk reducing surgery as an opportunity for fertility preservation in carefully selected patients with CAIS.

Results: We present the case of a 17-year-old with a known diagnosis of CAIS. Supported with comprehensive specialist counselling and Multidisciplinary team (MDT) input for the patient and her family, the patient was offered post pubertal bilateral gonadectomy to mitigate the risk of developing malignant germ cell tumours in the intra-abdominal gonads [1-2]. Gonadectomy had been delayed to allow for natural pubertal progression. Prior to surgery, the patient requested fertility preservation, she identified as a female. This request was ethically approved with MDT input, via the Oxford Reproductive Cryopreservation programme.

Post operatively, selected tissue biopsies following gonadectomy were negative for malignancy. Her sibling had also undergone bilateral gonadectomy for CAIS, fertility preservation was not undertaken in their case.

Conclusion: This is the first case report of gonadal tissue cryopreservation post gonadectomy in an XY female with CAIS, versus the usual practise of presumed infertility for such individuals.

This case highlights that risk reducing gonadectomy can be an opportunity for gonadal tissue cryopreservation and this has the potential to be extended to other individuals with DSD (Differences/Disorders of Sexual Development) having functional gonadal tissue [3]. This could potentially pave the route to biological parenthood for individuals with DSD. Due consideration must be given to myriad of bioethical issues in such a case. It also emphasises the need for further research into the potential of cryopreserved tissue in fertility.

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RF6 Rapid Fire Poster Session

312. Isolation and characterisation of peritoneal cells from laparoscopic surgeries to model superficial endometriosis

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Category

Other

Sub-Category

Basic Science

Abstract

Background: Peritoneal endometriosis lesions cause adhesions and scar formation that can interfere with ovulation, fertilisation and embryo migration resulting in infertility. However, the

underlying molecular mechanisms that drive endometriosis-associated scar formation are yet to be fully elucidated. This study aims to establish an in vitro patient-derived multicellular model of the peritoneum to support studies exploring superficial endometriosis associated fibrosis.

Methods: Primary mesothelial cells were isolated from peritoneal washes from six women who underwent laparoscopic surgery, while the primary peritoneal fibroblasts were derived from three individual fallopian tube mesentery explants. The cells were characterised by immunofluorescence (IF) staining. LP-9 mesothelial cells and normal human dermal fibroblast (NHDF) were used as controls. Mesothelial cells were seeded on top of the peritoneal fibroblasts embedded in a bipartite rat-tail collagen type I-Matrigel 3D matrix to model the peritoneum. Human peritoneal biopsies were stained with mesothelial and fibroblast markers to compare with the models.

Results: Primary mesothelial cells optimally grew in media supplemented with 15% FBS and EGF, while peritoneal fibroblasts grew in serum-free media with bFGF. Cobblestone shape with localisation of WT1, pan-cytokeratin, and vimentin in primary mesothelial and LP-9 cells demonstrated retention of phenotype. Spindle-shaped appearance with expression of vimentin and lack of pan-cytokeratin in the primary peritoneal fibroblasts and NHDF indicated their fibroblastic characteristics. Optimisation showed that the 3D peritoneal in vitro model resembles a simple peritoneum structure by the formation of mesothelial monolayer surface, and basement membrane Collagen IV following 10 days culture.

Conclusions: Primary mesothelial cells can be isolated from peritoneal wash, and peritoneal fibroblasts can be isolated from fallopian tube mesentery explants. The 3D cell culture method is a promising mimic of the peritoneum and will be valuable for modelling human peritoneum, to be used in studies exploring the early formation of peritoneal endometriosis.

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74. Fertility outcomes of laparoscopic transabdominal cerclage (TAC)

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Objective: This study aims to assess fertility outcomes following in-pregnancy or pre-pregnancy laparoscopic transabdominal cerclage (TAC) for patients with previous unsuccessful transvaginal cerclage, or patients with a previously diagnosed short cervix. Video footage demonstrates the technique in pregnant and non-pregnant cases.

Methods: A retrospective review was conducted of all patients treated with laparoscopic TAC between May 2010 and August 2024 at a tertiary hospital in the United Kingdom. Fertility history, surgical outcomes, time to conception, assisted conception treatments and obstetric outcomes were collected and analysed.

Results: 33 patients underwent laparoscopic TAC, 4 patients underwent TAC during pregnancy and 29 pre-pregnancy. The mean number of previous pregnancy losses was 2.8 (0-12). Patients had co-existent diagnoses including endometriosis/adenomyosis (n=9), congenital uterine anomaly (n=7) and pelvic adhesions (n=9). 6 (18%) patients had previously undergone multiple assisted conception treatment cycles with recurrent pregnancy losses before TAC.

Intraoperatively, 2 patients had uterine perforation which required suturing. Most patients went home on Day 0 or Day 1 postoperatively. 16/29 (55%) have conceived following the procedure, average time to conceive was 11 months (3-26 months), 12/16 (69%) patients delivered >37 weeks, 1 patient had a **Sub**sequent mid-trimester loss and removal and re-insertion of TAC, 2 patients had an early miscarriage and 1 patient is currently mid-trimester.

For TAC inserted during pregnancy, 2 patients delivered >37 weeks and 1 had rupture of membranes shortly after TAC but delivered at 34 weeks and 1 is currently pregnant.

Conclusion: TAC appears to be a safe and effective treatment and does not appear to prolong time to conception. For patients undergoing concurrent assisted conception treatment, TAC should be considered pre-treatment. Patients requiring TAC often have other diagnoses contributing to **Sub**fertility and recurrent pregnancy loss including congenital uterine anomalies, endometriosis and adhesions, highlighting the importance of a comprehensive approach to management.

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340. How reliable is the diagnosis of Adenomyosis by conventional 2D and 3D ultrasound?

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Category

Other

Sub-Category

Clinical

Abstract

Objective: This study aims to evaluate the reproducibility of the diagnosis of adenomyosis using the direct and indirect ultrasound features defined by the revised Morphological Uterus Sonographic Assessment (MUSA) consensus.

Methods: Women, aged 18-40 years, who attended the recurrent miscarriage clinic of a tertiary hospital were recruited in this prospective study. All participants had a 2D and 3D transvaginal ultrasound in the late follicular-early luteal phase of their menstrual cycle. 3D grey scale and power Doppler image volumes of uterus were acquired and stored. **Sub**sequently, the stored images were independently evaluated offline by two investigators. Both direct and indirect features of adenomyosis, as defined by the revised MUSA consensus, were analysed. The agreement between the two observers was measured using Cohen's Kappa coefficient (Graphpad Prism software).

Results: While the observed agreement between the two observers for the diagnosis of adenomyosis based on the direct features was 72.3%, the expected agreement was 60.4%. The level of agreement was fair with kappa coefficient of 0.302 (95% CI 0.011-0.592). Amongst the direct ultrasound features of adenomyosis, the agreement was better for 'hyperechoic islands' (kappa coefficient 0.28; 95% CI 0.012-0.547) than for myometrial cysts (kappa coefficient 0.085; 95% CI -0.173-0.343) and **Sub**endometrial lines and buds (kappa coefficient 0.049; 95% CI -0.263 - 0.36). The agreement of the indirect features of adenomyosis ranges between slight to moderate.

Conclusion: The diagnosis of adenomyosis, based on the direct features on ultrasound, defined by the revised MUSA consensus, is reproducible, but only to a fair degree. Amongst the three direct features, 'hyperechoic islands' is more reproducible than 'myometrial cysts' and '**Sub**endometrial lines and buds'. Due to diverse ultrasound features, it is clinically challenging to reliably diagnose adenomyosis.

247. CRISPR/Cas9 mediated generation of *GATA3* knockout (KO) bovine cell line models to validate the targeting efficiency of sgRNAs

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Objective: CRISPR/Cas9-based genome editing has become an efficient technique for targeted genetic modifications of host genomes. Knockout/knock-in of a gene by targeted gene disruption is an effective approach to decipher function[1].

Methods: Major steps of CRISPR pipeline included designing sgRNAs targeting specific regions of bovine-*GATA3* gene, CRISPR cloning of guides into pX459 plasmid, transfecting bovine cells with CRISPR clones and MiSeq-analysis[2]. We designed 11 CRISPR-Cas9 sgRNAs spanning different regions of bovine-*GATA3* gene i.e. transcription initiation site (Exon-2) and Zinc-finger (ZnF) functional domains (Exon-4,5). In-vitro cleavage assay was used to screen sgRNAs analyzing optimal cutting efficiencies. These sgRNAs were tested in bovine fetal fibroblasts and bovine MDBK cells to analyze in-vivo targeting efficiency by transfection and screened through puromycin selection followed by MiSeq analysis to verify successful knockouts.

Results: We identified three effective guides, two targeting ZnF-1 and ZnF-2 functional domains (sgRNA#5,sgRNA#8) in Exon-4,5 respectively, and one targeting transcription initiation site (sgRNA#1) in Exon-2 by successfully generating *GATA3*-KO bovine fibroblasts and MDBK cell line models through CRIPSR/Cas9-mediated genome editing. MiSeq data from targeted bovine cells showed indel frequency of 47.40%, 55.5%, and 42.4% in bovine fetal fibroblasts, 11.03%, 28.9% and 7.3% for MDBK cells for sgNA#1,5 and 8 respectively. Our results showed higher lipofection and indel rates in bovine fibroblasts than in MDBK cells. Overall, MiSeq data for 3

selected sgRNAs showed successful disruption of *GATA3* gene inserting a base pair 2-3 bp upstream of PAM site ultimately resulting in premature stop codon TAA in downstream region.

Conclusion: *GATA3* is crucial for TE initiation in early mammalian development[3]. Our study advances this understanding by developing a CRISPR/Cas9 knockout model in bovine embryos. We are microinjecting *GATA3*-sgRNAs and Cas9 protein into bovine zygotes 12h post-fertilization to further investigate gene's functional role in embryogenesis[4].

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257. Conceptus regulates activity of DNA methyltransferases differentially in endometrial luminal and stromal cells in the pig

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Category

Uterus

Sub-Category

Basic Science

Abstract

Objective: On days 11-12 of pregnancy, porcine conceptuses (embryos with extraembryonic membranes) signalize their presence by secreting multiple factors, of which estradiol (E2) is considered as the major embryonic signal. Our previous study reported that DNA methylation patterns of certain genes in the endometrial tissue changed in response to conceptus during early pregnancy and this corresponded with alteration of these genes expression. DNA methylation is catalyzed by DNA methyltransferases (DNMTs). The aims of the present research were to: evaluate the activity of DNMTs in endometrial luminal epithelial (LE) and stroma cells (ST) in response to conceptus *in vitro;* and to localize DNMT1 and DNMT3A proteins in the porcine endometrium.

Methods: Endometrial samples were collected from uteri of gilts (n=6) on day 12 of the estrous cycle and pregnancy (n=6). LE and ST cells were isolated from endometrium on day 12 of the estrous cycle and the cells were incubated with the control medium and conceptus-exposed conditioned medium. DNMT activity was determined in nuclear protein extracts of LE and ST cells using a colorimetric assay. Immunolocalization of DNMT1 and DNMT3A was performed by immunohistochemistry in paraffin cross-sections of endometrium on day 12 of the estrous cycle and pregnancy.

Results: The conceptus-exposed conditioned medium decreased DNMT activity in LE cells ($p<0.05$), however in ST cells the DNMT activity tended to elevate in response to this medium. The expressions of DNMT1 and DNMT3A proteins were localized in luminal and glandular epithelial cells and stromal cells in the endometrium.

Conclusions: The present study indicate that conceptus differentially regulate DNMT activity in LE and ST cells. Our results suggest that putative changes in DNA methylation in endometrial cells in response to conceptus could play a significant role during pregnancy establishment and development.

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SP2A BFS Young Scientist Prize Session

149. Towards Single-Cell Embryo Assessment

Chloe He[1,2], Neringa Karpavičiūtė[3], Rishabh Hariharan[4], Céline Jacques[5], Koen Wouters[6], Jonas Malmsten[7], Nikica Zaninovic[7], Francisco Vasconcelos[1], Cristina Hickman[8,2]

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Introduction

Clinical embryology currently evaluates embryos as a whole, using aggregate metrics like cell count, uniformity, and compaction for grading. Artificial intelligence systems often follow a similar approach, assessing entire images. In contrast, modern developmental biology often focuses on tracking individual cells, monitoring events such as mitosis and apoptosis, which can provide insights into embryo genetics. These methods, however, typically require invasive staining and costly imaging techniques making them infeasible in clinical practice. In this work, we propose a non-invasive cell tracking system that enables single-cell analyses in the IVF lab.

Methods: We employ the 3D reconstruction technique developed by He et al. [1] to detect the 3D positions of individual cells from each frame of an Embryoscope timelapse. To associate individual cell detections into tracks corresponding to the same cell across time, we use a variant of the Crocker–Grier algorithm. We tested our system on 15 embryo timelapses captured at a single clinic, each consisting of 20 frames from the cleavage stage. We evaluated the performance of our system using established cell tracking metrics including Multi-Object Tracking Accuracy (MOTA) and IDF1 (both with a maximum score of 1), as well as precision and recall for individual cell detections.

Results: Our system demonstrated strong performance with a MOTA of 0.832 and an IDF1 score of 0.870. The precision of individual cell detection was 0.966, and recall was 0.938. The system managed to track 92.0% of cells across more than 80% of their lifetime (“mostly tracked”), while only 2.2% were tracked across fewer than 20% of their lifetime (“mostly lost”).

Conclusion: We have presented a novel approach to non-invasive single-cell analysis in clinical embryos. Our work lays the foundation for future work investigating cell lineage tracking in clinical human embryos, which could offer valuable insights for embryologists.

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10. Revealing the secrets of ovulation

Christopher Thomas[1,2], Tabea-Lilian Marx[2], Sarah Mae Penir[2], Melina Schuh[2]

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Background: Ovulation is essential for reproduction. During ovulation, an egg is released from an ovarian follicle, ready for fertilisation. Ovulation occurs deep inside the body during a narrow window of time, impeding direct studies of its progression. The exact mechanisms that control ovulation have therefore remained unclear.

Methods: Here we developed a model system to study ovulation live in isolated mouse follicles using a long-term culture system adapted for use with advanced quantitative live imaging. To follow the behaviour of individual cells, the system takes advantage of CAG-TAG transgenic mice expressing a membrane (Myr-TdTomato) and a chromosome (H2B-GFP) marker. A combined approach of confocal and two-photon microscopy allows for the study of ovulation at both the cellular and whole follicle scale. This model system was validated by scRNAseq and immunofluorescence staining of key ovulation-related proteins.

Results: We show that ovulation proceeds through three distinct phases, follicle expansion (I), contraction (II), and rupture (III), culminating in the release of the egg. Follicle expansion is driven by the secretion of hyaluronic acid, and an osmotic gradient-directed influx of fluid into the follicle. Subsequently, smooth muscle cells in the outer follicle drive follicle contraction. Follicle rupture is initiated by the formation of a stigma in the thinnest region of the follicle wall,

followed by the exit of follicular fluid and cumulus cells, and eventually, the rapid release of the egg.

Conclusion: In summary, we have established an experimental system that allows for continuous visualisation of the entire process of ovulation. This approach has provided important mechanistic insights into the spatio-temporal control of ovulation. The ex vivo ovulation model allows for easy drug delivery and paves the way for further mechanistic and systematic studies of ovulation in the future.

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203. The impact of ethnicity on clinical outcomes in women undergoing IVF treatment

Elhem Loukily[1], Simon Hanassab[1,2,3], Scott Nelson[4,5], Ziyad Ansari[6], Artur Akbarov[2,3], Tom Kelsey[7], Artsiom Hramyka[7], Arthur Yeung[1], Sotirios Saravelos[8], Rehan Salim[8], Alexander Comninos[1,9], Geoffrey Trew[5], Thomas Heinis[2], Waljit Dhillo[1,9], Ali Abbara[1,9]

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Background: Significant disparities in maternal health and fertility care exist among ethnic groups due to biological factors, as well as intersectionality of systemic injustices and

socioeconomic factors. Indeed, Black women have higher rates of infertility yet are underrepresented in women undergoing IVF treatment.

Aim: To investigate differences in pre-treatment prognostic characteristics and responses to IVF treatment amongst women of White, Asian, Black, Mixed, and Other ethnic backgrounds.

Method: This retrospective, multicentre cohort study, analysed data from 11,120 women undergoing IVF treatment between 2007-2023 across ten centres in the UK and Poland. Outcomes included live birth rate (LBR) after fresh embryo transfer. A multivariable logistic regression model was used to adjust for age, BMI, and primary cause of infertility. Ethical approval: 23/HRA/2849.

Results: Distribution of ethnic groups included White (72.3%, n=8,258), Asian (17.9%, n=1,995), and Black (2.6%, n=284). Asian women (34.1yrs) were younger (P<0.0001) than White (34.7yrs) and Black women (35.1yrs) at time of treatment. BMI was higher in Black than White women (26.8 vs. 25.0 kg/m^2; p<0.001). Despite Black (15.3) and Asian (16.1) women having a lower pre-treatment antral follicle count than White women (17.6), there was no significant difference in the number of mature oocytes retrieved. However, Black women were nearly 50% less likely to achieve a live birth compared to White women (OR 0.54, 95% CI [0.36 to 0.78]), even after adjusting for age, BMI, and primary infertility cause. Biochemical and Clinical pregnancy rates were similarly reduced in Black women, whereas miscarriage rates did not significantly differ.

Conclusion: Less favourable pre-treatment prognostic characteristics in Black women did not fully account for the observed differences in LBR. The impact of ethnicity on outcomes following IVF treatment is complex and further research is needed to elucidate the reasons for the observed disparities in clinical outcomes.

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114. PRMT1-mediated arginine methylation determines cell fate decision in bovine early embryonic development through glucose metabolism

Jinlong Qiu, Pedro Beltran-Alvarez, Roger Sturmey

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Objective: Protein arginine methyltransferase (PRMT)4-catalyzed asymmetric dimethylarginine (ADMA) is crucial in early mouse development, regulating Sox2 to influence inner cell mass (ICM) specification(1). However, the role of PRMT1, mediating 85% of ADMA(2), in early mammalian embryonic development remains unknown. Bovine embryos serve as an excellent model for studying lineage differentiation in human and large mammalian embryos(3). This study aimed to investigate the role of PRMT1-mediated ADMA in bovine embryonic development, particularly its influence on cell fate decisions through glucose metabolism.

Methods: PRMT1 was separately inhibited using MS023(4) and GSK3368715(5). Glycolysis, the pentose phosphate pathway (PPP), and the hexosamine biosynthesis pathway (HBP) were inhibited using YZ9, 6-Aminonicotinamide, and ST045849, respectively(6).

Results: PRMT1 and its catalyzed H4R3me2a were prominently expressed during early bovine embryos. PRMT1 inhibition reduced H4R3me2a and ADMA levels while increasing symmetric dimethylarginine and monomethylarginine levels. Despite unaffected blastocyst rates and GATA3 expression, PRMT1 inhibition reduced total cell number, trophectoderm (TE) cell number, and ICM cell number, along with decreased CDX2 and SOX2 expression, suggesting PRMT1's pivotal role in cell fate decisions. This correlated with a significant decrease in pH3S10-positive cells, indicating cell cycle disruption. PRMT1 inhibition also caused decreased H3K27me3 and H3K9me3 and increased H3K9ac, indicating disrupted global epigenetic reprogramming.

Additionally, PRMT1 inhibition caused reduced glucose and pyruvate depletion from media, with constant lactate secretion, and led to diminished YAP1 expression. Blocking glycolysis didn't affect blastocyst rate, CDX2, or GATA3 expression, suggesting exogenous pyruvates were energy sources. HBP inhibition reduced blastocyst rates and YAP1 expression, indicating PRMT1 may influence TE specification via glucose metabolism. Interestingly, while PPP inhibition caused morula-stage arrest, bovine embryos progressed to the blastocyst stage in glucose-depleted media, a phenotype differing from that of mouse embryos. Further research is needed to fully elucidate these mechanisms in this ongoing project.

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173. Evaluating the relationship between human blastocyst morphology and polygenic risk scores

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Category

Fertilisation and embryo

Sub-Category

Translational

Abstract

Objective: Several studies demonstrate that using polygenic risk scores (PRS) for embryo prioritization for transfer significantly reduces disease risk when compared to random selection. The expected translational benefit to IVF patients assumes that morphology-based embryo selection is independent from the embryo's genetic makeup. This study is the first to investigate the relationship between embryo morphology and PRS.

Methods: The analysis included euploid blastocysts with PGT, composite-PRS values, and clinic-provided Gardner scores. Gardner scores were transformed into a numerical scale using a novel approach that involved summing expansion phase, inner cell pass (ICM) scores, and trophectoderm (TE) scores, assigning values of A = 3, B = 2, and C = 1. This gave each embryo a score from 5-12. Validated using 25,935 embryos undergoing PGT-A by high throughput SNP array, this approach confirmed the established relationship between high aneuploidy rates with poorer morphology. A one-way ANOVA assessed the relationship between PRS and morphology, while linear regressions analysed correlations among biopsy day, TE, ICM, and expansion scores. Analyses were conducted in R software, with statistical significance defined as $p<0.05$.

Results: No significant correlation was found between PRS and morphology ($p>0.05$, n=712). Mean PRS values for low (n=129), medium (n=376), and high (n=207) embryo grades were 0.161, -0.031, and 0.080, respectively, where higher values suggest improved health. An inverse relationship was found between lower TE scores and better PRS values ($p<0.01$). A marginal inverse relationship was found between PRS and biopsy day ($p=0.06$).

Conclusion: This preliminary data suggests that morphology-based embryo selection does not reduce polygenic disease risk more effectively than random selection, highlighting the potential benefit of PGT for polygenic diseases to reduce disease risk. Active research is exploring if the early TE findings could align with the Quiet Embryo Hypothesis, and whether conventional morphology-based embryo selection may increase long-term disease risk.

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148. Promoting the quality of life of patients who end fertility treatment without a live birth: results from a multicentre two-arm randomised controlled trial (RCT) of Beyond Fertility, a brief face-to-face psychosocial intervention

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Category

Psychosocial

Sub-Category

Clinical

Abstract

Objective: Around 46% of IVF patients end all treatment cycles without a live-birth (1). Despite demand for support (2-4), accessible, evidence-based care is lacking. Beyond Fertility is the first face-to-face psychosocial intervention aimed at attenuating the negative impact of ending treatment without a live-birth. It includes preventive-care (session 1: individual/couple to prepare patients for this negative outcome) and early-interventive care (session 2: individual/couple, sessions 3-7: group-based support if this happens).

Methods: Registered, two-arm (1:1) parallel-group (Control: care-as-usual; Intervention: Beyond Fertility) open-label RCT. 158 women scheduled to initiate their last NHS-reimbursed IVF/ICSI cycle within one month at four public fertility centres in Portugal were consecutively invited to participate with their partners (Dec,2021-Mar,2023). Linear-mixed-effect models compared quality-of-life changes [primary outcome, self-reported with FertiQoL (5)] from baseline (T1, before randomisation) to 2-weeks (T2, post-preventive care) and 6-months (T4, post-intervention) after cycle end.

Results: Of 143 eligible women, 74 (51.7% response-rate) and 41 partners were randomised (N=115). Participants were, on average, 38 years old and undergoing treatment for three years. 64% were women, all in a heterosexual relationship, and 30% had children. Study attrition-rate (77.4%) was high. Most (58.8%) continued treatment after unsuccessful cycle, and the others who ended treatment reported low acceptability (44.4%) to group-based support (sessions 3-7). Accounting for baseline scores, modified intention-to-treat analysis showed, compared with those in Control, those in Intervention had a higher estimated quality-of-life mean of 4-points at T2(β [95%CI];4.42[-0.18-9.08], p=0.070, n=72; small effect-size) and 8-points at T4(7.91[-1.11-16.90], p=0.121, n=24; medium-to-large effect-size). No unintended harms were reported for preventive and early-interventive care, and the former seemed to promote patients' engagement with individual/couple support after treatment (session 2: 72.2% uptake).

Conclusions: Quality-of-life benefits may be achieved with this care model, but future intervention development/testing needs to account attrition from planning the last treatment cycle.

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SP2B Reproductive Endocrinology and the Ovary

313. Evaluating the performance of kisspeptin as a test of hypothalamic function in women presenting with menstrual disturbance

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Category

Endocrinology

Sub-Category

Clinical

Abstract

Background: Polycystic Ovary Syndrome (PCOS) and Functional Hypothalamic Amenorrhoea (FHA) are the two commonest causes of menstrual disturbance. A fundamental abnormality that underpins both conditions is altered hypothalamic function, being increased in PCOS but reduced in FHA. Kisspeptin is a potent stimulator of hypothalamic GnRH secretion, and thus could be a novel tool to interrogate hypothalamic function in women presenting with menstrual disturbance.

Methods: Healthy women (n=33), women with PCOS (n=30), FHA (n=30), or congenital hypogonadotropic hypogonadism (CHH) (n=8) aged 18-35yrs not currently taking hormonal treatments, underwent two study visits, where they received an intravenous bolus of kisspeptin to interrogate hypothalamic function, and of GnRH to interrogate the pituitary response. Serum hormones were monitored 15-minutely for 8hrs.

Results: The mean (SD) of the maximal rise in LH (IU/L) after kisspeptin was 9.7 (11.4) in healthy women, 9.7 (8.3) in women with PCOS, 17.6 (10.8) in women with FHA, and 1.0 (1.1) in women with CHH. The mean (SD) of the maximal rise in FSH (IU/L) after kisspeptin was 4.2 (3.4) in healthy women, 2.8 (2.1) in women with PCOS, 9.2 (5.6) in women with FHA, and 0.7 (0.5) in women with CHH. The maximal rise in FSH after kisspeptin could differentiate women with lean PCOS (BMI <25 kg/m^2) from those with FHA (area under ROC 0.91, p=0.0001). The maximal rise in FSH after kisspeptin could differentiate women with FHA from women with CHH (auROC 1.00, p<0.0001), whereas the equivalent auROC for FSH rise after GnRH was 0.7 (p=0.086).

Conclusion: Kisspeptin offers a novel approach to assessing hypothalamic function in patients presenting with different reproductive disorders causing oligo / amenorrhoea. Our data reveals for the first time that the hormonal response to kisspeptin has promising diagnostic potential to aid in the evaluation of women presenting with menstrual disturbance.

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100. Polycyclic aromatic hydrocarbons in human granulosa cells: first in vivo presence and positive correlation with body mass index and in vitro ovarian cell steroidogenesis regulation

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Polycyclic Aromatic Hydrocarbons (PAHs) in air are environmental pollutants with a high public health concern. Some evidence shows that PAHs exposure leads to lung and cardiovascular disorders, as well as cancer and obesity. Human obesity is also reported in female infertility patients.

Objectives : hence, this work aims to unravel correlation, if any, between ovarian PAHs exposome and body mass index (BMI) in infertile patients and to investigate the *in vitro* effects of fluoranthene, phenanthrene and naphthalene in ovarian cell functions.

Methods and results : By gas chromatography coupled with tandem mass spectrometry, we found all 16 high-priority PAHs in human follicular fluid (FF), granulosa cells (Gc) and blood plasma with the highest concentration in Gc. The higher concentration of PAHs was reported in Gc from obese patients, except for acenaphthene and acenaphthylene, and positively correlated with BMI. In FF, we noted only positive correlation between naphthalene and BMI, whereas in blood plasma positive correlation between naphthalene, acenaphthene, pyrene and BMI. We also showed that phenanthrene and naphthalene but not fluoranthene inhibited steroid production by ELISA assay, *CYP19A1* mRNA expression by RT-qPCR and increased oxidative stress index and catalase expression independently on metabolic status in primary human Gc. While all studied PAHs decreased Gc proliferation and viability as determined by Bromodeoxyuridine incorporation and Cell Counting Kit-8 assays and Cyclin D1 mRNA expression in both normal weight and obese patients.

Conclusions: Taken together, we showed that 16 most abundant PAHs accumulated in human Gc are positively correlated with BMI. Moreover, PAHs alter the Gc functions suggesting a negative impact of PAHs on the women reproductive health and possibly on their offsprings. The measurements of PAHs concentration in the atmosphere could help to better understand some women reproductive disorders.

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50. FOXL2 ablation disrupts ovarian cell fate by remodelling sex-specific gene regulatory networks and results in testis-like reprogramming of adult ovaries

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Gonad identity in mice is dependent on specification of bipotential precursor cells into granulosa cells of the ovary or Sertoli cells of the testis during sex determination at E11.5. However, deletion of the gene encoding the transcriptional regulator FOXL2 in 8-week-old females results in gonadal sex reversal, where granulosa cells destabilise their fate and transdifferentiate into Sertoli-like cells [1]. This involves activation of the transcription factor SOX9, a critical testis determinant, indicating that FOXL2 directly represses *Sox9* in the ovary. Here, the aim was to explore the molecular and regulatory mechanisms underlying the ability of ovarian cells to transdifferentiate into testicular cell types across different developmental stages. To investigate the period during which ovaries are permissive for the cell fate switch, *Foxl2* was conditionally deleted at different embryonic and postnatal stages, including pre and post pregnancy timepoints. This revealed that extensive gonadal sex reversal is inducible at all timepoints, except in the embryo, showing that FOXL2 becomes critical for maintaining ovarian cell fate postnatally. To explore the transcriptional changes occurring in the ovary upon deletion of *Foxl2* at a single-cell level, single-cell RNA-Sequencing was performed on dissociated cells from testes and ovaries collected before, during and after gonadal sex reversal. This resolved single cell composition allowed us to identify the cell populations that are prone to transdifferentiate. These studies provide important advances in our understanding of the molecular and regulatory mechanisms underlying granulosa and ovarian cell fate maintenance and will be informative for the management of differences of sex development conditions, and perhaps more generally for regenerative medicine.

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118. ZIP9, a zinc importer and membrane androgen receptor, is essential for female reproduction in zebrafish

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Category

Endocrinology

Sub-Category

Basic Science

Abstract

Introduction: Androgens mediate their physiological functions via the classical nuclear receptor, androgen receptor[1]. However, recent studies have identified a new plasma membrane (and non-genomic) androgen receptor- the Zn(II) channel, ZIP9. Indeed, ZIP9 has been reported to regulate oocyte growth and maturation in the teleost ovary[2,3]. However, how ZIP9 impacts the reproductive hypothalamic-pituitary-gonadal (HPG) axis remains unknown.

Aim: To utilise CRISPR/Cas9 deletion of ZIP9 to determine how ZIP9 modulates HPG axis gene expression and reproductive function.

Methods: CRISPR/Cas9 was used to generate a global zebrafish *zip9* knock-out line. Key reproductive gene expression in adult *zip9*$^{-/-}$ zebrafish was determined via qPCR with a minimum n=3 in triplicate.

Results & Conclusion: In wild-type (wt) adult male and female zebrafish, *zip9* mRNA expression was detected in the brain(hypothalamus and pituitary), testis, ovary and liver. Interestingly, ZIP9 was highly expressed in the ovary and liver, suggesting potential sexual dimorphism in ZIP9 expression levels in these tissues. In the brain of male *zip9*$^{-/-}$zebrafish, *gnrh3* expression was lower than wt while the expression of *gnrh2* showed no change. In females *zip9*$^{-/-}$, *gnrh3* expression was higher than wt while *gnrh2* was unchanged. *zip9* deletion resulted in lower expression of *ar, esr*, and *lhr* in both the ovary and the testis. Interestingly, *fshr* expression was significantly lower in the ovaries of *zip9*$^{-/-}$females compared to wt, this contrasted with zip9-/- testes where *fshr* expression was significantly increased in comparison to wt. Mating studies demonstrated *zip9*$^{-/-}$ females were infertile while the males remained fertile, suggesting an essential role of Zip9 in female reproduction. Differences in key HPG axis gene expression provide mechanism underpinning the sexual dimorphic roles of ZIP9 in zebrafish reproduction.

This may suggest the role of Zip9 in influencing the physiological processes involved in follicle development and maturation in female zebrafish.

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241. Molecular evolution of adipose tissue dysfunction in polycystic ovary syndrome (PCOS)

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Category

Endocrinology

Sub-Category

Translational

Abstract

Prenatally androgenised (PA) sheep are a clinically realistic model of PCOS. Like women with PCOS, **Sub**cutaneous adipose tissue (SAT) is dysfunctional with larger adipocytes and more inflammation. Reduced adipogenesis in adolescence is an antecedent to adipose tissue dysfunction in adulthood. We hypothesised that analysis of adipose tissue in young adults, after adipogenesis is complete but before inflammation is manifest, would give insights into the evolution of adipose tissue dysfunction in PCOS.

Pregnant Sheep were treated intramuscularly with testosterone propionate (PA) or vehicle control (C) twice weekly from day 62-102 of gestation. Weight-matched female offspring (PA=10; C=10) were studied as young adults at 20 months of age. Serum was collected and SAT was fixed for histological analysis and snap frozen for gene expression studies, RNAseq and immunoassay.

There was no difference in the average size of SAT adipocytes between PA and C offspring. There were no differences in the expression of the inflammatory markers TNF and IL6 or the adipogenesis markers PPARG, CEBPA and CEBPB confirming the adipose tissue was at the crossroads between differentially altered functions in adolescence and adulthood. PA sheep however were already hyperinsulinaemic with reduced SAT noradrenaline concentrations. A total of 792 genes were differentially expressed in SAT between PA and C sheep (406 upregulated; 386 downregulated). POSTN, which is associated with tissue inflammation and fibrosis, was increased (FC 2.8: P=0.0002) in PA sheep. Ingenuity pathway analysis (IPA) highlighted upregulation of fibrosis signalling pathways, extracellular organisation pathways and the assembly of collagen fibrils in the SAT of PA sheep, and COL1A1, COL1A2 and COL3A1 were increased.

Early fibrotic changes in SAT occurs before changes in adipose tissue size and inflammation in PA sheep. This might provide a barrier to healthy adipocyte expansion and have a mechanistic role in the development of the detrimental inflammatory environment in PCOS.

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228. Could analysis of FSHR gene splicing variants have a role in predicting ovarian response to stimulation and personalising treatment?

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Category

Oocytes and ovary

Sub-Category

Translational

Abstract

Objective: This study aimed to investigate the interplay between Follicle-Stimulating Hormone Receptor (FSHR) mRNA splicing variants, patient age, and the degree of response to controlled ovarian stimulation (COS). Results were considered with respect to their implications for the personalisation of treatment.

Methods: RNA was extracted from the cumulus cells of 124 patients and reverse transcribed. FSHR gene transcripts were then **Sub**jected to long-read nanopore sequencing. Expression patterns were analysed according to ovarian response level (oocytes retrieved), sensitivity to FSH (dosage required), patient age (<38 years or ≥38 years) and AMH levels.

Results: As expected, older women typically required higher FSH doses for stimulation ($p=0.0019$) and per oocyte retrieved ($p<0.0001$). Of note, 33% of the patients had a response to COS stronger or milder than predicted based on their age and AMH levels.

The use of long-read sequencing provided the first characterisation of the structure of full-length FSHR transcripts. This revealed five novel mRNA isoforms, characterised by the inclusion of additional intronic segments that included stop codons. Such transcripts are expected to produce truncated versions of the FSHR protein. The novel transcripts were predominantly observed in older patients ($p=0.017$) but showed no influence on COS response ($p=0.59$). A previously described transcript variant, involving skipping of exon 6, was also detected and displayed differential expression for low, normal and high responders. Low responders expressed the transcript variant less frequently ($p=0.026$), a difference most apparent for women in the older age **Category** ($p=0.029$).

Conclusions: This study reveals a complex landscape of FSHR mRNA splicing variants. Age-related changes in splicing patterns, including increasing diversity of transcript variants, may indicate declining transcriptional fidelity, with possible implications for ovarian function. The association of specific variants with sensitivity to COS supports the hypothesis that these genetic markers could help predict and optimise personalised stimulation protocols.

SP2C Advances in Reproductive Science

227. Oxidative stress and metabolic alterations induced by nano-microplastics (NMPs) in human granulosa cells

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Objectives: Recent rise in global plastic production has increased concerns regarding human health. Since very little is known about the impact of nano- and microplastics (NMPs) on mammalian female reproductive functions, we investigated molecular mechanisms underlying NMP effects on ovarian cells.

Methods: Human granulosa cell (hGC) line KGN was exposed to NMPs of different size (40, 70, 100, 200 nm) at 5 - 1000 µg/ml, for 24 hours. NMP uptake was studied under confocal laser scanning microscopy and in live imaging with Nanolive, Media System Lab. Cell viability, apoptosis and reactive oxygen species (ROS) production were assessed by Cell Counting Kit 8, TUNEL assay and Mitosox Red, respectively. Mitochondrial bioenergetics was evaluated by MitoStress kit (Seahorse Xfe96, Agilent) and by quantification of ATP production (Cell Titer-Glo ATP assay kit, Promega Ltd). Gene and protein expression of key regulators of cell cycle progression (p21, p53) and antioxidant response (catalase, SOD1, SOD2, SIRT1, SIRT3) were analysed by real-time Taqman PCR and Western blotting, respectively.

Results: We observed that all NMPs are uptake by hGCs, with a process starting after two hours of exposure. This led to reduced hGC proliferation and increased the rate of apoptosis. In accordance, NMP exposure enhanced protein expression of cell cycle regulators p21 and p53. Moreover, NMP treatments promoted ROS generation and affected the expression of catalase, SOD1 and SOD2. In addition, NMPs induced a reduction of gene expression of sirtuins (Sirt1, Sirt3) in association with an increase of SIRT1 protein level. Finally, mitochondrial bioenergetics and ATP production were altered by all NMPs.

Conclusions: NMPs induce redox imbalance, mitochondrial dysfunctions and influences cell cycle progression/survival, likely underlying deleterious effects of NMPs on female fertility potential. In order to cope with this, hGCs trigger SIRT1 adaptive response leading to activation of antioxidant defences.

53. Mosaicism reporting in PGT-A does not significantly improve clinical outcomes: European multisite, mosaicism non-selection/blinded study including 4293 embryo transfers

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Background: A recent large prospective, blinded study in America showed reporting mosaicism does not improve clinical outcomes[1]. However, intermediate chromosomal copy number (ICN) PGT-A results continue to be interpreted as embryo mosaicism and used for embryo selection based on retrospective analysis findings data with inherent biases[2].

Design: Replication of the blinded-design previously reported in America[1] in an independent European clinical setting, using the same targeted-NGS PGT-A assay, examining the predictive value of whole-chromosome ICN(wICN) and segmental ICN(sICN) following concurrent copy-number and genotyping-PGT. The study involved 14 clinics (April-2022 to July-2023), including 3365 patients and 4293 single embryo transfers. Embryos, without uniform aneuploidies (including those with only wICN and/or sICN) were transferred based solely on standard parameters. Primary outcome was the live birth rate (LBR) per embryo transferred.

Results: PGT-A results displayed wICN in 6.8% and sICN in 6.2% of the transferred embryos.

LBR of embryos in the control (without ICN), sICN and wICN groups were 46.8% (1736/3708;95%CI:45.2-48.4%), 36.4% (98/269;95%CI:30.9-42.3%) and 39.2% (115/293;95%CI:33.8-44.9%), respectively.

Logistic regression (P=0.05) showed that the presence of sICN (OR:0.7;95%CI:0.54-0.9) and wICN (OR:0.62;95%CI: 0.36-1.07) were modestly but significantly associated with LBR, whereas miscarriage rate was not. However, other factors including embryo morphology (OR:0.89;95%CI:0.84-0.96), day of biopsy (OR:0.65;95%CI:0.56-0.75), and previous ET failures (OR: 0.79;95%CI:0.71-0.88) were more strongly associated.

Random Forrest regression, considering all correlating variables, showed a statistically insignificant and clinically negligible improvement of the LBR-prediction when including putative mosaicism in the prediction model (AUC of 0.578 without putative mosaicism vs AUC of 0.583 with putative mosaicism)

Conclusion: Two large independent non-selection/blinded studies now confirm reporting putative mosaicism has no clinical benefit when selecting embryos for transfer based on standard parameters. Mosaicism reporting in PGT is therefore questionable given the high risk of discarding embryos with **Sub**stantial reproductive potential and no increased adverse outcomes.

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71. Reducing mosaic aneuploidy at the first mitotic division of human embryos

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Background: Human reproduction is remarkably inefficient, where two-thirds of conceptions are lost before birth, and ~50% of fertilised human eggs arrest before blastocyst formation *in vitro*[1]. A leading cause of this inefficiency is aneuploidy, where cells have the wrong number of chromosomes, and/or structural defects. However, human preimplantation embryos are commonly mosaic, containing a mixture of euploid and aneuploid cells. Mosaic embryos have wide-ranging outcomes depending on the severity of the aneuploidy[2].

Objective & Methods: Our previous work showed that chromosome segregation in the human zygotic mitosis is error-prone[3], which likely contributes to mosaicism. However, precise molecular mechanisms causingthe low mitotic fidelity were unknown. Here, we used a combination of live chromosome imaging, single-cell next generation sequencing (NGS) and small molecules to investigate the causes of early embryonic aneuploidy in human embryos created for research, plus deselected zygotes (n = 46) (HFEA Licence RO155).

Results: We found that increasing the enzymatic activity of the microtubule depolymerase MCAK/Kinesin 13 in human zygotes using a small molecule agonist (UMK57) significantly improves the fidelity of chromosome segregation and cell division. Our data indicate that MCAK activation significantly reduces chaotic chromosome mis-segregation and reciprocal gain/loss in the first mitosis. This intervention reduces the frequency of numerical and structural aneuploidies in daughter blastomeres and increases the proportion of 2-cell human embryos with at least one euploid cell: 0% (0/7) vs 40% (4/10). These data demonstrate that an increase in the stability of kinetochore-microtubule attachments drives chromosome segregation errors at the first human cleavage division, resulting in mosaic aneuploidy.

Conclusions: These results provide the first mechanistic explanation for the unusually high chromosome error rates in the first human cleavage division and demonstrate that mosaic aneuploidy in human embryos can be reduced prospectively.

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33. Advancing maternal age and absence of meiotic recombination are risk factors for ploidy abnormalities in human conceptions

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Background: Little is known about ploidy abnormalities in human conceptions. Human embryos undergoing PGT provide an ideal model to characterize such abnormalities which are often incompatible with later stages of development.

Design: Retrospective study including 96,660 trophectoderm biopsies analysed following ICSI-cycles between 2020 and 2022 using SNP-genotyping data from a targeted-NGS platform. Blastocysts identified as haploid or triploid were used to investigate origin and patterns of ploidy abnormalities. Additionally, a novel genotyping algorithm was developed to detect the previously undescribed phenomenon of uni-parental recombinant isodiploidy. Re-biopsy of

embryos and independent validation utilising SNP micro-arrays were used to confirm accuracy and reproducibility of the analyses.

Results: Ploidy abnormalities were detected in 1.1% (95%CI:1-1.2%) of 2PN-embryos. Haploidy was predicted to be predominantly due to lack of paternal genome (98.3%), whereas triploidy was predicted to be mainly of maternal origin (94.6%). Furthermore, using our bespoke algorithms, we described a previously undocumented and apparently rare form of recombinant maternal isodiploidy identified in 41 embryos (0.05%; 95%CI:0.04-0.07%). Further analysis of 55 embryos, whose parents were also genotyped, confirmed that haploidy was mainly characterized by lack of the paternal genome, whereas triploidy was exclusively of maternal origin, mainly arising during meiosis II. We also established for the first time that advancing maternal age is positively associated with triploid conceptions (OR=1.059 per-year; $p<0.001$), also confirming this result in an independent dataset (OR=1.03 per-year; $p=0.03$). We also identified 7 triploid embryos with total lack of recombination (statistically significant outliers $P<0.001$, permutation test), suggestive of a mechanism driving genome segregation errors in meiosis. Ploidy abnormalities in ≥3 embryos from a single cycle, not explainable by chance, were identified in 0.03% of cases indicating a potential individual predisposition to ploidy abnormalities.

Conclusion: This work offers novel and important insight into the origin and aetiology of ploidy abnormalities in human conception.

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52. Inflammation of the endometrium, mimicked using TNFα-stimulated Ishikawa cells, causes a dose-dependent decrease in model embryo-endometrial attachment through impaired *HOXA10* expression

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Background: The inflammatory cytokine tumour necrosis factor-alpha (TNFα) is often elevated in reproductive disorders of chronic low-dose inflammation such as polycystic ovary syndrome (PCOS) and endometriosis, disorders linked to decreased pregnancy outcomes. The *HOXA10* gene is involved in embryo implantation and modulation of *HOXA10* has been associated with decreased implantation rates in PCOS and endometriosis. Here we quantified the effect of TNFα treatment on endometrial *HOXA10* expression and model embryo-endometrial attachment.

Methods: Ishikawa human endometrial adenocarcinoma cells were treated with increasing doses of TNFα (0.005ng/ml-5ng/ml) for 24h. The effect of TNFα on the expression of *HOXA10* gene and protein were determined using RT-qPCR and western blotting. Fibronectin-coated Affi-Gel beads (75-150µm, mimicking the blastocyst) were incubated for 4h with a monolayer of untreated or TNFα-treated Ishikawa cells. Attachment rates were measured following two gentle washes. To assess the role of HOXA10 in model embryo-endometrial attachment, Ishikawa cells were transfected with target siRNA or scrambled siRNA for 24h prior to performing the bead attachment assay.

Results: Treatment of Ishikawa cells with TNFα decreased *HOXA10* gene and protein expression in a dose-dependent manner, with a significant decrease at 0.5ng/ml (p=0.02, n=3). TNFα doses above 0.005ng/ml showed significantly decreased attachment of fibronectin-coated beads to an ishikawa cell monolayer when compared to untreated cells (67+/-4%, 64+/-8%, 50+/-11% for 0.05, 0.5, 5ng/ml respectively; p=0.0004, n=5). No associated effect was seen on Ishikawa cell viability measured at TNFα concentrations less than 5ng/ml (cell viability decreasing to 88+/-4% at 5ng/ml compared to untreated cells). siRNA-mediated HOXA10 knockdown in Ishikawa cells significantly decreased bead-endometrial cell attachment (31+/-27% in target siRNA-treated cells compared to 80+/-24% in scrambled siRNA-treated cells; p=0.01, n=4).

Conclusion: Together the results suggest that elevated levels of TNFα decrease endometrial receptivity and downstream embryo attachment through negatively effecting *HOXA10* expression although the mechanisms remain to be elucidated.

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7. A New Potential Pathological Mechanism for Thin Endometria

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Category

Uterus

Sub-Category

Basic Science

Abstract

Objective: The objective of this study was to investigate the pathological mechanism involved in the thin endometrium, particularly under ischemic conditions.

Methods: We recruited 10 patients with thin endometrium and 15 patients with healthy endometrium. Endometrial thickness and blood flow were measured during the late follicular phase using transvaginal Doppler ultrasound. Endometrial tissue samples were obtained via hysteroscopy. Human endometrial organoids were generated from fresh endometrial tissues and cultured under oxygen-glucose deprivation (OGD) conditions for 24 hours to simulate ischemic conditions. Apoptosis and cell death were assessed using Annexin-V/propidium iodide staining. Immunofluorescence analysis, RNA sequencing, Western blotting, Simple Western, immunohistochemistry, and electron microscopy were conducted to evaluate cellular and molecular changes.

Results: Patients with thin endometrium showed significantly reduced endometrial thickness and altered blood flow patterns compared to those with healthy endometrium. Immunohistochemical staining revealed fewer CD34-positive blood vessels and glands in the thin endometrium group. Organoids cultured under OGD conditions exhibited significant morphological changes, increased apoptosis, and cell death. RNA sequencing identified differentially expressed genes related to cytoskeletal remodeling and stress responses. OGD induced strong cytoskeletal reorganization, mediated by the RhoA/ROCK signaling pathway. Electron microscopy indicated compromised epithelial integrity and abnormal cell junctions in thin endometrial tissues. Additionally, there was upregulation of hypoxia markers (HIF-1α and HIF-2α) and activation of the RhoA/ROCK pathway in thin endometrial tissues, suggesting ischemia and hypoxia as underlying mechanisms.

Conclusions: Endometrial dysfunction in patients with thin endometrium primarily results from cytoskeletal remodeling and compromised cellular junctions in endometrial epithelial cells under ischemic conditions, with ischemia and hypoxia being the underlying mechanisms.

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SP2D ARCS Post Reg Prize Session

61. Three's a Crowd: Unpacking the viability of 2.1PN Embryos

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

'Ambiguous' fertilisation of embryos can be visualised by the presence of a third micro pronucleus (PN), otherwise known as a 2.1PN. These micro PN may occur as an artefact within a diploid embryo or be representative of true embryonic triploidy (1). Data suggests the incidence of 2.1PN embryos at The Evewell is around 1% (March 2020 to June 2024), though we believe the incidence rate to be a lot higher as historical record keeping did not always classify 2.1PNs as distinct from 3PNs.

With the advancement of commercially available preimplantation genetic testing for aneuploidy (PGT-A) and the ability to check embryo ploidy status, The Evewell can offer to culture and biopsy blastocysts showing ambiguous fertilisation, rather than discarding embryos that are deemed to be abnormal on visual morphology alone. Of 2.1PNs assessed, the diploidy rate was 90.4% (n=52), and of these, the euploidy rate was 23.4% (n=47).

Most patients presenting at The Evewell fall within the categories of advanced maternal age and/or low ovarian reserve. By considering 2.1PNs for biopsy, a significant improvement in the number of embryos available for these patients is achieved. Indeed, there were 3 patients within the group studied for which their only euploid embryo came from a 2.1PN.

The likelihood of 2.1PNs being truly polyploid is low, only two 2.1PN blastocysts were reported as triploid 4% (n=52).

PGT-A is invaluable in helping certain groups of patients achieve pregnancy. By incorporating atypically fertilised embryos into the biopsy programme, potential euploid embryos are prevented from being discarded based on visual observation alone. Our data highlights the critical benefits of applying a molecular fertilisation check via PGT-A for patients who have embryos traditionally classed as abnormal, and in some cases providing their only chance of having their own biological child.

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299. Insights into embryo biopsy practice in UK and Ireland

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: To understand commonalities and divergences in biopsy practice as a first step to establishing best practice.

Methods: A 25-question anonymous self-administered online survey was developed using Qualtrics software. The survey was devised in collaboration with the Association of Clinical Reproductive Scientists (ARCS) and distributed to their active membership. Individuals were eligible if working as a biopsy practitioner in an IVF laboratory in the UK or Ireland. Questions covered PGT service provision, culture systems, biopsy and tubing practice, and witnessing procedures.

Results: A total of 96 biopsy practitioners completed the survey. Most respondents work at centres providing a range of PGT services, with cycles numbers ranging from <1 to >20 per week. Variation exists in day of hatching, but 74.51% perform this separately to the biopsy procedure. While 35.3% of respondents biopsy embryos individually, the remainder place 2->5 embryos in the biopsy dish, with 11.8% of respondents stating there is no maximum limit of embryos/dish within their clinic. The majority of respondents performed biopsy using a combination of laser and mechanical methods (84.3%) and agree on the factors used in assessing suitability for biopsy. Despite the high use of timelapse incubation (80.4%), morphokinetic parameters are not routinely used as selection/deselection criteria. All respondents routinely biopsy on day 5 but there is lack of agreement regarding biopsy on days 4, 6, or 7. Respondents are aligned on offering rebiopsy (99.2%) but clinic policies vary on indications. What constitutes witnessing varies and where biopsy is performed as part of weekend or lone-working, 23.5% of respondents report having to work to a different witnessing protocol.

Conclusions: Manipulations involved in PGT cycles may impact on clinical outcomes, and so as usage of PGT increases, our understanding of this becomes increasingly important. Sufficient variation exists to warrant further examination of this impact.

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281. Genotyping blastocysts derived from abnormally fertilised oocytes through PGT can increase the number of euploid embryos available for transfer

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Background: Biparental diploidy is essential for achieving a successful live birth. Traditionally, ploidy is assessed at the zygote stage, with the observation of 2PN being an indicator of correct fertilisation. However, studies suggest that zygotes with 1PN or ≥3PN can yield healthy

pregnancies (1,2,3,4). Advances in molecular genetic technologies enable a more robust assessment of embryo ploidy in PGT cycles, reducing the risk of discarding viable embryos.

Objective: To study the incidence of abnormally fertilised oocytes (AFO) and genetically analyse ploidy in AFOs that reached blastocyst stage.

Methods: Retrospective observational study of 406 IVF and ICSI PGT cycles at IVI-London from Jan-2023 to Aug-2024 in patients using own fresh or vitrified oocytes. AFOs were classified as ≥3PN, Micro3PN or 1PN. Genetic analysis of AFO- and 2PN-derived blastocysts was performed using NGS PGT-Seq, which co-evaluates copy number variation and single nucleotide polymorphisms to establish molecular ploidy. Statistical analysis was conducted using chi-squared test.

Results: Of 4620 inseminated oocytes, 69.1% showed 2PN (66.5% IVF vs 71.1% ICSI) with 41.9% blastocyst formation (42.6% IVF vs 41.4% ICSI). The incidence of AFO was 7.4% (8.7% IVF vs 6.5% ICSI). 12.8% of AFOs formed blastocysts (10.8% IVF vs 14.9% ICSI) and were biopsied. No statistical differences were found between IVF Vs ICSI in all groups.

Among >3PN-derived blastocysts, 64.7% were triploid, 23.5% diploid and 11.7% had no result.

For Micro3PN-derived blastocysts, 10% were triploid and 90% diploid.

For 1PN-derived blastocysts, 29.4% were haploid and 70.6% diploid.

Euploid rate in each group was 5.8%, 30% and 17.6%, respectively.

Conclusions: Our data demonstrates genotyping AFOs could rescue euploid embryos that would otherwise be discarded. Despite the low incidence of AFOs reaching blastocysts, a notable proportion were euploid, particularly among micro3PN and 1PN embryos. This approach could increase cumulative pregnancy and LB rates, particularly for poor prognosis patients.

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294. Proteomic assessment of the pre-implantation environment using a fallopian organoid model

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Background: The *in-vivo* environment in which embryo development occurs is difficult to examine due to challenges in studying the female reproductive tract. However, the use of organoids has the potential to revolutionise research in this area. Organoids are 3D cellular structures that retain functional features of their respective organs[1]. Fallopian tube (FT) organoids consist of epithelial cell types (secretory and ciliated) that recapitulate the tube microenvironment in which embryos develop[2]. FT organoids form cystic structures, filled with a

fluid created by secretory activity of the epithelial cells[2]; this fluid could be used to model the FT luminal environment.

Methods: FT organoids, generated from a human FT biopsy, were maintained by passage in Matrigel[2]. FT organoids were harvested using Cell Recovery Solution, and phosphate-buffered saline was conditioned with organoid luminal fluid through centrifugal rupture of the organoids. Proteomic analysis of the luminal fluid was undertaken using liquid chromatography-mass spectrometry. Metabolic analysis was performed by enzyme-linked fluorometric assay.

Results: A total of 473 proteins were identified in FT organoid luminal fluid; of these, 167 (35.3%) were annotated extracellular proteins. Enrichment for molecular function among these secreted proteins included calcium-dependent protein binding, peptidase regulator activity and antioxidant activity (FDR <0.05). Pyruvate was present in FT organoid luminal fluid at triple the concentration of glucose (2.15 +/- 0.13 mM vs 0.72 +/- 0.03 mM).

Conclusions: Collection and biochemical analysis of FT organoid luminal fluid demonstrated enrichment of extracellular proteins. These proteins may be critical to regulating the redox and enzymatic environment of the FT lumen, for optimal embryo development. Moreover, FT organoid luminal fluid is high in pyruvate, an essential energy source for early embryo development. These findings suggest that FT organoids are an excellent model to study the *in-vivo* environment for human embryo development and could be used to optimise embryo culture media.

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220. Blastocysts that develop from monopronucleated zygotes should not be discarded by default but should be subjected to genetic testing to clarify their ploidy status

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Background: For over 40 years, evaluation of pronuclei (PN) following fertilisation has been used to identify and exclude embryos at risk of haploidy or triploidy. Recently, a preimplantation genetic testing for aneuploidy (PGT-A) method has been developed, capable of detecting abnormal ploidy with near 100% accuracy. Accumulating data now shows that many embryos with atypical PN number are in fact diploid. This study specifically focuses on 1PN embryos.

Methods: Data was collected over two-years, during which our clinic extended PGT-A to embryos with an atypical PN number. Embryos were biopsied at the blastocyst stage and a highly validated PGT-A method used, involving next-generation sequencing and parallel analysis of relative chromosome copy number and thousands of DNA polymorphisms. 1PN and 3PN embryos found to be euploid were considered for transfer.

Results: 1,134 1PN zygotes were cultured during the study (571 ICSI; 563 IVF). 1PNs from IVF produced three times the number of blastocysts suitable for biopsy or freezing (28.8% vs 9.6%; $p<0.0001$). Genetic testing confirmed that half the blastocysts derived from ICSI 1PNs were truly haploid (52.7%), while only 4.1% of those from IVF 1PNs were haploid ($p<0.0001$). For ICSI, 22.9% of biopsied 1PN blastocysts were entirely chromosomally normal (euploid), while for IVF 51.6% were euploid. So far, 23 euploid 1PN embryos have been transferred, 10 (43.5%) producing viable pregnancies (foetal heart/delivered). Considering that some embryos arrest, others are aneuploid, and not all euploid embryos implant, our data suggests that ~10% of 1PN zygotes from IVF are capable of producing a viable pregnancy.

Conclusions: These results demonstrate that 1PN embryos that form blastocysts have a significant chance of being chromosomally normal and viable, especially when produced using IVF. Discarding 1PN embryos without genetic testing will inevitably result in the loss of viable embryos and the pregnancies they could have produced.

214. Evaluating the effect of warming blastocysts vitrified in Cook media in Gems warming media and the introduction of Gems media into a successful vitrification programme.

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Introduction: A successful vitrification programme is essential for any IVF lab to ensure the ability to provide the maximum number of healthy live births per egg collection. CRGH Portland routinely used Cook vitrification and warming media since 2007 (Cook Medical, Sydney, Australia). Cook announced the discontinuation of this media from 28/02/2023. CRGH Portland performed an in-house trial, warming embryos donated for training in 3 warming solutions. The outcome measures were survival rate (SR) and expansion rates at 2, 4 and 24 hours post warm. Based on this data, CRGH Portland selected to switch their vitrification and warming media to Gems (Genea Biomedx, Sydney, Australia). This **Abstract** details our experience with Gems media.

Method: We compare 6658 blastocysts vitrified and warmed in Cook media (group 1) with 1159 blastocysts vitrified in Cook media and warmed in Gems media (group 2) versus 1114 blastocysts vitrified and warmed in Gems media (group 3). Embryos vitrified on day 7 were excluded from the study. Outcomes measured are SR and implantation rate (IR). A chi squared test was performed with 2 degrees of freedom.

Results: The mean age between the groups was not significant (37.2 vs. 38.0 vs. 36.9). SR was not significantly different between each of the 3 groups: 97.9% (6658/6519) vs. 98.7% (1144/1159) vs. 98.2% (1094/1114) respectively p = 0.18. Similarly, no significant difference was found between IR: 49.8% (3246/6519) vs. 50.8% (581/1144) vs. 48.1% (526/1094) p = 0.43.

Conclusion: Gems warming media can be considered as a suitable warming media for a blastocyst vitrified in Cook media. Gems vitrification and warming media offer a successful alternative vitrification programme.

SP2E Embryo and Embryo Transfer

262. A day early Embryo transfer in natural cycles is comparable to on-time transfer

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Introduction: The timing of frozen embryo transfer (FET) in natural cycles is a critical factor for success. However, it can be challenging, especially when weekends or holidays are involved. It is unclear whether transferring an embryo a day earlier is non-inferior to on-time transfer regarding pregnancy rates (1,2).

Objectives: Evaluate whether performing embryo transfer a day early is not inferior to transferring on time in terms of pregnancy rates.

Methods:

Study Period: Between 2021 and 2023.

Setting: Single-center study.

Inclusion Criteria: All cases of natural FET cycles performed on weekends.

A noninferiority test was conducted to evaluate whether performing embryo transfer one day early is not inferior to transferring on time regarding the probability of achieving a specific outcome (pregnancy rate). The predefined noninferiority margin was set at -0.11.

Results: 85 on-time cycles were compared to 78 day-earlier cycles. The demographic and clinical parameters were comparable between the groups (mean age 34.9±5.9 vs. 33.9±6.1, BMI 24.8±4.3 vs. 23.9±4.6 for on-time and day-early groups respectively p>0.05 for all). 45.9% cycles were blastocyst transfer in the on-time groups and 46.2% in the day-early group (p=1).

There were no significant differences between the two groups in the outcomes measured: pregnancy rates (30.12% vs. 32.05%, P = 0.86), and clinical pregnancy rates (26.8% vs. 28.8%, P = 0.86) for the on-time and day-early groups respectively.

The observed difference in pregnancy rate probability between the groups was 0.0193 ± 0.0726 (90% CI: -0.100 to 0.1391), showing non-inferiority of the day-early group.

A logistic regression analysis model including the variables BMI, day of embryo transfer, age, and the timing of transfer (on time vs. a day early) did not identify any significant predictors of pregnancy rates.

Conclusion: Our results suggest that the precise timing of embryo transfer does not significantly impact pregnancy success.

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106. Should we be transferring morulae and early blastocysts in a fresh cycle? - a retrospective study

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Aim: To analyse clinical outcomes of fresh transfers involving day 5 embryos with expansion grades 0 to 6.

Participants and Materials: The study included women who had single fresh embryo transfers from 2017 to 2023, divided into age groups: Below 30, 30-35, 36-40, and 41+.

Method: Out of 10,431 cycles, 2,883 were analysed. These were classified into three embryo grade groups: morulae (grades 0 and 0-1) with 135 records, early blastocysts (grades 1, 2, 3) with 202 records, and expanding to hatching blastocysts (grades 3, 4, 5, 6) with 2,546 records. Data was further divided into four age groups (Below 30, 30 to 35, 36 to 40, and 41+). Statistical analysis was performed (paired T-test).

Results: Morulae observed lowest rate of live births ($p<0.05$) with higher miscarriage rates ($p<0.05$). Expanding to hatching blastocysts had the highest number of live births ($p<0.05$). Miscarriage rates increased by increasing age across all three embryo types. Morulae had the poorest outcomes overall.

Interpretation: The study suggests that culturing morulae to day 6 and converting fresh transfer cycles to frozen, might be more beneficial to clinical outcomes. It also emphasizes the importance of patient counselling prior to the start of the cycle. This study raises questions on the decision factors that influence patients regarding transferring a morula versus waiting for it to become a blastocyst and freeze.

Limitations: Limited records of morulae and early blastocysts may bias results towards certain age groups. More data is needed for accurate understanding of outcomes across age groups, and reporting biases may have shifted outcomes.

Conclusion: This audit highlights the importance of transferring embryos at a more advanced blastocyst stage. Culturing morulae to the expanding blastocyst stage may improve clinical outcomes, especially for older women. It is important to counsel patients appropriately so they can make informed decisions.

168. Clinical experience with a PGT-A strategy in which embryos with euploid or mosaic results are not differentiated and given equal priority for transfer

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Background: Preimplantation genetic testing for aneuploidy (PGT-A) is becoming increasingly routine, but maximising its potential benefits requires an understanding of how best to use the information it provides. One challenge has been interpreting intermediate chromosome copy number results (a copy number lying between normal and monosomy/trisomy levels). Such results may indicate a mixture of euploid and aneuploid cells in the trophectoderm biopsy (mosaicism).

Method: We chose to use the PGT-A method that we considered to have the most compelling published validation data. Emerging evidence using this method suggested that embryos having intermediate copy number (potentially mosaic) have similar viability to those with entirely euploid biopsies. Therefore, we chose a strategy where euploid and 'mosaic' embryos weren't differentiated and given equal priority for transfer.

Results: 4,448 embryos were examined over a 2 year period. The average female age was 38.5. 56.3% of embryos were potentially transferrable (no full aneuploidy detected). Outcome data was available for 571 embryo transfers (98.4% involving a single embryo) and 67.6% resulted in a pregnancy. The PGT provider was asked to unblind which transferred embryos had intermediate chromosome copy number scores, revealing that 17.7% were in this **Category**. The pregnancy rate for these potentially mosaic embryos was 61.3%, not significantly different from the 68.9% seen for embryos with a euploid biopsy specimen (p=0.16). Pregnancy loss rates (biochemical+miscarriages) were 12.9% and 12.3%, respectively.

Conclusion: Patients within this age range can typically expect a pregnancy rate of 32% per transfer (HFEA 2022 data). That two-thirds of embryos transferred produced a pregnancy highlights the power of PGT-A as an embryo selection tool. Embryos with results consistent with mosaic chromosome abnormality had similar outcomes to those with entirely euploid biopsy specimens, suggesting that reporting mosaicism may complicate embryo selection and patient counselling while delivering little if any clinical benefit.

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338. Levels of mitochondrial DNA heteroplasmy, occurring as a side effect of meiotic spindle transfer, can experience large fluctuations prior to birth with implications for the use of mitochondrial replacement therapies

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Category

Other

Sub-Category

Clinical

Abstract

Background: Mitochondrial replacement therapies (MRTs) involve transfer of the nuclear genetic material from an oocyte or zygote into the cytoplasm of an enucleated donor egg. MRTs have been proposed as a means of avoiding transmission of disorders caused by mitochondrial DNA (mtDNA) mutations whilst allowing the mother to retain genetic parenthood. Currently, very little information is available concerning the safety and efficacy of MRT strategies. For success, it is essential that the cells of the resulting individual are dominated by mtDNA derived from the donor oocyte rather than from the nuclear mother.

Methods: Last year, a study was published examining the use of meiotic spindle transfer (a type of MRT) for the treatment of infertility associated with poor oocyte quality. This resulted in the births of 7 children. We obtained samples from blastocyst biopsy, amniocentesis. and several tissues from each child taken at regular intervals from birth up to 4 years. Samples were

analysed using a deep sequencing method, allowing the different mtDNA molecules from the donors or patients to be detected and precisely quantified.

Results: All blastocysts produced after spindle transfer had <1% of mtDNA originating from the mother. In 5/7 pregnancies this level remained below 1% at all **Sub**sequent timepoints and in all tissues examined. However, in two cases there was a dramatic increase in maternal mtDNA in all samples tested after the blastocyst stage, accounting for an average of 44.4% in one patient and 30.0% in the other, a phenomenon termed 'reversal'.

Discussion: This is the first study to provide a longitudinal assessment of the health and mtDNA heteroplasmy of children born following an MRT procedure. Importantly, while all children were healthy, the results indicate that mtDNA reversal is not uncommon, and consequently the power of MRTs to avoid disease transmission may be less than initially anticipated.

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171. Impact of repeated vitrification and biopsy on clinical outcomes: a comparative study of once-frozen and thaw-biopsy-refreeze embryos

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Background: Genetic testing of previously unbiopsied frozen embryos through "thaw, biopsy, refreeze" (TBR) has become common as pre-implantation genetic testing for aneuploidy (PGT-A) has become mainstream. However, it remains uncertain whether embryos undergoing multiple vitrification cycles exhibit diminished pregnancy outcomes due to potential damage from repeated freezing and thawing. This study aimed to compare clinical outcomes between once-frozen and TBR (twice-frozen) embryos. Additionally, we investigated whether TBR embryos biopsied once or twice differed in their clinical outcomes.

Methods: This retrospective, single-centre cohort study included 421 embryos from patients undergoing assisted reproductive technology (ART) treatment: 374 embryos that were frozen once and 47 TBR embryos, of which 36 were biopsied once and 11 were biopsied twice. The primary endpoints were implantation rate (IR), clinical pregnancy rate (CPR), live birth rate (LBR), and miscarriage rate (MR).

Results: There were no significant differences in clinical outcomes between once-frozen and TBR embryos: IR (64% vs 66%), CPR (56% vs 52%), and LBR (50% vs 52%). Among TBR embryos, those biopsied once and twice showed no significant differences in IR (67% vs 64%), CPR (57% vs 36%), LBR (57% vs 36%), or MR (5.7% vs 27%).

Discussion: The findings suggested that a second vitrification cycle did not negatively impact pregnancy outcomes, as clinical success rates were comparable between once-frozen and TBR embryos. Moreover, repeated biopsy of TBR embryos did not significantly compromise clinical outcomes compared to those biopsied only once. This has important implications for cases where the initial biopsy yields inconclusive genetic results. However, the small sample size of embryos biopsied twice limited the statistical power of these findings.

Conclusion: This study demonstrated that pregnancy outcomes were similar between once-frozen and TBR embryos, as well as between TBR embryos biopsied once or twice, indicating that the TBR approach does not adversely affect embryo viability.

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321. Exploring surgical strategies and fertility outcomes after myomectomy

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Background: Uterine fibroids are common benign tumours in women of reproductive age, contributing to infertility in an estimated 3% of cases. This is particularly true for **Sub**mucosal or deep intramural fibroids, which can distort the uterine cavity and negatively affect implantation and live birth rates. Myomectomy, performed through laparotomy or laparoscopy, is the surgical removal of fibroids, often used when fertility preservation is a priority. However, evidence supporting the effectiveness of myomectomy, regardless of the surgical approach, in improving fertility outcomes remains limited.

Objective: The aim of this study was to examine the effect of myomectomy on pregnancy outcomes and to evaluate pregnancy outcomes with different surgical approaches.

Methods: This was a retrospective study looking at all patients who had a myomectomy at Sheffield Teaching Hospital between 2017 and 2019 due to **Sub**fertility. The patients' electronic records, investigations and operative notes were reviewed and data was collected using a proforma. Data collected included patient demographics, scan findings, surgical approach, post-operative and pregnancy outcomes.

Results: 23 out of 71 cases (32%) had a myomectomy due to **Sub**fertility. 14 cases (61%) were due to primary infertility. 13 out of 23 cases (57%) achieved a pregnancy after a myomectomy and myomectomy significantly improved chance of pregnancy ($p<0.05$). 11 cases (85%) achieved a live birth. Laparoscopic approach (27%) was not associated with a higher chance of live birth compared to open approach (73%) ($p = 0.087$). 10 cases (77%) achieved a term delivery and 77% of patients who achieved a pregnancy were primiparous.

Conclusion: Removal of fibroids by myomectomy had a positive impact on pregnancy outcomes, particularly with achieving live births. Further research is required to assess the relationship between myomectomy, surgical approach, and reproductive outcomes.

PW6 Poster Walk

Abstracts presented in Rapid Fire Sessions on this day will also be featured in the Poster Walk, but the abstract itself is shown in the Rapid Fire Session in this publication and not repeated.

4. The effect of sequential embryo transfer on pregnancy outcomes in patients with recurrent implantation failure: A systematic review and meta-analysis of randomized controlled trials

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Objective: To assess the impact of sequential embryo transfer on pregnancy outcomes among patients with recurrent implantation failure (RIF).

Methods: We conducted a comprehensive search across various databases for eligible clinical trials from inception to January 2024. Randomized controlled trials (RCTs) were included if they compared sequential embryo transfer, comprising both cleavage-stage and blastocyst-stage embryos, with other transfer protocols in infertile women with repeated implantation failure. Meta-analysis was performed using Revman software. Our primary focus was on the ongoing pregnancy rate. Our secondary measures included rates of chemical pregnancies, clinical pregnancies, miscarriages, and multiple pregnancies.

Results: Seven RCTs, encompassing 909 patients, met the inclusion criteria. Sequential embryo transfer demonstrated a significant increase in the ongoing pregnancy rate compared to the control group (OR = 2.28, 95% CI [1.46, 3.56], p = 0.003). Moreover, the sequential embryo transfer group exhibited notable improvements in chemical and clinical pregnancy rates. There were no statistically significant differences between the groups regarding multiple pregnancy and miscarriage rates (p > 0.05).

Conclusions: Sequential embryo transfer shows promise in enhancing pregnancy outcomes among RIF patients. However, additional trials are warranted to validate our findings.

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126. AMH levels and Assisted Reproduction outcome in women aged 40-42: A comprehensive study on predictive power and treatment success using AMH-tailored COH protocols

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Objective: In the context of fertility treatment, higher Anti-Mullerian Hormone (AMH) levels are associated with better ovarian response to controlled ovarian hyperstimulation (COH). However, the relationship between AMH and treatment success remains controversial, particularly in women of advanced maternal age[1]. The aim of this study was to investigate the correlation between AMH levels and clinical outcome in fertility patients aged 40 to 42 years.

Methods: This was a retrospective cohort study including 377 fresh Intracytoplasmic Sperm Injection cycles carried out from 01/04/2019 to 31/03/2023. Female patients aged 40 to 42 years were included and stratified into groups based on serum AMH levels: Group 1 (≤6 pmol/L), Group 2 (6-15 pmol/L), Group 3 (15-25 pmol/L), and Group 4 (≥25 pmol/L). AMH-tailored COH

protocols were employed and local standard operating procedures followed throughout treatment. The primary study endpoints were oocyte yield, fertilisation, utilisation, clinical pregnancy and live birth rates (per embryo transferred). Secondary outcomes included abnormal fertilisation rate and the frequency of Day 5 over Day 3 embryo transfers.

Results: Correlation analyses showed a strong positive relationship between AMH and oocyte yield ($r=0.51$, $p<0.001$) and a weak positive correlation with abnormal fertilization rate ($r=0.11$, $p=0.03$). Stratification by AMH levels followed by contingency and ANOVA analyses revealed statistically significant differences in the median oocyte yield ($p<0.001$), clinical pregnancy ($p=0.02$) and live birth rate ($p=0.01$), and frequency of Day 5/Day 3 embryo transfers ($p=0.02$). These measures were all reported higher in Groups 3, 4 vs. Groups 1, 2.

Conclusion: This study highlights the value of AMH in predicting clinical outcome for women aged 40-42 years undergoing fertility treatment. Higher AMH levels were linked to an increased oocyte yield, greater likelihood of reaching a Day 5 transfer, and higher chances of achieving a live birth.

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334. Euploid and live birth rates of thaw biopsy refreeze embryos compared with fresh biopsied embryos

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Introduction: Preimplantation genetic testing(PGT-A) is commonly used as an additional tool to select embryos with the highest potential[1]. Thaw biopsy refreeze(TBR) allows patients to have PGT-A on previously cryopreserved embryos. The benefits and impact of TBR is still debated due to contradictory evidence on ploidy rates and impaired transfer outcomes[2-3]. The aim of this study is to investigate the impact of TBR by analysing the euploid and live birth rate(LBR) following TBR.

Method: Data was retrospectively analysed (2016-2023) to include patients whose blastocysts underwent trophectoderm biopsy in either a fresh cycle (fresh biopsy) or following TBR, where embryos were thawed to be biopsied and refrozen. The rate of euploidy in different female age groups between fresh biopsied and TBR embryos were analysed. LBRs of FET cycles using fresh biopsied and TBR euploid embryos were compared.

Results: A total of 2492 fresh embryos were biopsied for PGT-A. 740 out of the 932 embryos thawed for TBR, were suitable for biopsy and refreeze(79.8%). The euploidy rate for all the age groups were found to be higher in TBR than fresh biopsy: ages<35 (68.9%vs 51.2%, p=0.01), ages 35-37 (55.1%vs 48.1%,p=0.04), ages 37-39 (44.9%vs 38.1%p=0.05) and ages>42 (11.8%vs11.4%,p=0.8). The LBR of the of FETs(n=379) and TBR(n=49) were 26.2% and 26.5% respectively(p=0.5).

Conclusion: Despite the limitations presented by the retrospective nature of this study, we found that euploid rates of TBR embryos is higher than fresh biopsied embryos for females aged<42. This could be attributed to the fact that we are more confident in the quality of the TBR embryos being biopsied; as we know that they have survived cryopreservation. The LBRs using fresh biopsied and TBR embryos were not significantly different. These combined findings indicate that TBR is a safe and viable option for patients.

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42. Is a diagnostic laparoscopy acceptable to inform the underlying pathology of chronic pelvic pain? An online questionnaire.

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Category

Psychosocial

Sub-Category

Clinical

Abstract

Background: Chronic pelvic pain (CPP) is pain in the lower abdomen or pelvis lasting longer than three months(1). CPP is a symptom and can be attributed to various conditions, such as endometriosis, a common condition affecting 10% of women of reproductive age and 30-50% of fertility patients(2-4). Diagnosis and long-term sequelae of CPP is under-researched and poorly understood leaving many women in a cyclical process of no answers and repeated investigations leading to poorer quality of life and psychological conditions (5).

Objective: Assess acceptability of a diagnostic laparoscopy to aid pathological diagnosis of CPP.

Methods: Online questionnaire distributed through social media and women's health charities to those assigned female at birth and ≥18years over 3-months. 63-item questionnaire consisted of; demographics, previous medical tests and acceptability.

Results: 521 individuals completed the questionnaire with a mean age of 33 years. The majority were heterosexual (80%), white (89.4%) and resided in England (89.1%). 70 individuals (13.4%) suffered with CPP. Friedman's test revealed a statistically significant difference in acceptability ratings of diagnostic laparoscopies dependent on diagnostic outcomes ($p<.001$). Diagnostic laparoscopies in general were viewed as more acceptable than those when no pathology was found ($z=-10.545$, $p<.001$). Diagnostic laparoscopies with abnormal outcomes were rated more acceptable than diagnostic laparoscopies in general ($z=-5.267$, $p<.001$) and those with negative outcomes ($z=-12.796$, $p<.001$). Diagnostic laparoscopies diagnosing cancer were seen as more acceptable than diagnostic laparoscopies in general ($z=-9.190$, $p<.001$), those with negative outcomes ($z=-13.728$, $p<.001$) and abnormal outcomes ($z=-6.224$, $p<.001$).

Conclusion: Diagnostic laparoscopies are viewed as moderately acceptable to aid pathological diagnosis of CPP, with acceptability decreasing when no pathology is found. Negative laparoscopies can lead to patients feeling overlooked, isolated and experiencing regret. Psychological interventions should be included within the care pathway of CPP and a biopsychosocial approach should be applied to improve patient outcomes.

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239. Impact of Fertility Coaching: Insights from Patient Feedback

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Category

Psychosocial

Sub-Category

Translational

Abstract

Background: The psychological impact of sub-fertility on patients has long been a matter of concern, with almost half the participants of a recent survey reporting feelings of depression (Fertility Network UK, 2022[1]). Fertility coaching is an emerging supportive service aimed at enhancing patient experience during their fertility treatment. At Guy's and St Thomas' ACU a unique and innovative, embryologist-led coaching program provides 1-to-1 support and information to patients and couples. 50-minute online coaching sessions are available before, during or between treatment cycles.

Objective: This qualitative study analysed feedback from 19 patients or couples who received fertility coaching. The study aims to identify recurring themes in patient experiences, to further understand its value to patients.

Methods: Open-ended questionnaire responses were analysed using pattern recognition, thematic analysis and AI-powered tools. Themes such as emotional support, empowerment, and informational clarity were extracted to understand the perceived benefits of coaching.

Results: Participants consistently reported positive experiences with fertility coaching, noting significant improvements in emotional resilience (86%), understanding of treatment options (78%), and overall satisfaction with care (64%). Some participants noted initial scepticism (14%) that transformed into appreciation as they gained insights and personalized guidance. Specific benefits cited included enhanced understanding of treatment options and processes, improved emotional resilience, and feeling more in control of their fertility journey.

Conclusion: The findings underscore the value of integrating fertility coaching into clinical practice to enhance patient-centred care. The use of coaching skills such as active listening, emotional intelligence, and the maintenance of a curious and empathetic approach allows patients to receive trusted information, ask questions and build confidence and understanding of their treatment. Fertility coaching not only improves emotional well-being and patient satisfaction but also provides crucial support in navigating the complexities of fertility treatments.

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89. Anti-Müllerian hormone protects the human ovary from the immediate and sustained fertility damaging effects of cyclophosphamide *in vitro*

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Introduction: A key adverse effect of chemotherapy on female fertility is damage to the primordial follicle pool. Anti-Müllerian hormone (AMH) has been shown to attenuate 4-hydroperoxy-cyclophosphamide (4-HC) induced damage to human primordial & transitional (i.e. non-growing) follicles after 24 hours *in vitro* (1). We examined both the immediate and sustained effects of 4-HC on non-growing follicles and whether AMH provides chemoprotection to the ovary during gonadotoxic chemotherapy treatment.

Methods: Ovarian cortical biopsies from patients undergoing elective caesarean section (25 – 39yo) were obtained with informed consent, prepared as strips, and exposed *in vitro* to either DMSO (vehicle control), 2μM 4-HC, 200ng/mL AMH, or both 4-HC+AMH. Tissue was cultured with 4-HC ± AMH and collected after 4 hours for short term culture (n=2-4 biopsies), or for a longer-term culture, 24h with media replenishment every 48h for 7 days total (n=4-5 biopsies). Histological analyses were used in follicle staging & health assessment. TUNEL assays were used to examine apoptosis.

Results: A significant decrease in the proportion of morphologically healthy non-growing follicles was seen post-4-HC treatment compared to a vehicle control at both 4 hours (72%±4 control vs 49%±8 4-HC treated, $p<0.0001$) and 7 days (68%±9 control vs 52%±3 4-HC treated, $p<0.001$). AMH co-treatment with 4-HC rescued follicle health compared to 4-HC alone after 4 hours (66%±6, $p<0.0001$) and 7 days (72%±8, $p<0.05$). Total number of follicles per mm^3 of tissue was not significantly different at either timepoint. Initial analysis suggests no significant difference in the number of TUNEL positive nuclei or staining intensity between groups (4h: n=3 biopsies, 7d: n=1 biopsy).

Conclusion: These data suggest that AMH protects non-growing follicles from the onset of cyclophosphamide exposure *in vitro*. This chemoprotectant effect persists for at least 7 days, indicating AMH may have therapeutic potential to protect female fertility from chemotherapy.

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297. Men attending a recurrent miscarriage clinic have high sperm DNA fragmentation damage irrespective of their semen analysis

Emily Newton[1], Rebecca Lunt[1], Craig Ledgerwood[2], Rachel Gregoire[1], Tara Moore[2], Andrew Drakeley[1,3]

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Aim: To assess the prevalence of raised sperm DNA damage in males attending a recurrent miscarriage clinic.

Methods: A prospective cohort study. One hundred men were recruited from couples attending an NHS University Hospital recurrent miscarriage clinic who had experienced either three or more consecutive early pregnancy losses (less than 14 weeks), two consecutive pregnancy losses where the female was over 35 years, or if one of those losses occurred after 14 weeks. Male partners were offered a semen analysis and an Exact® sperm DNA fragmentation test (Examen, N. Ireland) between January 2022 and June 2024. Semen analyses were reported as 'normal' or 'abnormal' against WHO (2010) criteria. Sperm DNA fragmentation was deemed 'normal' or 'abnormal' by comparison with a fertile range, determined by a control group of fertile men (ranges: average <26%, low >74%, high<4% DNA damage).

Results: Overall, of the 100 men, 77% had abnormally high sperm DNA damage.

Of the 66 with a normal semen analysis, 48 (73%) had raised sperm DNA damage.

18 had a normal semen analysis and sperm DNA damage within the normal range. 48 had a normal semen analysis and abnormal sperm DNA damage. 5 had an abnormal semen analysis and sperm DNA damage within the normal range, and 29 an abnormal semen analysis and high sperm DNA damage.

Conclusion: Focus on the male patient is generally lacking in recurrent miscarriage clinics. Our findings suggest a high prevalence of sperm DNA damage in male patients of couples with a history of recurrent miscarriage. Having a normal semen analysis is not reassuring that the sperm DNA damage assessment will also be normal. Further research into different forms of sperm DNA damage is required to better inform management and advice to couples with a history of recurrent miscarriage.

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48. Unravelling effect of hyper gravitational forces on mouse embryos.

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Space is known to have extreme environment called microgravity that a normal human or mammals do not experience on Earth. Microgravity can alter various molecular and biological aspects during short or long term missions in human astronauts[1]. It may affect the reproductive system leading to adverse abnormalities in growth and development[2]. Existing studies investigated whether embryos could develop normally in microgravity and demonstrated how mouse embryos were sent to ISS for 4 days and developed into blastocysts with normal cell numbers but exposure of hyper gravity during rocket launch remains undiscovered[3].

Objectives: To address the effects of the hyper gravity on mouse embryos. To this end, mouse embryos are often considered one of the best indicators of animal's overall health and fitness[4].

Methods: IVF was performed at CNR IBCC, Roma, Italy to collect 20 embryos at the 2-cell stage and put them into 100 ul of M2 inside an eppendorf. One eppendorf for the CTRL, one for 3g and one for 9g respectively and centrifuged for 15 mins. After centrifugation, collected all the contents of the eppendorf on a plate (one plate per sample) and counted the surviving cells and put them into a new plate containing 3 drops of KSOM (2 for washing and 1 where I leave them). After 72 hours, they checked how many have reached blastocyst stage and calculated the percentage.

Results:

- CTRL: 89% of blastocysts
- 3G: 80% of blastocysts
- 9G: 95% of blastocysts

Conclusion: This study aims to understand how embryos will behave when the launch takes place under hyper gravity, which is approximately (from 1 to 6/7g for a few minutes), and how it impacts the live embryo growth and development. This research explores regulation of epigenetic and behavioral pattern, scientific insights useful for human space exploration studies advancing reproductive medicine and health.

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206. Comparative effects of Ocimum gratissimum and cyclophosphamide on haematology variables and fertility in female Wistar rats

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University of Ibadan, Ibadan, Nigeria

Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

This study was carried out to investigate the effect of *Ocimum gratissimum* and Cyclophosphamide on hematology variable Ovarian oxidative stress in female Wistar rats.

Forty female Wistar rats were divided into four groups (n=10) and orally treated as follows: Group 1- Control (0.5ml distilled water), Group 2- *Ocimum gratissimum* (OG, 400 mg/kg), Group 3 Cyclophosphamide (CP, 6mg/kg) and Group 4- *Ocimum gratissimum* + Cyclophosphamide (OG+CP). After 21 days of treatment, five rats in each group were sacrificed under anesthesia to obtain blood sample for full count and serum reproductive hormone profile using standard procedures. The other rats were tested for fertility by co-habiting them with male Wistar rats for 10 days in a 2:1 female-male ratio. The male rats were withdrawn after 10 days of co-habitation while the gestation rate and period in the females were monitored for another 21 days. Data were reported using descriptive statistics and analyzed using ANOVA at $p < 0.05$.

There was a significant increase in Red Blood Cell count in OG and OG+CP while White Blood Cell count was significantly decreased in CP and OG+CP compared with the control. While eosinophil and basophil counts were not affected, neutrophil count was increased in all treatment groups compared with control. Lymphocyte count was decreased in OG and CP while the Neutrophil-Lymphocyte ratio was increased only in OG. Luteinizing hormone decreased in all treatment groups, progesterone was increased in OG and CP while follicle stimulating hormone and estradiol were similar in all groups compared with the control. The control group had a normal fertility rate, fertility was delayed in OG and OG+CP while CP was not fertile within the observation period.

It is therefore concluded that *Ocimum gratissimum* had a similar immunosuppressive effects to cyclophosphamide while it reversed the infertility induced by cyclophosphamide.

230. The effect of myomectomy for FIGO Type 0 to 3 uterine fibroids on IVF/ICSI cycle:

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Category

Uterus

Sub-Category

Clinical

Abstract

The effect of myomectomy for FIGO Type 0 to 3 uterine fibroids on IVF/ICSI cycle

Objective: A systematic literature review to assess the evidence regarding the effect of myomectomy for FIGO Type 0 to 3 uterine fibroids on IVF/ICSI cycle outcome.

Design: An online search of databases from June 1949 to August 2024 was performed.

Method: PROSPERO registered. A literature search was performed using Ovid MEDLINE, EMBASE, and Cochrane Library databases. Medical **Sub**ject headings and keywords were used to generate a **Sub**set of citations for myomectomy, fibroid, leiomyoma, myomata, infertility therapy, assisted conception, ICSI, IVF, assisted reproduction, and pregnancy outcomes. The PRISMA checklist, flowchart,[1] and quality assessment of studies using the Newcastle Ottowa Scale were moderate to good. Two independent reviewers reviewed and selected the study.

Result: 1572 studies were identified, 423 were assessed for eligibility, 118 duplicates were removed, and 58 met inclusion criteria. Eight studies were included: non-randomized control trials[2,3,4] & retrospective cohort studies[5-9]. A total of 5941 women were reported in these studies. Only two studies mentioned the type of fibroid using FIGO classification[2,6]; the remaining included intra-mural fibroids, **Sub**-serous and **Sub**-mucous fibroids. In five studies, cumulative pregnancy rates were reported to be higher & statistically significant after myomectomy, with P ≤0.05.[3-7] A meta-analysis of three studies, including abdominal myomectomy (laparoscopic or

open), shows that the test for overall effect does show a significance at P<0.05 (RR is 1.41, with 95% CI 1.09 – 1.83).[3,4,7]

Conclusion: Myomectomy before ART has been shown to be beneficial in a small number of non-randomized studies. However, there is heterogeneity in using FIGO classification of fibroids and unreported outcomes within studies; therefore, further evidence is required. At present, individualised patient care might help to improve, and the decision for myomectomy might help to improve the IVF/ICSI outcome.

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180. Validation and clinical implementation of an automated cryostorage platform in a large HFEA regulated fertility clinic.

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Hewitt Fertility Centre, Liverpool, United Kingdom

Category

Other

Sub-Category

Clinical

Abstract

Introduction: Current cryostorage systems are manual, involving handling of multiple patient samples when accessing samples for unrelated treatment. Gregoire *et al.* 2020, quantified the risk in manual specimen handling and demonstrated that a large fertility clinic can experience almost 30,000 unnecessary exposures outside of a temperature-controlled environment[1]. TMRW Life Sciences, have created the Cryo Robot Select (CRS) reducing potential points of failure, by removing manual handling steps required during cryostorage/retrieval. This project aimed to validate and assess the suitability of the CRS for use in a busy HFEA regulated fertility clinic.

Methods: Validation of the CRS included performing an Installation and Operation Qualification (IOQ); a time-motion study of warming and vitrification using CryoBeacon storage in the CRS; validation of emergency CryoBeacon retrieval, and the use of the TMRW Operations Centre (TOC) system for cryostorage inventory. For cryoaudit validation, 200 CryoBeacons linked to 'test' patients were added to the CRS to replicate the number of patients annually audited for HFEA compliance.

Results: Clinical implementation of the CRS removes all unnecessary manual handling events during cryostorage. Repeated retrieval and storage of multiple CryoBeacons and **Sub**sequent ice formation in the picking head highlighted a potential risk during retrieval of samples, however modifications to clinical practice helped to reduce ice formation and resume effective storage/retrieval of CryoBeacons. Supervision of the CRS is required when in use.

Discussion/Conclusion: The CRS reduces unnecessary risk and exposure of patient samples to **Sub**optimal temperatures by removing manual handling events during cryostorage. Minor changes to clinical practice may be required to minimise delays/adverse events when retrieving samples. Although, the CRS removes requirement of a second witness during storage, current HFEA regulation requires witnessing during warming/vitrification. These findings demonstrate that the CRS can optimise the safety of cryostored samples and is effective in clinical practice.

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121. Analysis of health and lifestyle behaviour data from 300,065 UK-based women to analyse preconception lifestyle choices in the context of the broader female population.

Zoya Ali[1], Lucinda Lawrie[1], Tharni Vasavan[1], Natalie Getreu[1,2], Helen O'Neill[1,2]

[1]Hertility Health, London, United Kingdom. [2]University College London, London, United Kingdom

Category

Other

Sub-Category

Basic Science

Abstract

Objective: Existing knowledge underscores the impact of alcohol consumption, drug use, smoking, on fertility. However, there is limited research on the impacts of vaping and awareness regarding limits of exposure and intake, which can hinder informed decision-making.

This study aims to bridge this gap by shedding light on the prevalence of broader lifestyle choices and their potential implications for fertility.

Methods: A cross-sectional study was conducted on 300,065 UK based women aged 18-58 between September 2020-January 2024.

Users completed an online health assessment (OHA) assessing demographics, menstrual cycle history, symptoms, lifestyle and medical history and asked to select one or more categories that best described their reproductive motivations - "planning for the future (PFF)", "actively trying to conceive (TTC)", "just curious about their reproductive health", "experiencing symptoms".

Counts, means, and percentages of completed OHAs were calculated using R software.

Results: For those TTC (n= 81,257) , the mean age was 30.7, 39.53% (n=30,317), consumed 1-14 units of alcohol weekly, 3.95% (n=3,028) exceeded 14 units, the national recommendation for adults [1], 21.95% (n=16,834) regularly or occasionally smoked, 22.40% (n=9,436) regularly or occasionally vaped, and 7.06% (n=5,415) used recreational drugs regularly or occasionally.

Among those PFF (n=76,692), the mean age was 28.3, 57.27% (n=76,556) consumed 1-14 units of alcohol weekly, 5.31% (n=7,095) exceeded 14 units, 22.86% (n=30,566) regularly or occasionally smoked, 27.29% (n=21,002) regularly or occasionally vaped, and 13.52% (n=18,071) used recreational drugs regularly or occasionally.

Conclusion: Our data demonstrates that a significant number do not follow national recommendations, highlighting the need for tailored preconception education to improve fertility awareness and uptake of practices to improve pregnancy outcomes.

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256. Reflecting on PGT data: Essential embryological and genetic insights

Emma Whitney[1], Dhruti Babariya[2], Georgina Cutts[2], Millie Kanani[1], Dagan Wells[2]

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Background: The successful implementation of preimplantation genetic testing for aneuploidy (PGT-A) depends upon a multidisciplinary approach requiring skilled embryologists, highly optimised laboratories, experienced genetic counsellors, and collaboration with geneticists utilising well-validated tests. We sought to gain a better understanding of how clinical choices made by a fertility clinic can influence outcomes when using PGT-A.

Methods: PGT-A results were retrospectively examined for 2,875 embryos. Clinical outcomes were available for embryos transferred from January to July 2024 (358 embryos). During that time, PGT-A had been provided by two different companies (Lab 1 and Lab 2), allowing comparisons to be made.

Results: As expected, aneuploidy rate was closely associated with female age (from 24.4% for <35 years to 91.0% for women >42). Embryos insufficiently developed for biopsy on day-5, had increased aneuploidy and lower pregnancy rate for euploid transfers (67.2% on day-5; 33.3% on day-7; $p<0.0001$). The classification system used by Lab 2, which placed potentially mosaic embryos in the same category as embryos with euploid biopsy specimens, resulted in more embryos assigned the highest transfer priority (47.9% versus 39.0% Lab 1; $P<0.0001$). Pregnancy rates were also higher for Lab 2 (63.4% versus 57.2%), although not statistically significant. Additionally, Lab 2 was able to detect contamination and ploidy abnormalities in biopsy specimens with extremely high sensitivity.

Conclusion: For patients above 42 years, PGT-A is valuable for avoiding aneuploidies associated with miscarriage and abnormal pregnancy, while for younger patients it helps prioritise euploid embryos for transfer. Even slow developing embryos can produce pregnancies when they are euploid, arguing that any embryo suitable for biopsy should be tested. The single classification given to euploid and putative mosaic embryos by Lab 2 simplified the application of PGT-A, reducing genetic counselling burden, resulting in more embryos considered for transfer, and potentially yielding higher pregnancy rates.

SATURDAY, 11 JANUARY 2025

PW7 Poster Walk

17. Navigating PGT-M hurdles to provide patient options; Reference laboratory limitations and pathways.

Benjamin Raybould, Vladimir Ovsyankin, Valerie Shaikly, Mohammed Taranissi

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Are options available for PGT patients with pathogenic mutations in genes situated within regions of the genome where traditional DNA amplification strategies are not possible?

Innovative approaches may provide solutions where standard PGT-M approaches fail, allowing patients access to necessary embryo testing.

What is known already: Preclinical work-up for PGT-M feasibility is routine but sometimes fails due to technical difficulties, particularly in regions with repetitive DNA sequences. The methodologies of genetic reference laboratories vary, affecting the availability of clinical testing strategies.

Study design, size, duration: A case study of a patient with a de novo RUNX2 gene mutation (cleidocranial dysplasia) illustrates the value of collaborating with various laboratories to tackle technically demanding cases.

Method. The initial workup by one laboratory failed due to repetitive sequences in close proximity to mutation site, complicating PCR primer design. A second lab succeeded using long-range PCR and polymorphism analysis. DNA from non-viable embryos was used for reference.

Main results and the role of chance: Repeated DNA sequences near the mutation site complicated PCR amplification and minisequencing. The second lab designed primers outside the repetitive region, tested multiple DNA polymerases and PCR conditions, and established a reliable protocol. They identified an 18bp deletion via Sanger sequencing, later confirmed as non-pathogenic by next-generation sequencing. The optimized protocol involved whole genome amplification, long-range PCR, Sanger sequencing, and microarray analysis. Out of 13 eggs retrieved, 9 were inseminated, 7 fertilized, and 5 blastocysts were biopsied. PGT-M identified 3 unaffected embryos, with 2 being euploid.

Limitations, reasons for caution: Highly customized PGT-M protocols require more time and cost compared to standard methodologies.

Wider implications of the findings: This case study shows that customized PGT-M protocols can overcome significant technical challenges. Clinics should consider multiple genetic testing laboratories to support patients based on their specific mutations.

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9. Identifying inefficiencies and opportunities within an admission process map for the care of IVF patients who need oocyte retrieval.

Lois Whelan

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Category

Nursing

Sub-Category

Clinical

Abstract

Background: How the patient is prepared for IVF treatment varies clinic to clinic. After funding is granted from the local Clinical Commissioning Group for IVF there are steps that are needed before they are ready for oocyte retrieval. There is no set guidance on these steps by the HFEA which leads to potential inefficiencies in the process.

Aim: To use staff feedback through questionnaires to create an improved process map for patients from funding approved to oocyte retrieval.

Method: Mixed methods approach was taken. Five key stake holders were identified to give qualitative feedback to look for key themes in the process. Themes identified were information and timing of information for women, nurse led clinic alongside the consultation, teaching about drugs and length of appointments. A quantitative questionnaire was then sent to the wider multi-disciplinary team. A new proposed process map was created using this data. The five key stakeholders were then invited to feedback on the new process map using qualitative data.

Results: Patients should receive an information pack prior to their consultation. Staff were in favour of a nurse led clinic alongside the consultation. Staff suggested that a nurse and a healthcare assistant would be best placed to work together for this clinic. Staff felt patients should be given options for the drug teach online or face to face. However, limitations from the digital team meant that this could not be piloted at present. Staff felt that if the new process was successfully implemented that the appointment times would be appropriate.

Conclusion: Stakeholder engagement was positive and staff were keen to improve the system. Ongoing clinical audit will be needed to see how successful the new process map is in practice and it is important that patient opinion should also be sought.

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8. Religious Perspectives on Medically Assisted Reproduction in Nigeria: Insights from Religious Leaders.

Oluwatobiloba Olabode, Federica Lopes, Willem Ombelet

University of dundee, Dundee, United Kingdom

Category

Assisted Conception

Sub-Category

Translational

Abstract

Objective: This study investigates the impact of religious beliefs on the acceptance of Medical Assisted Reproduction (MAR) in Nigeria by examining the perspectives of different religious communities and their influence on patient decisions.

Methods: A mixed-methods approach was used to explore how religion influences attitudes towards MAR among Christians and Muslims in Nigeria. The study combined qualitative and quantitative methods, employing snowball sampling to select religious leaders from various Islamic and Christian denominations (Pentecostal, Protestant, and Catholic). Structured interviews were conducted with anonymous, voluntary respondents after obtaining informed consent.

Results: The study found varying levels of awareness and acceptance of MAR among Nigeria's major religious groups. Awareness was highest among Pentecostals (96%), followed by Catholics (87%), Muslims (83%), and lowest among Protestants (60%), with a significant p-value of 0.0093. Acceptance rates were high among Pentecostals (100%), Muslims (96%), and Protestants (88%), but low among Catholics (20%), indicating a significant relationship ($p<0.001$) between religion and MAR acceptance. Religious teachings strongly influenced Muslims (75%), had mixed effects on other groups, and showed a strong relationship ($p<0.001$) between teachings and acceptance. Support for MAR from religious leaders was high among Pentecostals (96.20%), Muslims (87.50%), and Protestants (96%), but lower among Catholics (46.70%), with a significant p-value <0.001. The study recommended dialogue between policymakers, healthcare professionals, and religious leaders, although no significant relationship was found between dialogue and MAR practices (p-values >0.05)

Conclusion: While familiarity with MAR is common among religious figures, acceptance varies significantly. Pentecostals show the highest acceptance with minimal influence from religious teachings. In contrast, Catholics exhibit the lowest acceptance and are heavily influenced by faith and beliefs. The study underscores the importance of collaboration between healthcare practitioners and religious leaders in managing MAR practices, highlighting the need to consider religious perspectives in developing MAR-related healthcare policies.

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261. Replacing baseline ultrasound with estradiol testing prior to controlled ovarian stimulation: our experience

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Category

Oocytes and ovary

Sub-Category

Clinical

Abstract

Introduction: Controlled ovarian stimulation (COS) is essential for in vitro fertilisation (IVF) to maximise oocyte yield and improve pregnancy outcomes. Baseline ovarian cysts can cause cycle cancellation, with studies showing conflicting results regarding their impact on IVF outcomes(1–11). Baseline transvaginal ultrasound scans (TVUS) detect ovarian cysts, but they don't provide information on their functional status. Estradiol testing before COS could offer a reliable alternative to TVUS for out-ruling the presence of hormonally active cysts that may interfere with folliculogenesis.

Methods: We retrospectively reviewed 986 baseline scans from January to December 2023 at Merrion Fertility Clinic. Serum estradiol levels were measured on the day of baseline scan and patients were deemed ready to begin COS if the endometrium was thin (<5mm), ovaries appeared quiescent, no cysts were present, and estradiol levels were suppressed (<150 pmol/L). We examined the correlation between estradiol levels and the presence of ovarian cysts.

Results: Of the 986 baseline scans, 36 cycles (3.7%) were cancelled. Failure to downregulate accounted for 52.8% of cancellations, with estradiol levels ranging from 169–2382 pmol/L. Ovarian cysts were the cause of 16.7% of cancellations. Half of the women with cysts had suppressed estradiol levels (<150 pmol/L), indicating non-secreting cysts, which could have allowed COS to proceed. The other half had elevated estradiol levels (>150 pmol/L), suggesting functional cysts that could disrupt stimulation.

Discussion: Baseline estradiol testing may offer a viable alternative to TVUS for identifying women ready to start COS, by out-ruling the presence of functional cysts, and thereby reducing unnecessary cycle cancellations. This approach could optimise resources by lowering the number of ultrasounds performed while still detecting potential issues like failed downregulation. However, further prospective studies are needed to assess the effectiveness and cost-efficiency of estradiol testing as a primary tool for baseline assessment.

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160. Virtual Reality Shows Promise as a Tool for Patient Education in IVF

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Category

Psychosocial

Sub-Category

Basic Science

Abstract

Introduction

Virtual reality (VR) is increasingly being integrated into medicine, with applications ranging from clinical training to patient care, such as anxiety reduction and rehabilitation. However, its potential remains untapped reproductive medicine. We present the first study demonstrating VR as an effective tool for patient education in IVF.

Methods: A virtual reality tour of an IVF lab was developed, allowing users to experience each step of the IVF process within a lab setting. The tour, using the Meta Quest 2 headset, featured footage captured directly in an IVF lab. Volunteers were recruited from public engagement events held between 28/6/24 and 20/7/24. Participants completed pre- and post-VR surveys to evaluate their understanding of the IVF process and provide feedback on the experience. Understanding was measured through questions assessing lab processes (maximum score: 4). Related-Samples Wilcoxon Signed Rank and McNemar-Bowker tests were employed to compare pre- and post-VR knowledge and confidence respectively.

Results: We recruited 53 participants (16/32/5 aged 18-24/25-49/50+, 26/26/1 Male/Female/Non-Binary). Of these, 60% had never used VR before and 36% had direct or indirect experience with IVF. Knowledge scores (M±SD) improved from 2.25±1.40 to 3.13±1.06 post-VR ($p<0.001$), with gains seen regardless of age, gender, occupation, prior VR or IVF experience or confidence in IVF knowledge. Confidence in IVF knowledge also increased (25% vs. 68% reporting confidence in knowledge, $p=0.001$). All participants felt the tour enhanced their understanding and would recommend it to others. Feedback highlighted the realism of the simulation (n=7) and the engaging nature of the immersive experience (n=10), with suggestions for increased interactivity (n=5).

Conclusion: Our study demonstrates VR as a promising tool for patient education. Further research involving real IVF patients in clinical settings is necessary to fully validate its effectiveness.

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341. Fertility Preservation for Endometriosis: An expert panel review of clinical outcomes and referral policy development

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Category

Other

Sub-Category

Clinical

Abstract

Background: Endometriosis affects approximately 10% of reproductive-age women (1). Endometriomas cause ovarian damage, with bilateral cystectomy depleting Anti-Mullerian Hormone level (AMH) by 44% and subsequent premature ovarian insufficiency risk 2.4% (2–4).

Fertility preservation (FP) is increasingly offered pre-operatively (5), yet post-surgical outcomes show similar IVF/ICSI pregnancy rates compared to no or untreated endometriomas (6), sparking debate surrounding the validity of pre-operative FP for endometriosis (7,8).

Objective: Review current FP for endometriosis practice at a tertiary NHS centre. Develop a standardised referral pathway.

Methods: A retrospective review (April 2022-March 2024) of FP for endometriosis was performed. A panel of expert clinicians, internationally recognised across both disciplines, reviewed findings, and developed a consensus policy.

Results: Endometriosis was the most common benign indication for FP with increasing referrals (n=2 Q2/2022, n=6 Q1/2024). Of 36 women referred, 69% (n=25/36) had current endometriomas or ovarian surgery history.

FP was offered to 58% (21/36), 44% proceeded (n=16/36); of these, 50% (n=8/16) had ovarian surgery history and 69% (n=11/16) had current endometriomas with 73% (n=8/11) planning ovarian surgery.

Seventeen FP cycles were completed with median age 34-years-old, pre-FP AMH of 6.8pmol/L, AFC of 6, stored MII 4 and embryo 1. No cancellations, complications or return-to-use cryopreserved material occurred.

Conclusion: The results highlight wide variation in clinical presentation, referral expectation and indication for FP.

Panel discussion acknowledged the need to collect data prospectively to evaluate the place of FP in women with endometriosis. This may aid refinement of referral criteria, capturing women with highest gonadotoxic threat, likely FP efficacy and future use of stored material; ensuring valid, just access.

The consensus criteria agreed for FP referral are female age up to 40-years-old, presence of larger (>3cm mean diameter) or bilateral endometriomas with planned surgical treatment.

Implementation and prospective data collection will yield outcomes to be shared.

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307. Five Years of Prospective Data Collection for Fertility Preservation: Service Requirements Analysis

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Category

Other

Sub-Category

Clinical

Abstract

Background: Onco-fertility is an evolving field with specific patient and resource needs. Effective fertility preservation (FP) services rely on real-world data for optimal planning and delivery. Current guidelines often rely on assumptions, which risk suboptimal resource allocation in the face of rising demand.

Aim: This study aimed to prospectively collect data on all FP referrals at a tertiary centre to accurately define service requirements and improve FP delivery.

Methods: In 2019, a data collection protocol was implemented at a tertiary centre performing about 500 egg collections annually. This protocol captured all FP referrals, including cancer, non-cancer, and transgender patients. Data on patient demographics, referral reasons, consultation outcomes, and preservation methods were collected. Descriptive statistics were used for categorical data, while means and standard deviations (SD) were calculated for continuous variables.

Results: Over five years, 368 FP referrals were recorded, stabilizing at 70–80 referrals annually after an initial increase. Cancer-related referrals accounted for 310 patients (85%), with a mean age of 29.78 years (SD = 9.27). Transgender referrals represented 46 cases (12.5%), and non-cancer referrals comprised 25 cases (6.8%). Sperm storage was the most common preservation method (56%), followed by egg or embryo storage (23%). Additionally, 21% of referrals involved consultations without storage.

Discussion: The predominance of cancer-related referrals highlights the central role of FP in oncology care. The increasing number of transgender and non-cancer referrals underscores the need for inclusive FP services. Clinics performing 500 egg collections annually must accommodate up to 80 additional FP consultations, many of which require urgent attention. Even consultation-only cases create significant resource demands, emphasizing the need for coordinated multidisciplinary teams.

Conclusion: This five-year analysis reveals the growing demand for FP services and emphasizes the need for data-driven resource planning, particularly in oncology and increasingly diverse patient populations.

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6. Effects of letrozole alone or in combination with gonadotropins on ovulation induction and clinical pregnancy in women with polycystic ovarian syndrome: a systematic review and meta-analysis of randomized controlled trials

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Objectives: To compare letrozole in combination with gonadotropins versus letrozole monotherapy in ovulation induction and clinical pregnancy among infertile women with polycystic ovarian syndrome (PCOS).

Methods: Several databases were searched for available clinical trials from inception until March 2023. We selected randomized controlled trials (RCTs) that compared sequential letrozole/gonadotropin versus letrozole alone among infertile women who met the Rotterdam criteria for PCOS. RevMan software was used to perform our meta-analysis. Our primary outcomes were ovulation and clinical pregnancy rates. Our secondary outcomes were endometrial thickness, number of mature follicles (diameter ≥ 18 mm), and incidence of miscarriage and ovarian hyperstimulation syndrome (OHSS).

Results: Six RCTs were retrieved with a total number of 723 patients. The ovulation and clinical pregnancy rates were significantly higher among the letrozole/gonadotropin group versus the letrozole monotherapy group ($p < 0.001$). In addition, there were significant improvements in endometrial thickness and number of mature follicles in the letrozole/gonadotropin group. There were no significant differences between the two groups regarding incidence of miscarriage and ovarian hyperstimulation syndrome.

Conclusion: Letrozole in combination with gonadotropin is superior to letrozole alone in improving ovulation induction and clinical pregnancy among PCOS patients. More trials are required to confirm our findings.

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120. The effect of vaping on hormonal ovarian reserve markers in women of reproductive age in the United Kingdom.

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Category

Endocrinology

Sub-Category

Basic Science

Abstract

Objective: To investigate the influence of vaping on ovarian reserve markers, anti-müllerian hormone (AMH) and follicle-stimulating hormone (FSH), in UK-based reproductive-aged women.

Methods: Medical history was collected via an online health assessment. Serum AMH (pmol/L) and FSH (IU/L) concentrations were measured in capillary blood samples of women aged 21-45 using an at-home hormone testing service.. Multivariate linear regression assessed the relationship between vaping and AMH or FSH, with log-transformed AMH or FSH as the outcome variable and vaping behaviours (current, occasional, former, never) as the explanatory variable. Percentage change in AMH or FSH was estimated using (exp(coefficient) -1)*100. Adjusted odds ratios (aORs) for low AMH (age-specific cut-offs: AMH <7.28 for ages 21-25, <4.93 for 26-30, <2.57 for 31-35, <1.29 for 36-40, and <0.07 for 41-45) were calculated for vaping using logistic regression, with age, BMI, ethnicity and smoking status included as confounders for both analyses.

Results: Of 21,102 women, 1,408 (6.7%) currently vape, 2,063 (9.8%) occasionally vape, 1,398 (6.6%) quit and 16,233 (79.6%) never vaped. Current and occasional vaping were significantly associated with decreasing AMH values, with a 7.8% (p=0.002) and 4.9% (p=0.017) reduction, respectively, compared to never vaped. Logistic regression demonstrated that current vaping significantly increased the odds of low AMH by 1.58 (aOR=1.58, 95% CI=1.25-1.99, p<0.001). No significant associations were found with FSH and vaping.

Conclusions: This large, UK-based study demonstrates that vaping negatively affects ovarian reserve, significantly decreasing serum AMH and increasing the odds of having low AMH, even after adjusting for confounders. No significant association was found with FSH. Additional investigation into more comprehensive vaping behaviours is needed to better understand this relationship.

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309. The development of a new dietetic service within the local Fertility Centre.

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Category

Other

Sub-Category

Clinical

Abstract

Introduction and Objective: The local Fertility Centre (FC) referral criteria for NHS fertility treatment require a Body Mass Index (BMI) above 18.5kg/m2 and below 30kg/m2. Lothian Weight Management Service supports people to achieve their health goals and reduce their weight. The nutritional support team supports patients who are required to gain weight. Waiting times for required services could delay the progression to fertility treatment. No specialist dietetic service for those wishing to engage with the FC existed within the Lothian. A gap was identified for dietetic service in FC that would enable expedited specialist support for patients hoping to reduce weight to meet the BMI eligibility criteria.

In May 2022, a test of change service was established for FC patients. This service provided dedicated, specialist dietetic input to help patients meet FC support criteria.

Method: FC refer patients directly to the Specialist Dietitian. Each patient completes an assessment and is offered 6 core sessions plus relevant resource tools. A choice of virtual groups, 1:1 face to face or virtual sessions or the Second Nature digital programme is available. Support is extended on a monthly basis for 12 months.

Results:

- 419 referrals, 63.2% opt in
- 273 assessments
- 101 chose a group programme
- 62.4% completed all sessions, average weight loss in 3 months was 2.84 kg and in 6 months was 4.85 kg
- 76 chose Second Nature
- 72% completed, average weight loss in 3 months was 6.2%
- 68 opted for 1:1 support
- 39.7% completed, average weight loss in 3 months was 4.1 kg
- 22 spontaneous pregnancies were reported

Conclusion: FC referrals exceeded the anticipated 200 per year. Waiting times were lower (18 weeks average wait for this specialist service) than for the standard Weight Management Service, and engagement rates were higher in this very well received service.

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196. Association between progesterone elevation on the day of the ovulation trigger injection and reproductive outcomes in fresh IVF Cycles

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Background: Progesterone (P4) elevation (PE) on the day of the ovulation trigger injection for fresh embryo transfers (ETs) during *in vitro* fertilisation has been associated with poorer reproductive outcomes. However, the evidence remains inconclusive, with a lack of consensus on the threshold at which PE significantly impairs outcomes. This study aimed to determine the association between PE and various pregnancy outcomes while identifying a definitive threshold for PE.

Methods: This retrospective, single-centre study utilised data from all fresh cleavage and blastocyst ET cycles performed between 2005 and 2021. Cycles were stratified into five P4 groups: ≤3.0nmol/L, 3.1-4.0nmol/L, 4.1-5.0nmol/L, 5.1-6.0nmol/L, and ≥6.1nmol/L. The primary outcome measured was live birth rate, with secondary outcomes including implantation rate, clinical pregnancy rate, and miscarriage rate.

Results: A total of 8858 patients were included in the analysis. For cleavage ETs, there were no significant differences in live birth rates between P4 groups, however, implantation and clinical pregnancy rates significantly decreased at P4 levels ≥5.1nmol/L and ≥6.1nmol/L respectively. For blastocyst ETs, groups with P4 levels ≥4.1nmol/L were significantly associated with reduced live birth rates, implantation rates, and clinical pregnancy rates compared to groups ≤4.0nmol/L. Miscarriage rates did not differ significantly among P4 groups in cleavage ETs but increased significantly in the P4 group ≥6.1nmol/L for blastocyst ETs.

Discussion: PE is significantly associated with poorer reproductive outcomes at a lower P4 threshold for blastocyst ETs compared to cleavage ETs. The PE threshold found for blastocyst ETs was 4.1nmol/L, which aligns with some previous studies.

Conclusion: This study contributes valuable evidence for guiding clinical decision-making regarding appropriate P4 levels for fresh ETs and the timing of transitioning to frozen ETs. Future studies should adopt prospective longitudinal designs and consider additional confounding factors to validate these findings and explore longer-term outcomes of PE.

127. Transformational change: Futureproofing NHS fertility care for the people of Wales

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Category

Other

Sub-Category

Translational

Abstract

Background: The Wales Fertility Institute (WFI) has faced significant challenges, including regulatory non-compliances and escalating concerns regarding service sustainability. These issues prompted a comprehensive review and a strategic response aimed at ensuring the long-term viability and excellence of the service.

Objective: The primary objective of this transformational change initiative was to address the critical areas of non-compliance identified by the Human Fertilisation and Embryology Authority (HFEA) and to implement sustainable improvements in the quality, safety, and accessibility of fertility services across Wales. This initiative also aimed to futureproof WFI by enhancing operational efficiency, financial stability, and workforce resilience.

Methods: A deep dive review was conducted to analyse WFI's operations, focusing on quality, safety, risk management, regulatory compliance, financial planning, and workforce development. The process involved setting up a multidisciplinary task force, engaging stakeholders at all levels, and incorporating feedback from patients and staff. This review informed the development of targeted interventions and a phased implementation plan, including strategic investment in infrastructure, training, and technology.

Results: The transformational change initiative led to the resolution of previous non-compliances, as confirmed by an interim HFEA inspection in May 2024, which reported no areas of concern. The service has been relicensed until 2026, and WFI has been de-escalated from Level 4 to Level 3. Key improvements included enhanced patient care pathways, optimised resource utilisation, and strengthened workforce capabilities.

Conclusions: The transformational change at WFI represents a significant step forward in securing the future of fertility care in Wales. The successful implementation of these changes not only addresses immediate regulatory concerns but also positions WFI as a leading NHS fertility service provider, equipped to meet the evolving needs of the population. Continuous evaluation will be essential to sustaining these advancements and ensure that fertility care in Wales remains accessible and of the highest quality.

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201. Oxygen consumption rate during in vitro maturation of bovine oocytes – a new gold standard?

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Introduction: Oxygen consumption rate (OCR) reflects overall metabolic activity and energy production within oocytes, with elevated levels indicating increased mitochondrial function, which may be necessary for maturation, fertilisation, and early embryo development. Abnormal OCR can signal metabolic dysfunction, therefore assessing OCR provides critical insights into oocyte quality. Current methods require removing oocytes from culture,

however the Resipher device (Lucid Scientific) can record OCR under standard culture conditions.

This project aimed to validate the Resipher device for the first time in mammalian oocytes, by comparison against the previously validated Nanorespirometer (Unisense) and Seahorse XF Analyser (Agilent) methods,

Methods: Cumulus-enclosed bovine oocytes (OCCs) were assayed individually by Nanorespirometry and in pools of 1-20 by Seahorse (over 20min) and Resipher (over 24h). All assays were completed at 39°C in buffered media; Resipher analyses used standard oocyte culture conditions (5% CO2 under humidified air).

Results: OCR measured by nanorespirometry was similar for individual immature (0.79±0.32pmol/OCC/min, n=11) and mature OCCs (0.68±0.20pmol/OCC/min, n=10, p>0.1).

By Seahorse assay, OCR of individual immature OCCs was 5.2±5.56pmol/OCC/min (n=3) and 2.35±2.81pmol/OCC/min for mature OCCs (n=3, p=0.47). Following titration, OCR increased with group size, with some variance, but no significant differences were detected between matched groups. Seahorse OCR data was most consistent using pools of 5 OCCs (4.52±4.93pmol/OCC/min).

Following Resipher assay, OCR of immature OCCs (3.60±0.14pmol/OCC/min, n=4) was similar to that of mature OCCs (3.19±0.21pmol/OCC/min, n=4, p=0.04). Resipher OCR was similar to stage-matched Seahorse OCR (p<0.05), with Nanorespirometer OCR lower than the other methods (p>0.05).

Conclusions: We report, for the first time, that oocyte OCR analyses are comparable between the novel Resipher method and established methods. The Resipher enables measurement of mammalian oocyte OCR during standard culture conditions, offering potential future clinical applications.

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27. Abnormalities in the endometrial epithelial stem/progenitor cell population and endometrial regeneration may be involved in the pathogenesis of recurrent reproductive failure

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Category

Uterus

Sub-Category

Translational

Abstract

Background: Epithelial endometrial stem/progenitor cells (eSPCs) drive luminal and glandular epithelial regeneration, which are vital for embryo-endometrial crosstalk, implantation and pregnancy establishment. SSEA-1, nuclear SOX9 (nSOX9), LGR5, N-cadherin and AXIN2 have all been described as epithelial eSPC markers. Until now, the epithelial eSPC population has not been characterised in women with recurrent implantation failure (RIF) and recurrent pregnancy loss (RPL).

Objective: To examine the expression pattern of epithelial eSPC markers within the window of implantation (WOI) of patients with RIF and RPL, versus fertile controls (FC).

Methods: Pipelle endometrial biopsies were collected from 30 women within the WOI; 10 RIF (≥6 failed ETs), 10 RPL (≥3 consecutive early miscarriages) and 10 FC (≥2 live births). Endometrial tissue biopsies were stained using immunohistochemistry for epithelial eSPC markers SSEA-1, nSOX9 and N-cadherin. In-situ hybridisation was used to detect *LGR5* and *AXIN2* mRNA across all samples. A semi-quantitative scoring technique was used to analyse staining within the luminal epithelium (LE) and functional glands (FG) separately. Statistical differences between groups were calculated using non-parametric tests, with a significance level set at $p<0.05$.

Results: During the WOI, significantly lower nSOX9 immuno-expression was observed within the LE (p=0.045; p=0.016) and FG (p=0.025; p=0.009) of women with RIF and RPL respectfully, compared with FC. In the FG, SSEA-1 (p=0.004) and *AXIN2* mRNA (p=0.018) expression were found to be significantly lower in the endometrium of those with RIF compared to FC. No significant differences in N-cadherin or *LGR5* mRNA expression were found between RIF/RPL and FC.

Conclusions: Significantly different levels of epithelial eSPC markers indicating altered eSPC populations in the LE and FG during the WOI may be associated with unexplained RIF and RPL phenotypes. Further characterisation and functional studies are warranted to explore if these differences provide novel diagnostic and therapeutic opportunities.

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345. Is day 4 embryo selection as informative as day 5 following application of a timelapse morphokinetic algorithm specific to the day of culture.

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: Embryo assessment and transfer on day 4 is not routinely performed, but could provide benefits for improved selection, shorter culture and more flexible working patterns. This study considers the change in embryo ranking, using a time-lapse algorithm, designed for day 4 and day 5 of culture, to understand if day 4 (d4) is more selective than day 5 (d5).

579 embryos from two clinics within a fertility group, were cultured to d5 in GERI TL (Genea Biomedx), with 3 or more, transferred or frozen embryos. An inhouse derived morphokinetic algorithm for live birth prediction, with models for d4 and d5 was retrospectively applied. The d4 model incorporates timings t3,t4,t5,t8,tSB and morula morphology, the day 5 model uses t3,t4,t5,t8,tSB,tB and trophectoderm morphology. The embryos were ranked according to the model score (1-10) for the differing models to assess whether d4 or d5 was more effective at identifying the 'top' ranked embryo.

Results: 197 embryos on d4, were identified as single highest or equally high scoring embryos. On day 5, significantly more d4 embryos maintained the highest status, compared to embryos no longer ranked the highest (161vs 36, $p<0.0001$). No difference was observed in patient

demographic details for insemination, oocyte age, number or fertilisation rate, comparing each group. In 114 patient cycles, day 4 was 30.7%(n35) effective at identifying a single high scoring embryo, day 5 15.8% (n18), equal selection on both days was observed in 40.3%(n46)and 13.2% (n15) cases were in disagreement and unclassified.

Discussion: These findings identify a strong correlation between D4 and D5 for embryo selection supporting Day 4 as a reliable option for identifying the best quality embryos for transfer.

Limitations: Further studies would need to quantify the potential clinical outcomes by tracing the top ranked embryos on d4 when replaced on day 5.

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251. Testing the general public's knowledge on PCOS and endometriosis; an online questionnaire.

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Category

Psychosocial

Sub-Category

Basic Science

Abstract

Polycystic Ovarian Syndrome (PCOS) and endometriosis are highly prevalent in women of reproductive age[1,2]. PCOS is a metabolic and endocrine disorder [1] which requires two of the Rotterdam criteria to be met: oligo-anovulation, hyperandrogenism, polycystic ovaries[3]. PCOS symptoms include irregular periods, infertility and excess hair[4]. Endometriosis is an oestrogen-dependent chronic inflammatory condition [2] which can cause chronic pelvic pain and infertility[5]. Previous studies have shown both conditions to be poorly understood by the general public.

Objectives: Understand the general public's knowledge regarding PCOS and endometriosis.

Methods: Online questionnaire with 26 questions distributed through social media recruited 133 consenting participants ≥18 years old.

Results: Participants ranged from 18 to 78 years old and 72% were female.

A better understanding of endometriosis compared to PCOS was seen in our cohort. 67% of participants had heard of PCOS, 36% could describe the condition and 48% understood what the acronym stood for. 86% of participants had heard of endometriosis and 46% could describe the condition.

Most participants did not know how common the conditions were, 42% thought 1 in 100 women had PCOS, and 43% thought 1 in 100 women had endometriosis.

A reasonable level of knowledge regarding symptoms was seen: 66% knew oligomenorrhoea and 65% knew difficulty losing weight were related to PCOS and 83% identified painful periods as a symptom of endometriosis.

Conclusion: Our findings show some areas of reasonable knowledge but a real lack of understanding regarding knowing the commonness and being able to accurately describe what the conditions are. Women's health, especially gynaecological health, is misunderstood, not openly discussed and stigmatised. A better understanding and awareness of these conditions could ensure quicker diagnosis and treatment for those affected and more recognition for research to help control and treat these very common and often devastating conditions.

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255. Improving the quality of aged oocytes through a complex replacement of cellular components

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Category

Assisted Conception

Sub-Category

Basic Science

Abstract

Objectives: The study was designed to evaluate the potential of improving the quality of oocytes from aged female mice through a complex replacement of oocyte components.

Methods: Selective enucleation of oocytes from young animals aged approximately 2-4 months, coupled with germinal vesicle transfer, was used. The germinal vesicle donors were approximately 12 months old, corresponding to 38-47 years in humans. Two different mouse strains were used as germinal vesicle donors. This unique procedure replaces most aged oocyte components, including the soluble nuclear material and the oocyte nucleolus-like bodies. Thus, this represents the most complex oocyte component replacement scheme tested so far. The reconstructed oocytes were **Sub**jected to in vitro maturation and fertilisation. Developmental rate scoring was applied to the embryos.

Results: The recipient cytoplasts obtained by the selective enucleation of oocytes from young animals showed a normal metaphase II spindle morphology and improved chromosome alignment when the germinal vesicle of an aged oocyte was introduced. This starkly contrasted with the intact oocytes from aged female mice, which showed highly disorganised spindles and misaligned chromosomes. This was also accompanied by improved in vitro fertilisation rates of the reconstructed oocytes compared to control intact aged oocytes, which tended to activate parthenogenetically. Unlike the embryos originating from the reconstructed oocytes, embryos from aged oocytes also tended to be arrested at the two-cell stage.

Conclusions: Although our results show improvement in all morphological features accompanying oocyte ageing evaluated so far, they should be approached with caution. As mammalian preimplantation embryos are extremely tolerant to aneuploidies, embryo transfer is being performed to further evaluate the procedure's efficacy and safety.

205. Impact of Temperature Fluctuations on Sperm Motility Parameters

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Introduction: Temperature-induced sperm motility changes for in-vivo navigation (thermotaxis) are a controversial topic, but it is undeniable that in diagnostic andrology, sperm are **Sub**ject to several sources of temperature fluctuation. The precise details of how such variation influences the sperm flagellar waveform (key aspect of motility) have yet to be established, necessitating a deeper examination of sperm's adaptation to and recovery from temperature changes.

Objective: To evaluate the effects of temperature fluctuations on human sperm motility, focusing on the recovery of key flagellar motility and head velocity parameters after cooling and (re)heating.

Methods: Semen samples were collected from 20 men attending for diagnostic semen analysis at Birmingham Women's Fertility Centre after informed consent. Samples were processed via swim-up for 30 minutes at 37°C. Then **Sub**jected to a temperature gradient, descending from 37°C to 25°C, before ascending to 37°C on a validated Tokai Hit heated stage. Sperm were imaged under negative phase microscopy, and processed using the FAST software package[1]. Parameters of interest included flagellar beat frequency (fBF), arcwavelength (fAWL), arcwavespeed (fAWS), power (p30), head straight-line velocity (VSL) and curvilinear velocity (VCL).

Results: Each of fAWS, fBF, VSL, VCL, and p30 exhibited an inverse-relationship with temperature. fAWL showed the least variation – suggesting that it is the *rate* of flagellar beating and not *shape* that is most impacted by temperature. All motility parameters were restored

upon reheating to 37°C, with no statistically significant difference between paired temperature groups.

Conclusions: The study suggests that, while temperature plays a notable role in regulating sperm motility, behaviour is recoverable within the short timeframes assessed in this study – suggesting that brief periods of fluctuating temperature would not result in lasting impacts on diagnostic results. Larger patient samples are needed to strengthen these findings, and assess the influence of other cofactors.

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Gallagher, M.T., Cupples, G., Ooi, E.H., Kirkman-Brown, J.C. and Smith, D.J., 2019. Rapid sperm capture: high-throughput flagellar waveform analysis. Human Reproduction, 34(7), pp.1173-1185.

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116. Expression of oxytocin and prostaglandin receptors across the inner and outer layers of pregnant human myometrium.

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Category

Uterus

Sub-Category

Basic Science

Abstract

Background: The myometrium, the major muscular part of the uterine wall, plays a crucial role in the induction and coordination of labour by generating contractions (1,2). The myometrium is composed of two discrete contractile layers: the inner **Sub**endometrial layer and outer tissue (3). Prostaglandins and oxytocin have established roles in the stimulation of myometrial contractions (4,5) but their respective receptor expression profiles across the myometrial zones has not been fully elucidated. Labour complications due to myometrial contractile issues occur in 33% of women in the UK, often necessitating labour induction (6). Understanding the normal

physiological state of these receptors is therefore necessary before studying abnormal labour e.g. failure to progress.

Aim: To investigate prostaglandin and oxytocin receptor expression across the inner and outer layers of pregnant myometrium.

Methods: Immunohistochemistry (IHC) was used to detect expression of prostaglandin (PGTFR) and oxytocin (OXTR) receptors in the myometrium of term, non-labouring pregnant women (n=10). Staining was quantified using the quickscore method (7).

Results: IHC confirmed PTGFR and OXTR protein localisation in the cytoplasm of myocytes and stromal cells across the inner and outer myometrial layers. Staining levels of PTGFR was not significantly different between zones ($p>0.05$) however there was a trend toward higher expression in the outer layer compared to the inner layer. Expression of OXTR across myometrial layers was not significantly different ($p>0.05$).

Conclusions: This study has demonstrated the presence of PTGFR and OXTR in the cytoplasm of myocytes and stromal cells in both myometrial layers. Expression was not significantly different, however, larger sample numbers, samples from women in labour and complementary analytical methods (e.g gene expression) are required to further confirm potential differences in PTGFR expression across the inner and outer myometrium. Oxytocin and prostaglandin dysregulation can lead to preterm labour (8,9), warranting further research into OXTR and PTGFR myometrial expression.

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288. Meta-analysis comparing frozen embryo transfer versus fresh embryo transfer in assisted reproductive technology and polycystic ovary syndrome patients.

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Background: Polycystic ovary syndrome (PCOS) affects 6%-21% of women at reproductive age. 70%-80% of PCOS patients are infertile. PCOS patients experience higher rates of miscarriage

and cycle cancelation during assisted reproductive technology (ART). Endometrium receptivity of PCOS patients is compromised due to genetic and hormonal abnormalities. PCOS patients experience higher rates of ovarian hyperstimulation syndrome (OHSS). Frozen embryo transfer (ET) offers embryo implantation in a more receptive uterus with natural hormonal levels compared to fresh (ET) by avoiding implantation following ovarian stimulation leading to improved clinical outcomes, pregnancy outcomes, and lower OHSS rates.

Objectives: A systematic review and meta-analysis comparing fresh ET and frozen ET to identify which method results in better clinical and neonatal outcomes, lower OHSS occurrence, and pregnancy-related complications among infertile populations including PCOS patients. In addition, a subgroup analysis of only PCOS patients.

Methodology: Online search through PubMed and EMBASE and the published literature to find published studies between 1-1-2010 and 1-7-2024. A meta-analysis using weighted data was performed employing a random effects model.

Results: 14 eligible studies included were randomised clinical trials, retrospective, prospective, and observational studies including 15806 patients. Four studies were used for PCOS patients' subgroup analysis including 1841 patients. In the overall infertile population, fresh ET had higher OHSS development ($P<0.00001$). Fresh ET had lower preeclampsia occurrence ($P=0.01$). In the PCOS patients' subgroup analysis, fresh ET showed lower live birth rates ($P=0.003$). Fresh ET had higher OHSS development ($P<0.00001$), and miscarriage rates ($P=0.0006$). Fresh ET showed lower preeclampsia rates ($P=0.01$).

Conclusion: It is suggested to use frozen ET in infertile ART patients as it reduces OHSS development. However, frozen ET for patients at risk of preeclampsia should be monitored. It is also recommended to use frozen ET among PCOS patients as it has higher live birth rates, lower OHSS, and miscarriage rates.

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169. A retrospective study to compare outcomes of euploid embryo transfers in natural and programmed frozen embryo transfers cycles

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective: To compare outcomes (live birth, clinical pregnancy, and miscarriage rates) of single PGTA-tested euploid embryos transferred in programmed vs natural/modified natural frozen embryo transfer (FET) cycles at a single UK fertility centre.

Methods: This retrospective cohort study between January 23 and June 24 included all patients undergoing FET of a single PGTA tested euploid blastocyst. FETs were performed using either programmed or NC/m-NC cycles based on clinician guidance or patient preference. Reproductive outcomes assessed were live birth rate per ET (LBR/ET), clinical pregnancy rate per ET (cPR/ET), and miscarriage rate per ET. Some ongoing pregnancies >12 weeks are currently

included in the live birth group but this will be clarified on repeat analysis. Statistical analyses were performed using R, with $p < 0.05$ considered significant. A multivariate logistic regression via generalized estimating equations was used to adjust for confounding factors.

Results: A total of 107 FET cycles were analysed (51 NC/m-NC, 56 programmed). The women in the programmed group were slightly older (mean 38.1 +/-3.7 vs mean 37.5 +/- 3.34). There were 60 positive pregnancy tests, 9 miscarriages <12 weeks (8.41%), and one stillbirth. The overall cPR/ET was 43% (n=46), and the overall LBR/ET was 41.1% (n=44).There were 22 livebirths/ ongoing pregnancies obtained after NC/m-NC endometrial preparation and 22 after the programmed FET protocol. No significant differences in outcomes were observed between the two groups.

Conclusion: No significant differences were found in miscarriage, clinical pregnancy, or live birth rates between programmed and natural euploid transfer cycles. These findings align with recent studies showing that endometrial receptivity is similar between the protocols (1). Considering evidence of more favourable obstetric outcomes in the presence of a corpus luteum, these data support use of natural cycles where possible.

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215. The impact of Male Infertility Multidisciplinary Team Meeting - perspective from a UK regional centre

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Category

Other

Sub-Category

Clinical

Abstract

Introduction: The positive impact of Multidisciplinary Team Meetings (MDTs) across various clinical contexts is widely recognised, including agreement on the best management through quality, joint decision making and and reduction of unorthodox/**Sub**optimal practices [1,2]. Male Factor Infertility MDT Meeting (MFI-MDT) is included in the relevant NHS Commissioning Policy[3] and has been held in Fertility centres across the UK. Nonetheless, the utility of MFI-MDT has not been studied. We aim to demonstrate this utility through sharing our experience gained through our regional MFI-MDTs.

Method: Retrospective review of electronic records of our monthly regional MFI-MDTs held between July 2022 and June 2024.

Results: A total of 182 discussions occurred for 153 male patients. The mean patient age was 36.0 years. 40.7% (74/182) of the discussions were to validate the suitability of proposed intervention/management strategy, whilst 59.3% (108/182) were complex discussions, where multiple intervention options/management strategies were presented and/or anatomical, functional issue, oncological history, previous fertility intervention failure, genetics and endocrine concerns were present. Approximately half of the discussions (84/182 = 46.2%) resulted in a change of proposed management. The change could be 1) Deferral on intervention selection/management strategy planning, due to the need of additional investigation results, re-evaluation of induction therapy/varicocoele treatment response, competing clinical priority e.g. testicular lesion or further counselling (25/84 = 29.8%); 2) Change of proposed intervention/management strategy after discussing predicted outcomes (29/84 = 34.5%), such as Surgical Sperm Retrieval (SSR) vs no SSR and PESA/Closed TESE vs Microsurgical TESE (mTESE) and with consideration to alternative options e.g. donor sperm; 3) Confirming which SSR intervention (e.g. PESA/Closed TESE vs mTESE)/management strategy to proceed with (30/84 = 35.7%).

Conclusion: Our regional MFI-MDTs have been invaluable in promoting and sustaining timely, quality care for affected couples/men by MFI.

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Research, No. 2.37.) Available from: https://www.ncbi.nlm.nih.gov/books/NBK260189/ doi: 10.3310/hsdr02370

3. Clinical Commissioning Policy: Surgical sperm retrieval for male infertility (NHS England 2016)

99. Rethinking referrals: A critical look at genetic testing for male factor infertility from 2021-2023

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Objective: The NHS National Genomic Test Directory (1) sets strict criteria for male factor infertility (MFI) testing. However, there has been a significant rise in the number of incorrect referrals over the past four years. This study aimed to assess whether referrers are adhering to these criteria and to evaluate previous referrals to identify potential improvements in the referral process. Additionally, the financial impact of ineffective testing on the Genomic Laboratory Hub (GLH) was examined, with the goal of reducing unnecessary costs.

Patients and Methods: A retrospective cohort study analysed 1,050 men referred for genetic testing between July 2021 and May 2023. Of these, 665 underwent Y chromosome microdeletion testing, 260 had chromosomal analysis, and 125 were tested for CFTR variants. Notably, ninety-nine patients underwent all three tests.

Results: The prevalence of microdeletions was 2.7% (n = 18), with AZFc being the most commonly deleted region (55.6%). Structural rearrangements or aneuploidies were identified in 4.62% (n = 12) of patients, with Klinefelter's syndrome being most prevalent (33.3%). CFTR

variants were detected in 12% (n = 15) of patients, with the p.(Phe508del) variant being most prevalent (60%).

However, over 20% of Y chromosome microdeletion referrals were incorrect, and 7% involved unconfirmed azoospermia. Only four of the 125 CFTR referrals were appropriate, with CBAVD or absent vas deferens as the primary reason. Incorrect testing during this period has cost the GLH over £90,000.

Conclusion: A **Sub**stantial number of referrals did not meet the criteria set by the National Genomic Test Directory or the European Association of Urology (EAU) Sexual and Reproductive Health Guidelines (2). This indicates a lack of understanding or misapplication of guidelines by referrers, resulting in unnecessary testing and **Sub**stantial financial waste.

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70. Dual parental periconceptional low protein diet may reduce embryo survival in mice

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Category

Fertilisation and embryo

Sub-Category

Translational

Abstract

Background: Parental low protein diet (LPD) during the periconceptional period (gamete maturation until implantation) affects developmental trajectory of offspring and increases their risk of developing non-communicable diseases in adulthood. Until now, effects of poor maternal or paternal diet have been investigated individually and not in combination. However, a parental combinatorial assessment would have more clinical relevance as both parents would likely be consuming the same diet prior to conception.

Methods: Male and female 8-week-old C57BL/6 mice were fed either a control normal protein diet (NPD; 18% casein) or an isocaloric LPD (LPD; 9% casein) for a minimum of 8 weeks prior to mating. Mice were mated in a 2x2 factorial design, resulting in four dietary groups: NN (NPD female, NPD male), NL (NPD female, LPD male), LN (LPD female, NPD male) and LL (LPD female, LPD male). Females were culled on embryonic (E) day 1.5 (E1.5) for the collection and culture of preimplantation embryos in a time-lapse system (Embryoscope). Preimplantation embryo morphometric and developmental timings were collected.

Results: No significant differences in preimplantation embryo morphometric parameters were observed between E1.5 and E4. However, a 25% reduction in the numbers of embryos reaching the blastocyst stage was observed in the LL (LPD female, LPD male) diet group when compared to the NN, NL and LN groups.

Conclusions: Our data indicates that when both parents consume the same sub-optimal LPD, the impact on embryo development is greater than for either parent alone. However, no differences in embryo morphokinetics were observed.

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151. A comprehensive human embryo reference tool using single-cell rna sequencing data

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Category

Fertilisation and embryo

Sub-Category

Translational

Abstract

Introduction and Objectives: Stem cell-based embryo models offer unprecedented experimental tools for studying early human development. The usefulness of embryo models relies on their molecular, cellular and structural similarities to their *in vivo* counterparts. To authenticate human embryo models, single-cell RNA-sequencing has been utilised for unbiased transcriptional profiling. However, an organised and integrated human single-cell RNA-sequencing dataset, serving as a universal reference for benchmarking human embryo models, remained unavailable. Here we aimed to develop such a reference.

Methods and Results: We developed a human embryo reference, through integration of six published human datasets covering development from the zygote to the gastrula. Lineage annotations are contrasted and validated with available human and non-human primate datasets. Using Slingshot Trajectory Inference, we identified the key the three main trajectories related to the epiblast, hypoblast and trophectoderm lineage development starting from the zygote and identified key marker gene and transcription factor regulatory networks. Using stabilised UMAP and Support Vector Machine Models in 20 dimensions, we constructed an Early Embryogenesis Prediction tool, where query datasets can be projected on the reference and annotated with predicted cell identities. Using this reference tool, we examined published human embryo models, highlighting the risk of misannotation when relevant **References** are not utilised for benchmarking and authentication. Our study also provides insights into the complexity of stem cell states by comparing the transcriptional profiles of naïve and primed human hPSCs to early embryonic lineages.

Conclusion: We hope this tool will facilitate development of more refined systems to study early human embryogenesis and benchmark these against the human embryo.

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212. A systematic literature review of healthcare professionals' knowledge and attitudes towards fertility awareness based methods.

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Category

Nursing

Sub-Category

Clinical

Abstract

Introduction: Fertility awareness-based methods (FABMs) involve the tracking of menstrual cycle dates alongside the observation of fertility signs to determine a woman's fertile window, which is vital information for women who are trying to conceive or prevent pregnancy. As women's interest and use of FABMs is increasing, it is essential that healthcare professionals (HCPs) have good knowledge of FABMs. This systematic literature review aims to explore HCPs' knowledge and attitudes towards FABMs.

Methods: The literature review was conducted in a systematic manner, in accordance with PRISMA guidelines. Ovid Medline, Embase, Emcare, CINAHL, MIDIRS, PsychINFO and Web of Science databases were searched. Studies published between 2010 and 2024 were included. Data relating to HCPs' knowledge and attitudes towards FABMs for both pregnancy planning and prevention was extracted. Quality assessment of studies was conducted using the McGill Mixed Methods Appraisal Tool.

Results: The search strategy retrieved 301 studies, with 14 studies meeting the inclusion criteria. The HCP most often included in the studies were nurses and obstetrician-gynaecologists and the FABM most often included was the Billings Ovulation Method. HCPs only expressed positive attitudes towards using FABMs for pregnancy planning, whereas HCPs expressed positive and negative attitudes towards using FABMs for pregnancy prevention. Negative attitudes towards using FABMs for contraception were linked to low levels of confidence and knowledge. Overall, HCPs have inadequate levels of knowledge of FABMs.

Conclusions: HCPs who provide advice on contraception and conception have a responsibility to ensure that patients are informed of all their options, which include the use of FABMs. As HCPs' knowledge of FABMs is inadequate, education about FABMs needs to be improved. If HCPs are better informed about FABMs, it is likely that more women will access FABMs, which will subsequently lead to improved fertility awareness and body literacy throughout the reproductive life course.

References

None.

134. A comparison of double dose 'step down' versus single dose FSH antagonist protocol on IVF outcomes in women with PCOS

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Background/Aim

Women with polycystic ovarian syndrome (PCOS) and high anti-mullerian hormone (AMH) levels have an increased risk of ovarian-hyperstimulation-syndrome (OHSS); however, many also display resistance to ovarian stimulation, resulting in **Sub**optimal egg yield or cycle cancellation. An alternative approach to the standard single-dose follicle-stimulating-hormone (FSH) antagonist protocol is to use double-dose FSH injections for the first 48 hours of stimulation followed by single-dose FSH, often referred to as the "step-down" protocol. We aimed to compare the IVF outcomes between the 2 treatment protocols for women with PCOS.

Methods: A retrospective study of all women with PCOS undergoing autologous IVF/ICSI in Birmingham Women's Assisted Conception unit between January 2020-December 2023 was undertaken. Both fresh and first frozen embryo transfer (where elective embryo cryopreservation occurred) were included. The primary outcome measures were live birth rate (LBR) and OHSS rate. Secondary outcomes included number of eggs retrieved, blastocyst number, miscarriage rate and cycle cancellation rate. A **Sub**group analysis of fresh versus frozen embryo transfer (FET) outcomes was conducted.

Results: A total of 184 women were identified: 76 on step-down protocol and 108 on standard antagonist protocol.

There was no difference in LBR between the step-down and standard protocol groups (61.9% vs 56.8%;OR 1.23, p=0.79). OHSS rates were lower in the step-down group compared to standard protocol (10.8% vs 16.8%;p=0.048).

The step-down protocol was associated with a higher egg yield (median 18.0 vs 13.0, p<0.05) and blastocyst number (median 4.0 vs 3.0, p<0.05) than the standard protocol. There was no difference in miscarriage or cycle cancellation rates between step-down and standard protocol. There were also no differences in LBR for fresh embryo transfer and FET between the protocols.

Conclusion: A step-down approach is a safe and effective alternative protocol for women with PCOS undergoing IVF however larger prospective studies are required.

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217. Ovarian rejuvenation: neonatal cell replacement revives age-related loss in ovarian self-organisation

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Category

Oocytes and ovary

Sub-Category

Basic Science

Abstract

Objective: The bidirectional communication within the follicle is crucial in coordinating follicle development and is known to be sensitive to age-related changes. In this study, we investigated the age-related changes in the self-organising capacity of ovarian cells using reaggregated ovaries (ROs)[(1-2)] and whether age-associated effects can be reversed by replacing germ cells (GCs) or somatic cells (SCs) with those of neonates.

Methods: ROs were created by dissociating ovaries of varying ages, separating GC and SC populations through differential adhesion, and reaggregating them to form same-age or different-age ROs (e.g., neonatal GC with neonatal SC, or neonatal GC with adult SC, etc.) using neonatal (P2-P4), prepubertal (3-week-old), and adult (12-15-week-old) mice. ROs were cultured

for 7 days, fixed in 10% NBF, embedded, and stained with H&E. Oocyte survival and follicle assembly were assessed.

Results: Ovarian age significantly affected RO self-organisation. ROs generated from neonatal cells contained numerous oocytes per mm^2 in putative follicle structures, while this capacity was almost completely lost in prepubertal ROs (median [IQR]: 103.1[58.2-111.2] vs. 5.5[0.0-6.3], p=0.05). This progressed to complete oocyte absence in adult ROs (103.1[58.2-111.2] vs. 0.0[0.0-0.0], p<0.005). Intriguingly, the self-organising capacity of prepubertal cells was fully restored when GCs or SCs were replaced with neonatal cells, with both showing numerous oocytes within putative follicle structures. However, this level of self-organisation was only partially replicated in neonatal:adult ROs, where some oocytes were present, but there were no signs of follicle assembly.

Conclusion: Thus, our findings indicate an age-dependent decline in ovarian self-organisation. This capacity can be rescued by neonatal ovarian cells in an age-dependent manner. Exploring the underlying mechanisms will enhance our understanding of ovarian biology and provide novel insights into rejuvenating mechanisms, offering new hope for women with fertility issues and potentially aiding species conservation efforts.

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44. Patient experience with transvaginal ultrasound in a tertiary level fertility clinic

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Category

Other

Sub-Category

Clinical

Abstract

Background: 'Intimate examinations' are integral to assessment and treatment within reproductive-medicine but can sometimes be uncomfortable or distressing for patients. The GMC and RCN urge clinicians to take steps to ensure patients feel respected and dignified. Their guidelines detail steps to take before, during and after the examination to ensure patient safety and comfort.

A review of patient experience with transvaginal ultrasound scans was first undertaken in 2020. This review identified areas for improvement such as informed consent, the provision of chaperones and documentation in patient records. This follow-up audit assessed the adherence to GMC and RCN guidelines on intimate examinations and implementation of improvements in clinical practice.

Methods: This audit was completed using a patient questionnaire, which consisted of 20 questions relating to the following domains: informed-consent; chaperones; dignity, respect and communication skills. The survey was performed over a two-week period. Documentation of consent and provision of chaperones was reviewed retrospectively.

Results: Fifty responses were received. 95% of patients felt that the clinician obtained consent. However, only 70% of patients felt that withdrawal of consent was discussed. 90% of patients felt dignified and respected. Only 72% of patients reported that pain or discomfort was appropriately picked up and responded to by clinicians.

Excellent documentation of consent and chaperone presence was recorded. Knowledge on chaperones and the role of a junior doctor amongst patients was however limited. A Key finding was the distinct difference between what patients reported and clinicians documented with regards to chaperones and the job title of the scanning professional. Creating posters may aid patients to learn more about these aspects.

Conclusion: Intimate examinations are fundamental to reproductive medicine. Regular review of patient experience is essential to identify areas for improvement to ensure delivery of a high quality service to patients while ensuring their dignity and comfort.

RF7 Rapid Fire Poster Session

59. All suitable blastocysts undergoing genetic testing, regardless of morphological grading, should be biopsied.

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objective: To explore the correlation between the simplified Nurture morphology grading of blastocysts and embryo genetic status after Pre-implantation genetic testing for aneuploidy (PGT-A).

Methods: This retrospective cohort study examined patients between January 2023 and July 2024 that underwent IVF or ICSI cycles and had embryos cultured to the blastocyst stage for trophectoderm biopsy and had PGT-A using next generation sequencing (NGS). Blastocysts were graded using the simplified Nurture morphology system (A, B or C)[1] prior to biopsy. Patients' age, day of biopsy (Day 5, Day 6 or Day 7) and subsequent genetic status of embryos was compared between the different embryo gradings.

Results: Sixty-two patients, average age 36.5 ± 4.4 years, had 225 blastocysts biopsied with a subsequent PGT-A report available. There were 151 A-grade blastocysts, 4 B-grades and 70 C-grade blastocysts. There was no difference in ages between the 3 groups (A = 36.7 ± 4.4 years, B = 38.7 ± 2.0 years, C = 36.8 ± 4.5 years (A vs. C, $p=0.88$). There was no difference in euploid rates between the groups (59%, 25% and 54% respectively $p=0.438$). When embryos were divided by day of biopsy, there was no difference between euploid rates ($p=0.156$). However, day-5 embryos were more likely to have better morphological score (graded A) than day-6 or day-7 embryos ($p<0.001$).

Conclusion: The Nurture morphological evaluation system[1] is designed to reduce the large inter- and intra-operator variation in blastocyst grading[2]. However, it cannot predict the ploidy status of blastocysts, and all suitable blastocysts should be biopsied regardless of day of procedure.

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107. Birthweight trends for babies born using Assisted Reproductive Treatments between 1991-2018: A national cohort study

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Category

Pregnancy outcomes

Sub-Category

Basic Science

Abstract

Background: Changes in Assisted Reproductive Treatments (ART) have been linked to temporal changes in outcomes, e.g.birthweight. However, it is unclear if reported trends(from smaller studies) reflect ART practices at a population level. Hence, this study utilised a national register to explore population-level trends.

Methods: This cohort study utilised the UK Human Fertilisation and Embryology Authority(HFEA) dataset of 140,859 singleton ART babies born between 1991 and 2018. Comparative aggregated data of 11,790,372 naturally conceived(NC) singletons born during the same period was obtained from NHS Digital. Primary outcomes were birthweight and gestation. Secondary outcomes were low birthweight(LBW), macrosomia, preterm birth, large(LGA) and small(SGA) for gestational age. Logistic and segmented linear regression models were adjusted for gestation(BW models), child sex, embryo transfer type and stage, Intracytoplasmic sperm injection, ovarian stimulation, infertility causes, maternal age and ethnicity, previous IVF treatments, pregnancies and births, number of oocytes retrieved, country of treatment, and funding source.

Results: Adjusted mean ART birthweight increased by approximately 103g between 1991 and 2012. After 2012, the trend was almost static. Average gestation was almost static between 1991 and 2006, followed by a significant drop by approximately 3.5 days between 1997 and 2018,

with the highest downward trend from 2012[0.064(CI:-0.072,-0.056)weeks/year (approximately 2.5 days)]. There was an increase in LGA(3.9% to 6.2%) and a decrease in small (LBW(20.7% to 14.7%) and SGA(9.1% to 7.8%)) babies. NC birthweight remained almost static over time and consistently higher than the ART BW. NC gestation dropped significantly after 2012.

Conclusion: ART babies getting bigger over time (a trend not observed in the NC population) is reflective of changes in ART and population characteristics. The drop in gestation (both ART and NC) post-2012 may be indicative of changes in pregnancy management and care.

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87. Evaluating the impact of conscious sedation without controlled drugs on pain and recovery following TVOR

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

NICE UK endorses and favors conscious sedation as the preferred method for providing analgesia during transvaginal oocyte retrieval (TVOR) (1). Its effectiveness has been well-documented, and it is associated with high levels of patient satisfaction (2). Various Royal Colleges provide guidelines on sedation, recommending certain agents but not superiority of one agent over another (3–6). However, guidelines do advise caution when combining opioids with sedative agents, highlighting risks of excessive sedation and prolonged recovery times. This 15-month survey compared drug regimens used by anesthetists for conscious sedation during TVOR at our hospital.

Regimens using controlled drugs (propofol with opioids ± benzodiazepines) were compared to those avoiding such drugs (propofol with paracetamol). The primary outcome was the need for rescue analgesia during recovery, with time ready for discharge as a secondary outcome.

122 cases were included, with the most common regimen being midazolam, alfentanil and propofol (n=86). Opioids in combination with benzodiazepines were used in 76% of cases, with one case requiring emergency airway intervention. In 19% of cases (n=23), only propofol and paracetamol were used. Survey data showed no significant difference in the need for rescue analgesia between regimens using controlled drugs and those without, with comparable recovery times.

To our knowledge, our findings are the first to suggest that avoiding controlled drugs during TVOR results in recovery outcomes comparable to those achieved with regimens including opioids ± benzodiazepines. As such, avoiding controlled substances may reduce the risk of adverse patient outcomes while ensuring patient comfort and effective recovery. While national guidelines recognize a variety of agents as appropriate for use, this diversity may not be desirable in the context of good clinical practice. Further research is needed to enable the development of more specific and standardized guidelines, ensuring consistent clinical practice and the highest standard of patient care.

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258. Experiences of infertility-related trauma and associated care at fertility clinics

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Category

Psychosocial

Sub-category

Clinical

Abstract

Objectives: Estimate the proportion of fertility patients self-reporting (complex) post-traumatic stress disorder, hereafter (C)PTSD, investigate background, fertility (e.g., children, treatment duration) and trauma (e.g., time since trauma, other trauma) correlates of (C)PTSD, describe underlying infertility-related traumatic experiences.

Methods: Online mixed-methods survey. Inclusion criteria were being adult, having suffered from infertility or attended a fertility clinic within last five years, ability to read/write English. Dependent variable was scoring for PTSD or CPTSD in the International Trauma Questionnaire (ITQ)[1,2], which asks people to describe the experience that troubles them the most and answer symptom-related items about it. In this study we replaced 'experience' by 'infertility experience'. Items were scored as per the ITQ algorithm[1], experiences analysed with Thematic Analysis[3], and correlates identified via Chi-squared or t tests.

Results: 865 consented and 590 (final sample) reported a traumatic experience or filled the ITQ. Fifty-three (9%) participants met criteria for PTSD, 189 (32%) for CPTSD, and 242 (41%) for any diagnosis. Correlates of (C)PTSD were not having children, strength of child desire, currently

trying, time since traumatic experience, and other reproductive events, specifically unsuccessful treatment, abortion, miscarriage, recurrent miscarriage, and health complications after birth.

Participants described a range of medical events as triggering traumatic experiences which were compounded by the care context, specifically lack of NHS funding and poor care in the form of mistakes and delays, dismissive or conflicting advice, no forewarning nor explanations about negative outcomes, poor communication, and insensitive/unsupportive care. Personal and social context also amplified trauma, mostly via unsupportive and stressful interactions. Perceptions of medical events as painful, invasive and bloodied, scary or health threatening, unexpected, unexplainable and uncontrollable were associated with trauma, leading to poor mental health.

Conclusion: Experiences of trauma are common among fertility patients and can be compounded by non-optimal care.

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80. Phyllanthus amarus has an anti-fertility activity in New Zealand White buck rabbit: a preliminary investigation

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

The leaves, seeds, fruits, barks, and roots of African medicinal plants have been used for various nutraceuticals and medicinal effects. Despite numerous research evidence on the ethno-biotic and ethno-veterinary benefits of *Phyllanthus amarus* in humans and animals, its impact in reproductive performance has not fully been established. We therefore hypothesize that *Phyllanthus amarus* is positively related to fertility in buck rabbits.

To test the hypothesis, we conducted a trial with thirty-two (32) post-pubertal rabbit bucks, randomly assigned to four treatment groups (n=8 per group) and fed either the Control diet 0g (A) or any of the three-treatment diet containing sun-dried *Phyllanthus amarus* powder at 5g (B), 10g (C) and 20g (D) per kilogram rabbits' growers' ration. Semen samples were collected from each rabbit buck four times with the aid of artificial vagina between 9 and 10 am in week 7 and 8 of the experimental period and assessed by routine method of microscopic examination

Semen had normal milky color appearance, normal viscosity, good progression and pH of 8.0 in all the groups. Semen volume was better ($P<0.05$) in treatment B (2.5ml) than treatment A (1.25ml), C (1.20ml) and D (1.0ml) respectively. Total sperm count was significantly higher ($P<0.05$) in treatment A ($650x10^6$), than in groups B ($600x10^6$) and C ($450x10^{6)}$ and D ($350x10^6$) respectively. Morphology decreased progressively ($P<0.05$) in dose dependent fashion with increasing levels of the *Phyllanthus amarus* powder (A-90.5%, B-82.5%, C-82.3% and D-67.5%). The percent active motile decrease progressively ($P<0.05$) among the treated groups (A-92.5%, B-82.5%, C-77.5%, and D-72.5%%) respectively. An inverse trend was observed from sluggishly motile. The percent dead cell was significantly higher ($P<0.05$) in treatment groups than the control.

We therefore conclude that *Phyllanthus amarus may be associated with* anti-fertility activity in rabbit bucks. We recommended further studies of *Phyllantus amarus* plant on male fertility.

RF8 Rapid Fire Poster Session

117. Disruption of the fructose transporter, Glut5, impairs steroidogenesis and energy metabolism in murine Leydig cells

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Introduction: Fructose has become an increasingly popular sugar worldwide for human and animal consumption due to its low cost and high sweetening power. To enter cells, fructose uses several transporters, including Glut5, the only fructose-specific transporter. Its expression is restricted to the intestine, certain neurons of the central nervous system, and the testis, specifically within Leydig cells and germ cells.

Methods: To determine the role of this transporter in Leydig cell function, we exposed a murine Leydig cell line (mLTC-1) to a specific Glut5 inhibitor, MNSBA, for 48 hours, using a multi-omics approach to decipher the role of Glut5 at the molecular level.

Results: Cells treated with MNSBA showed reduced fructose content, decreased proliferation, and increased androgen production. The elevated production of delta-4-androstenedione and testosterone was associated with upregulated steroidogenesis genes like hydroxy-delta-5-steroid dehydrogenase, 3 beta- and steroid delta-isomerase cluster (*Hsd3b)* and steroidogenic acute regulatory protein (*Star*). After inhibition of Glut5 in Leydig cells, lipidomics revealed lower cholesterol esters and a change in the proportion of polysaturated fatty acids (PUFAs) to monounsaturated fatty acids. Modification of lipid content was associated with changes in the expression of mRNA coding for enzymes involved in lipogenesis, such as Elovl6. BRB-seq and metabolomics approaches showed that several androgen-sensitive genes involved in glycolysis were deregulated, leading to a drop in glucose metabolite production but an increase in branched-chain amino acids and lactate levels linked to higher Lactate Dehydrogenase A (LDHA) expression, suggesting a compensatory mechanism to preserve the cells' energy balance.

Conclusion: In conclusion, reduced fructose content in cells can significantly impact lipid metabolism and glycolysis, leading to excessive androgen production, which may contribute to altered spermatogenesis or secondary effects like behavioral changes. These findings may help explain the decreased testicular activity related to a fructose-rich diet observed in overweight patients.

263. A comparison of day 5 and 6 PGT-M embryos based on ploidy and morphology status

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Category

Fertilisation and embryo

Sub-Category

Clinical

Abstract

Objectives: To evaluate the euploid rates between day 5 (D5) and 6 (D6) blastocysts in pre-implantation genetic testing for monogenic disease (PGT-M) cycles and analyse if there are any correlation between morphology and ploidy status of embryos and to review the outcomes of frozen-thawed D5 and 6 blastocysts.

Methods: Retrospective cohort study at a single UK fertility centre. A total of 426 PGT-M cycles were analysed between January 2019 to February 2024. Blastocysts on d5 and 6 underwent trophectoderm biopsy and PGT-M testing. Unaffected embryos had further aneuploidy (PGT-A) screening. Embryos that were unaffected and euploid were deemed suitable for transfer. We evaluated the euploid rates between D5 and 6 embryos and examined the correlation between the morphokinetics of embryos and the clinical outcomes.

Results: A total of 6819 embryos were analysed. 1952 embryos were suitable for biopsy on D5 and 6. 733 embryos were unaffected for the tested condition following PGT-M and had PGT-A results available. D5 blastocysts had a significantly higher euploid rates than D6 (63.3% versus 51.4%, $P<0.05$) with no difference in mean female age between the groups at 31.7 +/-3.43 versus 31.8 +/- 4.01. There was a higher proportion of euploid embryos with grade A blastocysts compared to embryos of lower gradings (73.3% versus 53.4%, $p< 0.05$). A total of 260 unaffected, euploid embryos were transferred, D5 (n= 204) versus D6 (n=56) resulted in similar livebirth rates (61.8% versus 62.5%, p= 0.46), whilst higher morphological grading resulted in higher livebirth rates (72.1% versus 50.4%, $p <0.05$) compared to lower grading embryos.

Conclusion: D5 blastocysts were more likely to be euploid compared to D6. Euploid rates were higher in embryos with better morphological gradings. The livebirth rates did not differ significantly between euploid D5 and 6 transfers but were higher in embryos with better morphological gradings.

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31. A UK-wide cross-sectional survey exploring current trends in progesterone testing and luteal phase support (LPS) for frozen embryo transfer (FET) cycles

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Introduction: There is some evidence (1-5) in artificial cycle (AC) FET cycles, that serum progesterone (P4) levels above a certain threshold on the day of embryo transfer, or day before, could improve cycle outcomes. There may be less certainty in the evidence (3, 6-7) assessing progesterone threshold levels and outcomes for true natural cycles (tNC) or modified natural cycles (mNC).

Objective: The aim of this UK-wide survey of IVF clinics was to determine current trends in the management of FET with a focus on progesterone testing and LPS.

Methods: A senior clinician in each of the 99 IVF clinics identified that perform FET was asked to complete an online survey between May and June 2024. Twenty-two (22%) responded.

Results: Of all FET cycles, 62% 16% and 22% were AC, tNC and mNC, respectively. Serum P4 testing occurs in 59%, 32% and 41% of AC, tNC and mNC cycles. The serum P4 target levels were 54, 54.3 and 57.8nmol/L in AC, tNC and mNC cycles. In all cycles, the most common progesterone prescribed was vaginal (55%, 67% and 79% across AC, tNC and mNC cycles,

respectively), followed by combination of vaginal and injectible (45%, 17% and 16%). Additional progesterone was required in 19.25%, 14% and 20.29% of AC, tNC and mNC cycles and the most prescribed additional progesterone was injectable (59%, 44% and 56% in AC, tNC and mNC cycles) followed by vaginal (9%, 50% and 39% in AC, tNC and mNC cycles). The duration of progesterone in weeks was similar between cycles at 11.55, 10.23 and 10.19 between AC, tNC and mNC cycles.

Conclusion: The results highlight the standard type of progesterone administered, regardless of progesterone testing and type of FET cycle, is vaginally with injectable progesterone usually reserved for when additional progesterone is required, especially for tNC and mNC.

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259. Estradiol-17β regulates the porcine trophoblast cell function and gene expression

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Category

Pregnancy outcomes

Sub-Category

Basic Science

Abstract

Objectives: Pregnancy establishment in all mammals requires proper communication between embryo and the uterus. The most important processes during early pregnancy are the maternal recognition of pregnancy and implantation. Maternal recognition of pregnancy occurs when the developing embryo signalizes its presence by secretion of species-specific embryonic signals. The porcine main embryonic signal is estradiol-17β (E2). The first increase of E2 secretion occurs during maternal recognition of pregnancy (days 10 - 13), while the second one peaks during beginning of implantation (days 15 - 20). This biphasic manner of E2 release by embryos affects the endometrium and is necessary for the prolongation of progesterone production by the corpus luteum. Until now, it has not been determined whether the embryonic signal influences the embryo development. Therefore, the aim of the present study was to determine if E2 regulates gene expression, adhesion and proliferation of the porcine trophoblast cells during the second peak of E2.

Methods: Trophoblast cells were isolated from porcine conceptuses collected from gilts (n=10) on day 15 of pregnancy. After reaching 40-50% confluence, the cells were incubated 24 h with vehicle or with E2 (10, 100 and 1000 nM). Cell adhesion and proliferation were assessed using

colorimetric methods, whereas gene expression was determined by real-time PCR. For statistical analysis, one-way ANOVA followed by Tukey's post-hoc test was used.

Results: Estradiol-17β in all tested doses significantly elevated trophoblast cell adhesion, proliferation and gene expression of MUC4 and TNF. Moreover, E2 in dose of 100 and 1000 nM increased trophoblast expression of ESR1 and ESR2.

Conclusions: Presented results indicate that E2 of conceptuses origin likely controls in an autocrine manner the key processes for the proper development of embryos and placenta.

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226. The composition of uterine luminal fluid extracellular vesicle miRNA cargo differs in response to embryo competency in cattle.

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Category

Uterus

Sub-Category

Basic Science

Abstract

Background: The endometrium acts as a biosensor of developmental competency of the conceptus. However, the mechanism by which this is achieved is still unclear. One potential way is different cargo contained in extracellular vesicles (EVs) released during conceptus-maternal crosstalk in the peri-implantation period of pregnancy. We sought to determine if conceptuses of differing developmental competency altered the expression of miRNAs within the endometrium and/or the uterine luminal fluid (ULF).

Methods: Higher competency *in vivo* (IV) (n=6), and lower competency *in vitro* fertilised (IVF) (n=9) and nuclear transfer (NT) clone (n=12) bovine embryos were transferred into synchronised recipients on Day 7. On Day 16, reproductive tracts were collected, intercaruncular endometrium and EVs from ULF recovered. RNA sequencing was carried out to determine miRNA composition of EVs and endometrium.

Results: No differentially abundant miRNAs were identified in endometrium between any type of embryo. In ULF EV composition, no differences in miRNAs were identified between IVF and NT, however 15 miRNAs were differentially abundant between IVF and IV ULF EVs (14 increased in IVF, 1 decreased). miR-378 was 25 log2foldchange lower in abundance in ULF EVs from uteri with IVF conceptuses compared to IV and NT- and is associated with embryo hatching (1). However, miR-378 was not altered in conceptus-derived EVs between IV, IVF, or NT (2). miR-12034 was in higher abundance in ULF EVs from IVF compared to IV, and similarly altered in conceptus-derived EVs, but the remaining 14 miRNAs were not (2). Predicted mRNA targets of the 15 miRNAs were enriched for gene ontologies associated with cell adhesion and stem cell proliferation and differentiation.

Conclusion: Our data demonstrates that ULF EV miRNAs are altered specifically in response to IVF embryos. ULF EV miRNA cargo could be contributing to pregnancy outcomes through endometrial sensing of conceptus competency.

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SP3A Clinical Management

306. Obstetric and Perinatal Outcomes in Women with Turner Syndrome: A Systematic Review and Meta-Analysis

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Introduction

Turner's Syndrome(TS) impacts 1 in 2,000 live female births. It is acknowledged within the 2017 'Clinical Practice Guidelines for the Care of Girls and Women with TS' that women with TS are at increased risk of adverse obstetric and neonatal outcomes. However, an overall risk estimate for each outcome has yet to be reported.

This study aims to collate an estimated risk of each outcome and analyse risk comparisons between egg donation (EDP) and spontaneous pregnancies (SP).

Methods: We conducted a systematic review and meta-analysis with a prospectively registered protocol, as per PRISMA Guidelines. All 30 included studies reported obstetric or perinatal outcomes of pregnancies in women with TS were included. Articles underwent eligibility screening, conducted by 2 independent reviewers. Obstetric or perinatal outcome data in TS women was extracted and tabulated.

Results: 1724 TS pregnancies were included. Obstetric outcomes: caesarean section(62.8%)(95%CI 57-76%), pregnancy-associated hypertensive disorders(21%)(95%CI 13-29%)., pre-eclampsia(10%)(95%CI 6-14%),gestational diabetes mellitus(6.0%)(95%CI 4-8%), aortic dissection(1.1%)(95%CI 0-2%)., intrahepatic cholestasis of pregnancy(4.6%)(95% CI 0-7%), post-partum haemorrhage(17.9%)(95%CI -3-37%)., and maternal mortality(0.3%)(95%CI 0-1%). Perinatal outcomes: prematurity(14.1%)(95%CI 8-18%), low birthweight(25.1%)(95%CI 12-

23%), and perinatal mortality(1.2%)(95%CI 0-1%). Outcomes across multiple pregnancies(6.0%), included prematurity(70.0%), low birthweight(73.3%) and pregnancy-associated hypertensive disorders(60.9%).

EDP and SP were assessed separately. EDP saw more adverse outcomes than SP: caesarean section(82.8%vs55.7%)(RR1.49)(95%CI 1.27-1.76), pregnancy-associated hypertensive disorder(33.0%vs12.9%)(p=0.001), pre-eclampsia(16.9%vs8.2%)(p=0.0023), gestational hypertension(17.9%vs0.0%)(p=0.082), gestational diabetes mellitus(11.9%vs5.0%)(p=0.555), low-birthweight(43.0%vs1.9%)(p<0.001) and preterm birth (17.5%vs0.0%)(p<0.001).

Conclusion: TS women see high rates of pregnancy complications, increasing if they pursue EDP compared to SP. Risks are also increased in multiple pregnancies. An MDT approach with careful counselling is vital to achieve healthier pregnancies.

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291. Relationship between ovarian follicle size and embryological and clinical outcomes: optimal timing for final maturation trigger

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Category

Oocytes and ovary

Sub-Category

Clinical

Abstract

Background: Currently, data regarding the optimal follicle size to administer the final oocyte trigger in IVF is lacking.

Objective: To identify the association between the size of the three dominant follicles (TDF) on the day of trigger and subsequent embryological and clinical outcomes and, if possible, determine a target that optimises them all.

Methods: A retrospective analysis of all patients undergoing IVF across a group of IVF clinics between January 2022 and December 2023. Patients were categorised according to the size of the TDF (≤15mm, 16mm, 17mm, 18mm, 19mm and ≥20mm) at the time of trigger and the following data collected: number of oocytes retrieved (NOR), number of mature oocytes retrieved (MOR), fertilisation rate, embryo quality, and clinical pregnancy and live birth rates. Statistical analysis was via one-way ANOVAs and Chi-squared tests depending on data distribution. Multiple logistic regression was also undertaken.

Results: 5173 patients were studied. As TDF diameter increased, so did the NOR and likelihood of transferring a good-quality embryo (GQE). The highest NOR and best chance of having a GQE for transfer (OR = 1.75) were observed in patients with a TDF diameter ≥20mm. However, for all TDF categories ≥17mm the differences in NOR and GQE were not statistically significant. No significant differences in fertilisation, clinical pregnancy or live birth rates were identified across the groups.

Conclusions: This study suggests that TDF diameter is a useful predictor of NOR, MOR and embryo quality. Using a TDF diameter of 17mm as the threshold for trigger administration may optimise the NOR and likelihood of transferring a GQE. Aiming for larger TDF diameters will potentially increase the physical, psychological and financial burden of IVF without necessarily significantly increasing its success.

75. The incidence of childhood cancers following fertility treatment: an umbrella review

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective:

To investigate the validity of the association between the incidence of childhood cancers following fertility treatment (FT).

Methods: A thorough literature search of the Cochrane Database of Systematic Review, EMBASE, Google Scholar and Pubmed was carried out to identify relevant systematic reviews and meta-analyses, from inception till April 2022. The inclusion criteria included original meta-analyses stating the incidence of childhood cancers (haematological, central nervous system (CNS), hepatoblastomas, bone tumours, nephroblastoma's and soft tissue sarcomas), in the offspring of women who underwent FT, compared to women in the control groups (non-FT). The principal outcome of interest was the incidence of childhood cancer in FT and non-FT groups. The effect estimates, Hazard Ratios and Odds Ratios (OR) were extracted, or calculated de novo. The strength of evidence and extent of potential biases were summarised.

Results: There were 317 publications identified, of which 5 meta-analytical reviews were included. This umbrella review synthesised 127 meta-analyses, including data from over 36 million patients. The incidence of childhood cancers (OR 1·18; 95% CI 1·00-1·38) was higher in the FT compared to non-FT group. When applying P=0.001 as the threshold for statistical significance, the meta-analyses remained statistically significant using a random-effects model.

Conclusions: There is a statistically significant association with the incidence of childhood cancers in the offspring of women who have undergone FT. Understanding the potential long-term sequelae of FT is fundamental to guide counselling and enable individuals to make informed decisions about their reproductive future. Validity determined in this umbrella review significantly contributes to previously published literature.

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135. A comparison of utrogestan © versus cyclogest © for luteal phase support in assisted reproduction treatment: A multicentre cohort study

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective: To compare the effects of utrogestan © and cyclogest © for luteal phase support in assisted reproduction (ART) cycles.

Methods: We performed a retrospective cohort study of all patients who completed ART cycles with either utrogestan© 600-800 mg/day or cyclogest© 800 mg/day, as the sole drug for luteal phase support. Our study population consisted of women from 14 Care fertility clinics in the UK, from January 2017 to December 2022. We included women with stimulated IVF/ICSI cycles with fresh embryo transfer (IVF-ET) and frozen embryo replacement (FER) cycles. We compared the cycle outcome data and pregnancy outcomes separately. Multivariate logistic regression analyses were performed with adjustment for female age, duration of subfertility, number of previous cycles, BMI, ethnicity, subfertility cause, number of oocytes and number of embryos transferred.

Results: A total of 46,774 cycles were analyzed. In the IVF-ET group the live birth rate was higher in those taking utrogestan© compared to cyclogest©: 35.5% vs 29.3%; adjusted OR (aOR) 1.23; 95% CI 1.13 to 1.32; P<0.001). In the FER group the live birth rate was again higher in those

taking utrogestan© compared to cyclogest©: 36.5% vs 32.8%; aOR 1.10; 95% CI 1.02 to 1.18; p<0.001). The miscarriage rate was lower in those taking utrogestan© compared to cyclogest© for both IVF-ET and FER cycles. For IVF-ET the miscarriage was 13.8% vs15.8%, P<0.01; for FER cycles it was 17.1% vs 19.3%, P<0.001. The adjusted effect was significant for the outcome of early miscarriage after FER with utrogestan© compared with cyclogest© (aOR 0.86; 95% CI 0.79 to 0.94).

Conclusion: Our study shows evidence of a higher live birth rate and lower miscarriage rate with utrogestan© compared to cyclogest©. This may be due to differences in the pharmacology of the drugs.

SP3B The Maternal-Fetal Interface

267. Macrophage-stromal cell crosstalk in the uterus is dynamic throughout reproductive cycles

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Category

Uterus

Sub-Category

Basic Science

Abstract

The extra-cellular matrix (ECM) environment in the uterus is highly dynamic due to the continuing cycles of tissue degradation, remodelling and repair and is essential for embryo implantation and successful pregnancy. Macrophage-stromal cell interactions are critical for shaping the ECM environment in other tissues but are poorly defined in the uterus. A combination of single-cell transcriptomics, flow cytometry and hyperion were used in genetically modified mice and human endometrial samples to analyse macrophage-stromal cell crosstalk. Single-cell analyses in mice revealed a network of quiescent and activated stromal cells, alongside pluripotent uterine monocytes recruited from the circulation expressing genes

involved in inflammatory immune pathways but also tissue repair/remodelling pathways. These monocytes differentiated into two distinct subsets of IFN-g-dependent pro-inflammatory or TGF-b-pro-repair macrophages. Flow cytometry revealed a coordinated fluctuation of monocytes/macrophages and stromal cells throughout reproductive cycles that was also present in humans, showing conservation across species. CellChat receptor-ligand pairing prediction programme indicated interactions between monocytes/macrophages and stromal cells including integrin (monocyte/macrophage) binding of collagens/ECM proteins (stromal cells) and monocyte/macrophage activation of stromal cells. Conversely, stromal cells expressed chemokines involved in monocyte recruitment to the uterus and were a major source of TGFb to shape differentiation of pro-repair macrophages. Monocyte-deficient *Ccr2*$^{-/-}$ mice exhibited uncontrolled expansion of activated, collagen-producing stromal cells indicating a critical role for monocytes in stromal cell homeostasis, to maintain tissue integrity in the uterus. Hyperion analysis in human tissue supported these data, showing presence of monocytes/macrophages in collagen-rich areas of the tissue. Accordingly, abnormal skewing of both macrophage and stromal cells were observed in human reproductive diseases including recurrent miscarriage and pre-eclampsia. Macrophage-stromal interactions play a key role in maintaining tissue integrity in the uterus; disturbances in this process manifest as reproductive diseases. Understanding these processes will enable therapeutic options in reproductive diseases.

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276. Exogenous melatonin ameliorates embryo-maternal cross-talk during early pregnancy in sheep.

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Category

Endocrinology

Sub-Category

Basic Science

Abstract

Objective: Early pregnancy loss causes 25% of pregnancy failures in small ruminants because of asynchrony between conceptus and uterine signals[1,2]. In that context, melatonin plays a crucial role in sheep reproductive dynamics, but little is known about its effects during the peri-implantation period[3,4]. We tested the hypothesis that exogenous melatonin benefits early conceptus development by supporting placenta rearrangement.

Methods: Both in vivo and in vitro approaches were employed. Ten multiparous ewes either did (MEL, n=5) or did not (CTR, n=5) receive a subcutaneous melatonin implant (18 mg) 50 days before a synchronized mating. On Day 21 of pregnancy, conceptus and uterus were collected for histological, gene, and protein expression analyses. Moreover, placental functionality (proliferation, migration, antioxidative activity, progesterone release) was assessed on primary ovine trophoblast cells from 21-23-day-old placenta (oTCs) 24h treated with 250µM melatonin and 200µM $CoCl_2$ (hypoxia-mimetic agent).

Results: MEL ewes exhibited a higher prolificity rate and plasma progesterone levels. Embryo crown-rump length and developmental stage did not differ between groups. MEL placenta had more binucleated trophoblast cells in the chorion and placental lactogen expression was more strongly upregulated than it was in CTR. MEL endometrium revealed increased expression of progesterone receptors, interferon-τ, and angiogenic factors. Melatonin receptors were expressed in both the MEL uterus and placenta, as well as in the MEL-treated oTCs model. Furthermore, melatonin enhanced proliferative, migrative, and antioxidant effects when oTCs were subjected to a hypoxic environment.

Conclusion: Our results suggest that melatonin implants act differentially on the uterus and placenta rearrangement by promoting endometrial vessel maturation and placental differentiation. Additionally, melatonin exerts a “rescue mechanism” when trophoblast lives in stressful conditions, by improving uterine microenvironment during the early stage of pregnancy in sheep. In this light, the beneficial effect of melatonin supplementation could be interesting for human placental diseases associated with hypoxic conditions.

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104. Defining changes in immune cell composition in a mouse model of endometrial repair

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Category

Uterus

Sub-Category

Basic Science

Abstract

Objective: Uterine immune cells are essential for normal reproductive function with important roles in tissue remodelling, foetal tolerance, and protection from infection[1]. The composition of immune cells in the endometrium changes in response to hormonal cues as part of the normal menstrual cycle and in pregnancy[1]. Menstruation is an inflammatory event, but we lack detailed understanding of how immune cell composition and function changes during this process. This study performed detailed phenotypic characterisation of uterine immune cells during menstruation.

Methods: A mouse model of simulated menstruation was utilised to investigate uterine immune cell dynamics during endometrial breakdown and repair[2]. Uterine tissues were collected from cycling mice (steady state) or from mice 0-, 12-, 24- or 48-hours after progesterone withdrawal (n=5-10 per group). Uterine tissues were digested, and multi-parameter flow cytometry was performed to characterise uterine immune cell composition. In matched tissues, immunohistochemistry was used to assess the location and abundance of uterine immune cells.

Results: Flow cytometry analysis demonstrated that the proportion of lymphocytes ($CD3^+$ T cells, $CD19^+$ B cells and $NK1.1^+$ NK cells) and $CD11c^+$ $MHCII^+$ dendritic cells were significantly decreased ($p<0.001$) at the 24-hour timepoint compared to 0-hour or cycling controls. Monocytes were most abundant at the 0-hour timepoint but were significantly reduced

thereafter ($p<0.0001$). $Ly6G^+$ $SigF^-$ neutrophils were most abundant 12- and 24-hours after withdrawal of progesterone ($p<0.0001$) but interestingly were still elevated at the 48-hour timepoint (remodelling phase). Immunohistochemistry analysis of uterine tissues from this timepoint highlighted that neutrophils, stained with either Ly6G or s100a9, localise to areas of shed tissue as well as to the basal endometrium consistent with a potential role in tissue remodelling.

Conclusion: These results provide comprehensive profiling of uterine immune cells during a mouse model of endometrial repair and highlight a potential role for neutrophils in endometrial remodelling.

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110. Androgenic Uterotrophic Responses are Mediated via AR-dependent Production of Igf1 in Stromal Fibroblasts

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Category

Uterus

Sub-Category

Basic Science

Abstract

Objective: Androgens, such as dihydrotestosterone (DHT), have recently emerged as important regulators of uterine physiology and female fertility. We have previously demonstrated that

DHT can promote uterine growth and proliferation[1] but the molecular mechanisms underlying this response are yet to be defined. This study aimed to investigate androgen effects on uterine function in a novel fibroblast-specific androgen receptor knockout (FARKO) mouse model.

Methods: FARKO were developed by crossing *pdgfra*-^{CreERT2} mice with *Ar*^{flox} mice, leading to the depletion of the *Ar* gene in pdgfra-positive uterine stromal fibroblasts[2]. FARKO mice ($^{+/Cre;\ fl/fl}$) were compared to littermate controls ($^{+/+;\ fl/fl}$; 'WT') in all experimental procedures (n=4-6 mice per experimental group). 8–15-week-old female mice were given tamoxifen (3x2mg/dose) and after 4 weeks washout underwent ovariectomy. Following a recovery period of 1 week, mice received 7 daily subcutaneous injections of either DHT (0.2 mg/mouse) or a vehicle control (VC; 5% ethanol, 0.4% methylcellulose in PBS). Expression of AR in uterine tissues was assessed by immunohistochemistry. Quantification of genes associated with proliferation and cell-cycle regulation was assessed by qPCR.

Results: Quantification of AR-positive cells by immunohistochemistry revealed knockout of AR in FARKO mice with a significant reduction in total uterine AR positive cells ($p<0.0001$) and stromal AR positive cells ($p<0.0001$) compared to WT. Specificity of knockout was confirmed via double immunofluorescence staining for AR and Pdgfra. DHT-induced trophic effects were absent in uteri from FARKO mice and uterine weights were significantly reduced compared to DHT-treated WT mice ($p<0.0001$). This was associated with significantly reduced expression of *Igf1* ($p<0.0001$) and altered expression of the cell-cycle regulator *Wee1* in DHT treated FARKO uteri compared to WT DHT mice.

Conclusion: These findings provide new insights into the molecular mechanisms of androgen action in selective tissue compartments and the role of paracrine signalling within the mouse uterus.

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SP3C Frontiers in Andrology

231. The role of SIRT7 in male meiosis and reproductive aging

Anna Guitart-Solanes[1], Mayra Romero[2], Irene Fernandez-Duran[1], Bryan A Niedenberger[3], Ignasi Roig[4,5], Christopher B Geyer[3,6], Alejandro Vaquero[1], Karen Schindler[2], Berta N Vazquez[4,1]

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Background: Sirtuins are NAD^+-dependent deacylases that play major roles in genome integrity, cell metabolism, and aging. Sirtuins are key regulators of gametogenesis and fertility in males and females. Previously, we demonstrated that Sirtuin 7 (SIRT7) deficiency in female mice leads to a premature decline in fertility. However, the impact of SIRT7 on spermatogenesis and male reproductive aging has not yet been investigated.

Objective: This study aims to elucidate the role of SIRT7 in male fertility and reproductive aging through the characterization of its molecular function in spermatogenesis.

Methods: Using a mouse model of SIRT7 deficiency, the fertility potential of *Sirt7*$^{-/-}$ male mice was assessed through fertility assays. Additionally, a combination of histological, biochemical and transcriptomic analyses was performed on *Sirt7*$^{-/-}$ testicular samples to determine the molecular function of SIRT7.

Results: *Sirt7*$^{-/-}$ males develop premature subfertility characterized by histological defects in testes and compromised sperm quality. Consistent with SIRT7 expression peaking in early spermatogenic cells in mammals, we observed premature DNA damage accumulation in spermatogonial stem cells (SSCs) and meiotic defects in *Sirt7*$^{-/-}$ male mice. RNA-seq analysis further revealed transcriptomic changes associated to aging in young *Sirt7*$^{-/-}$ testicular samples. Additional analyses indicated that SIRT7 deficiency results in epigenetic deregulation in early spermatogenic cells and impaired chromatin accessibility.

Conclusion: Our findings suggest that SIRT7 controls epigenetic pathways possibly associated with chromatin accessibility, ensuring genome integrity maintenance in SSCs and spermatocytes over time. These results identify SIRT7 as an essential factor in the preservation of male reproductive potential during aging.

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172. Comparative evaluation of oxidative stress measurement techniques: semen redox potential vs. reactive oxygen species in assessing sperm quality and DNA integrity.

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Category

Sperm and testes

Sub-Category

Clinical

Abstract

Introduction: Oxidative stress (OS) significantly affects male infertility, impacting semen quality, sperm DNA integrity, and pregnancy outcomes. This study compares two OS measurement methods–reactive oxygen species (ROS) and sperm oxidation-reduction potential (sORP)–and their correlations with sperm parameters, DNA fragmentation index (DFI), and polymorphonuclear leukocytes (PMNs). A retrospective analysis of 1,461 anonymized semen samples was conducted. ROS was measured by chemiluminescence, and sORP by the MiOXsys assay. DFI was assessed using the sperm chromatin structure assay (SCSA) and categorised as low (<15%), moderate (15-25%) and high (>25%). Samples were also grouped into normal, abnormal, or leukocytospermia as per the WHO (2021) guidelines.

Results: sORP had stronger correlations (p<0.001) with DFI (r_s=0.292) sperm concentration (r_s=-0.761), progressive motility (r_s=-0.332), total motility (r_s=-0.297), total motile sperm count (r_s=-0.678), normal morphology (r_s=-0.288), and vitality (r_s=-0.144) than ROS. DFI was elevated in OS samples, whether measured by ROS (p=0.023) or sORP (p<0.001). Both ROS and sORP were significantly higher in abnormal samples (p<0.001), though DFI was not. High DFI samples have

increased ROS and sORP than low (ROS: p=0.001, sORP: p<0.001) and moderate DFI (ROS: p=0.028, sORP: p=0.023) samples. Elevated DFI and compromised semen parameters were especially observed when both ROS and sORP were increased. Notably, samples with high sORP but normal ROS had poorer semen quality and higher DFI than those with high ROS but normal sORP. sORP remained significantly correlated with DFI (r_s=0.314, p<0.001) after normalising for varied sperm concentrations, unlike ROS.

Conclusion: sORP consistently reflected OS, sperm quality and DFI, independent of sperm concentration and leukocytospermia. ROS levels were more variable, suggesting potential inaccuracies in OS assessment. These findings highlight the benefits of sORP in male infertility assessments and suggest combining ROS and sORP measurements for a more comprehensive OS evaluation. Further research should refine OS measurement techniques, particularly regarding normalisation.

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164. Dexamethasone as a fertility protectant against cisplatin-induced damage in the human immature testis

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Background: 84% of children will survive for 5 years after their cancer diagnosis(1). Cisplatin is a chemotherapeutic commonly used to treat childhood cancers, however it can have off-target effects, including loss of germ cells in the immature testis(2). This is concerning for male childhood cancer patients since there are currently no clinical fertility preservation options. Dexamethasone has shown promise as a ferto-protectant against cisplatin in rodent spermatogonia cell lines and has a protective effect against cisplatin in other systems(3,4,5). We aimed to investigate whether dexamethasone could protect the human immature testis from cisplatin-induced damage.

Methods: Human fetal testicular tissue (HFT) was cultured in an *in-vitro* hanging drop culture system. HFT was exposed to vehicle, 0.5µg/ml cisplatin-only, 10µM dexamethasone-only, or co-exposed with 0.5µg/ml cisplatin and 1-10µM dexamethasone. Tissue was analysed 96 hours post-cisplatin exposure. Media was collected 48- and 96-hours post-cisplatin exposure, and testosterone levels were analysed by ELISA. RT-qPCR was used to analyse changes in gene expression. Immunofluorescence was used to analyse cell populations. Total germ cells and subpopulations were analysed by AP2γ and MAGE-A4 expression for gonocytes and pre-spermatogonia, respectively. Sertoli cells and apoptotic cells were analysed by SOX9 and CC3 expression, respectively.

Results: A significant increase in spermatogonia and gonocytes was seen in HFT co-exposed to cisplatin with 1µM dexamethasone compared to cisplatin-only exposed tissue (n=4 fetuses; 63.47 cells/tubular area (mm2) versus 192.23 cells/tubular area; $p<0.005$ and 13.39 cells/tubular area versus 50.90 cells/tubular area; $p<0.05$, respectively). No significant differences were identified in Sertoli or apoptotic cell numbers. No significant differences were identified in testosterone concentration ratio.

Conclusions: HFT co-exposed to cisplatin and dexamethasone does not appear to effect Sertoli or apoptotic cells or testosterone production. Co-exposure with 1µM dexamethasone may confer some protection against cisplatin-induced germ cell loss in HFT.

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198. Mitochondrial priming in human GCT cell lines is dependent on MCL1 and BCLX

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Category

Other

Sub-Category

Basic Science

Abstract

Testicular germ cell tumours (TGCT) are the most common malignancy of young men, and are highly treatable by the combination of bleomycin, etoposide, and cisplatin (BEP). While the majority of TGCT patients survive, the life-long side-effects – including infertility – of treating young people with these drugs motivates the search for new therapeutic strategies. Like other pluripotent cells TGCTs and their precursor, primordial germ cells, are primed for apoptosis, though the mechanisms governing this are not well understood.

Methods: Transcriptomic re-analysis of human TGCTs was undertaken to identify potential determinants of mitochondrial priming. To validate our predictions, human GCT cell lines were treated with chemotherapeutic drugs in combination with selective inhibitors of the BCL2 family. Cell viability was assessed by MTT assay, with verification using flow cytometry, qPCR and immunocytochemistry.

Results: Analysis of RNA-seq datasets across 33 tumour types revealed that the BCL2 family of pro-survival factors and their pro-death counterparts exhibit a unique signature of expression in TGCTs. Using inhibitors specific to the BCL2 family known as BH3 mimetics, we have characterised the sensitivity of several GCT cell lines to DNA damage. We find that simultaneously inhibiting two BCL2 proteins, known as MCL1 and BCLX, causes synthetic

lethality in all GCT cell lines confirming their role as key determinants of the hypersensitivity of TGCTs to DNA damage.

Conclusion: Genetic data in mice and humans implicate the BCL2 family as central to germline viability. Our data in human GCT cell lines indicate that the balance between cell death and survival is tightly controlled by BCL2 proteins, which ensure mitochondrial priming and underpin the sensitivity of TGCTs to existing therapies. A targeted strategy that employs BH3 mimetics could allow for lowering BEP dose and may represent a new strategy for chemoresistant tumours.

SP3D Cell Communication and Reproductive Toxicology

64. Oncological safety of ovarian stimulation and fertility outcomes of early-stage endometrial cancer patients treated with LND-IUS.

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Category

Uterus

Sub-Category

Clinical

Abstract

Background. Endometrial carcinoma (EC) is the fourth most common womens' malignancy. The current gold standard of treatment is hysterectomy. However, 5% of women with early-stage EC are younger than 40 years old and hysterectomy has terminal effects upon their fertility. Recent evidence has demonstrated the oncological safety of levonorgestrel-releasing intrauterine system (LND-IUS) as a fertility-sparing alternative.

Methods. This retrospective study included patients presenting with complex endometrial hyperplasia with atypia or early-stage EC at UCL Hospitals, managed with IUS-LND between

2014 to 2024. The primary outcome of the present study was to evaluate the oncological safety of ovarian stimulation (OS) upon disease progression and secondary, to explore fertility outcomes in patients treated with IUS-LND. Time-to-event outcomes were visualised as Kaplan-Meier plots, Hazard Ratio with 95% Confidence intervals.

Results. Thirty-four patients, median age of 34 years [IQR 30, 38] and BMI (kg/m2) 29.6 [IQR 26, 36.9], were included. A 76.5% of the patients were diagnosed with Grade 1 EC, and 73.5% sought fertility counselling. The median AMH was 22.40 pmol/L [IQR 8.7, 55.9]. Eleven patients underwent OS with a median peak oestradiol of 1406 pmol/L [IQR 694.0, 9577], median 5 oocytes retrieved [IQR 2, 17] and 4 embryos [IQR 1,6] stored. There was no significant difference between patients that underwent OS in terms of recurrence, HR 1.16 [95%CI 0.36 to 3.76]; P=0.85 or disease upgrading, HR 0.71 [95%CI 0.13 to 3.97], P=0.57 for the first 50 months following LND-IUS placement. A 32.35% of patients (11/34), attempted to conceive during the follow-up period, of those 54% achieved a live birth (3 by spontaneous conception, 1 by ART, 2 by surrogacy with own embryos).

Conclusions. There may be an oncologically safe window of opportunity for fertility preservation and conception for patients on LND-IUS diagnosed with early-stage EC, wishing to complete their family.

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269. Modulation of TGF-β signalling by Doxorubicin in the pluripotent human embryonal carcinoma cell line NTERA-2

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Category

Other

Sub-Category

Basic Science

Abstract

Introduction: Doxorubicin (DOX) is a widely used chemotherapeutic agent effective against various types of cancer but also impacts healthy proliferating cells, such as male germ cells. It generates reactive oxygen species within susceptible cells but its effects are not restricted to

genotoxicity: studies in our lab have shown that it can suppress the expression of key proteins involved in the response to DOX. This study explored DOX's potential to modulate the expression of genes and proteins involved in the TGF-β signalling cascade within the pluripotent human embryonal carcinoma cell line NTERA-2.

Methods: NTERA-2 cells were treated with DOX, without, or in the presence of, TGFβ1 to assess changes in protein levels using Western blot, while mRNA levels were analyzed through quantitative reverse transcriptase polymerase chain reaction (qRT-PCR). A luciferase assay was also conducted to identify affected genes in the TGF-β signalling cascade.

Results: Our results revealed a concentration-dependent reduction in both mRNA and protein levels of the Smad 1/5, Smad 3, and p38 MAP kinase genes and proteins, at low doses of DDOX. This could be ameliorated by the addition of exogenous TGF-β1.Further studies confirmed the decrease in ITGB1 expression.

Discussion & Conclusion: The results demonstrate that ITGB1 is down-regulated by DOX. Since ITGB1 can stimulate the TGF-β signalling cascade, the concomitant decrease in expression of the genes and proteins in this cascade, indicates that DOX affects NTD2 cells by modulating this pathway via an effect on ITGB1 expression. Reduced expression of ITGB1 inhibits cell proliferation and motility, while also increasing the cell's sensitivity to DOX, so these results in NTERA2 cells may have implications for testicular cancer treatment. Furthermore, since ITGB1 plays a vital role in the differentiation of spermatogonial stem cells in the immature testis, it will be important to investigate the impact of DOX on this process.

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144. The impact of *in utero* exposure to cancer treatments on foetal reproductive development and future fertility: a systematic review

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Category

Pregnancy outcomes

Sub-Category

Translational

Abstract

Background: The number of pregnant cancer patients undergoing chemotherapy has increased in recent decades, often requiring administration with chemotherapy and/or hormonal therapies, making it crucial to understand any potential risk of cancer treatment to the foetus. While existing evidence largely suggests no severe cardiac or neurological harm in children exposed to cancer treatments *in utero*, research on its effects to the foetal reproductive system and subsequent fertility is severely limited. This PROSPERO-registered systematic review (CRD42021272882, CRD42021271892) sought to address this gap by analysing animal and human studies that report reproductive outcomes following *in utero* exposure to cancer therapies.

Methods: A systematic search was conducted across PubMed, Web of Science, and Google Scholar. Two independent reviewers performed title, **Abstract**, and full-text screening. Data from the included animal and human tissue studies were independently extracted and analysed by chemotherapy class, focussing on reproductive outcomes.

Results: Twenty-four studies met the inclusion criteria (human = 4, animal-model = 20). These studies examined the reproductive effects of various cancer therapies used in treatment of pregnant cancer patients such as carboplatin, cisplatin, cyclophosphamide, etoposide, busulfan and tamoxifen. Notably, significant germ cell loss was consistently observed in both testes and ovaries after foetal gonadal exposure to chemotherapy and hormonal therapies. Additionally, several studies reported a chemotherapy-induced reduction in foetal Leydig cell number, testes weight, and disrupted testis architecture. Hormonal therapies also caused significant disruption to gonadal development in both sexes.

Conclusion: This review underscores the limited research on the reproductive impact of *in utero* cancer treatment exposure, highlighting the vulnerability of foetal gonads. The evidence suggests that such exposure may lead to gonadal damage and possibly later sub-fertility, with more follow-up studies being urgently needed. Improving our understanding of the adverse reproductive effects could enable fertility-saving treatments to be carried out to those exposed *in utero*.

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265. Endometrial gland-derived extracellular vesicles and their miRNA content

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Category

Uterus

Sub-Category

Basic Science

Abstract

Background: Endometrial receptivity and embryo implantation are strictly regulated processes essential for pregnancy success. We propose extracellular vesicles (EVs) present in the endometrial lumen as essential but poorly characterised regulators of these events. Via interaction with target cells of the reproductive tract or the blastocyst, EVs may deliver microRNAs to modulate gene expression and regulate receptivity.

We hope to establish the synthesis, contents and functions of EVs within the endometrium.

Methods: Matched endometrial tissue and fluid samples were collected. Endometrial fluid was prepared via sequential centrifugation to purify EVs, which were then quantified and investigated via flow cytometry, microRNA sequencing and RT-qPCR. Fluid samples were also imaged via electron microscopy to visualise EVs.

miRNAseq, qPCR and electron microscopy were also preformed on endometrial tissue samples.

Results: Flow cytometry with EV-specific markers CD63 and CD9, and gland-specific marker CD24, suggest an average EV concentration in endometrial fluid of 5600 vesicles/µl ± 221 (SEM). These range from 200-800 nm in diameter.

miRNA sequencing of EV preparations indicate miRNAs copurify with EVs. Pathway analysis suggests these miRNAs may be involved in regulation of embryogenesis and angiogenesis.

Electron microscopy imaging also demonstrates EVs circulating in both the endometrial fluid and endometrial glands within the tissue, where they are visualised budding from the epithelial cell microvilli.

Conclusion: This work demonstrates EVs are produced by the endometrial gland epithelium, and are present in the endometrial lumen at high concentrations. These EVs co-purify with miRNAs

with gene targets expressed in both the endometrium and the blastocyst, suggesting their potential targets.

In future work we hope to characterise potential EV dysregulation during infertility or pregnancy loss.

SP3E The Patient Journey

86. Results from the First Nationwide Audit of LGBTQ+ Inclusion in Fertility Care Providers in the United Kingdom

Chloe He[1,2], Nour Al-ma'ani[2], Mei Francis[3], Jules Sales[4], Isabella Marson[5], Neringa Karpavičiūtė[6], Rishabh Hariharan[5], Ranya Derrick[7], Sotirios Saravelos[8], Luca Sabatini[9], Sofia Tzouganatou[10], Devika Nair[10], Danielle Ellis[5], Céline Jacques[4], Timothy Ferrand[4], Tash Oakes-Monger[11], Teodora Popa[1,12], Francisco Vasconcelos[1], Cristina Hickman[8]

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Category

Psychosocial

Sub-Category

Clinical

Abstract

Introduction

LGBTQ+ patients represent a rapidly growing demographic in fertility care, yet studies reveal they face significant systemic barriers in accessing these services. We present the first nationwide audit of LGBTQ+ inclusion in UK fertility care.

Methods: A checklist for LGBTQ+ inclusion in fertility care was co-created by clinicians, researchers and members of the LGBTQ+ community, focusing on cultural competence, clinical considerations, and online presence for same-sex couples (SSCs) and trans/non-binary (TNB) patients. An online survey was used to assess care providers and individual respondents according to the checklist (live from 8/1/24 to 26/1/24). Providers' online presences were audited by independent assessors.

Results: We collected 50 responses from 29 care providers, achieving a 43% response rate among HFEA-registered fertility care providers, with 7 providers representing multiple clinics under the same brand.

Most providers were reported to be using gender-neutral HFEA paperwork (24/29) and having mixed-sex waiting spaces (24/29). However, fewer had LGBTQ+-specific clinical pathways (23/29 SSCs, 17/29 TNB). Moreover, while 27/29 providers had patient guidance inclusive of SSCs, this fell to 19/29 for TNB patients. We found no significant association between location (London/non-London), funding source (NHS/private) or website inclusivity and the existence of LGBTQ+-specific clinical pathways.

Clinical knowledge on TNB patients varied with only 4/7 doctors, 2/26 embryologists and 0/6 nurses meeting the minimum criteria. Only 16/29 providers offered alternatives to transvaginal ultrasound scans for transmasculine patients, and 13/29 alternatives to masturbation for transfeminine patients. Although six respondents mentioned referring patients to LGBTQ+-competent legal services, none were aware of LGBTQ+-competent antenatal or mental health care providers.

Conclusion: Our findings paint a picture of widespread gaps in clinical and cultural expertise alongside low levels of inclusion in fertility care. Our checklist provides a springboard for clinics considering improving LGBTQ+ inclusion.

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165. Perspectives of Obstetricians and Gynaecologists on the use of weight loss medications

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Category

Endocrinology

Sub-Category

Clinical

Abstract

Introduction: Obesity significantly impacts reproductive health, associated with subfertility, menstrual disorders, and adverse pregnancy outcomes in women(1,2), and impaired semen quality and erectile dysfunction in men(1,3). As obesity prevalence rises, weight management is increasingly important in preconception care. Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) show promise for weight loss and may improve fertility outcomes(4–7). This study explores the attitudes of Obstetricians and Gynaecologists regarding these medications.

Methods: A cross-sectional online survey was distributed to Obstetricians and Gynaecologists in Ireland, assessing familiarity with GLP-1 RAs and prescribing practices when managing obese patients. Questions addressed demographics, scenarios for appropriate medications use, and the need for further training and guidelines.

Results: 62 respondents represented roughly 12% of Obstetricians and Gynaecologists in Ireland (8,9). Most were senior (72.6%) or junior trainees (16.1%), with consultants comprising 11.3%. Nearly all respondents agreed that weight loss medications are appropriate for morbid obesity (90.3%) and **Sub**fertile patients with obesity (62.9%). Although 79.0% of respondents encounter obese patients daily, only 12.9% had ever prescribed weight loss medications. 96.8% of respondents desired further training, with a preference for teaching from endocrinologists or bariatric specialists (91.9%), and/or the establishment of national guidelines (91.9%). 70.9% were uncertain about the timing of discontinuation of GLP-1 receptor agonists before conception, and 75.8% were uncomfortable discussing potential teratogenic risks. 71.0% supported using medications to help women meet the eligibility criteria for publicly funded IVF. None of the respondents believed that Gynaecologists should bear primary responsibility for initiating weight loss medications. Instead, bariatric multidisciplinary teams (30.65%) and GPs (29.03%) were most frequently selected.

Discussion: The findings highlight gaps in the knowledge and confidence of Obstetricians and Gynaecologists regarding the use of weight loss medications. While there is recognition of potential benefits, the lack of clear guidelines and education limits clinical practice.

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112. Exploring ethnic variation in embryo aneuploidy rates; is it time for an individualised approach?

Rabi Ahmed-Odia[1], Carleen Heath[1], Suzanne Cawood[1], Victoria Hemingway[1], Wael Saab[1], Elpiniki Chronopoulou[1], Srividya Seshadri[2]

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Category

Other

Sub-Category

Clinical

Abstract

Objectives: Ethnic related differences have been documented with recent publications highlighting that ethnic minorities have impaired outcomes following assisted reproductive technology and significantly increased miscarriage rates. The aim of this study was to explore whether couple's ethnicity is related to blastulation and embryo aneuploidy rate.

Materials and Methods: This is a retrospective analysis of PGT-A cycles in a single centre. Blastocyst formation and embryo aneuploidy rates were the outcomes of interest. Reported ethnicity was documented for both partners. Results were analysed according to pared parental ethnicity. Embryos were biopsied at blastocyst stage, analysis by NGS. Embryo ploidy rates were compared across ethnic groups. Ovarian reserve, male and female age, number of oocytes and fertilisation rate were accounted for. Pearson chisquare test, Fisher's exact test were used and logistic regression adjusted for age.

Results: 146 PGT-A cycles were analysed, 648 biopsied blastocysts. Regression analysis for number of blastocysts per patient comparing the different ethnic groups and adjusting for maternal age showed no significant difference in blastulation rate. Statistically significant difference in complex aneuploidy rate was observed when comparing couples with both partners of Black/ Asian origin versus couples with partners of different ethnicity (mixed) ($p = 0.035$), indicating that the odds of complex aneuploidy are reduced by about 70% if both partners identify themselves as Black/Asian in comparison to interracial couples. Two-way contingency table of Caucasian versus both Asian for euploid was analysed. The Chi squared test is significant ($p = 0.033$) and the percentages with euploid are 51.28% and 33.6% in this group respectively. The difference in percentages (Both Asian – Caucasian) 17.67 % with 95% CI 8.9% to 34.45%

Conclusions: These findings, if confirmed at larger studies, indicate that there might be higher embryo aneuploidy rate for subfertile couples when partners belong to different ethnic groups.

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18. Dilemmas and consensus for counselling patients considering transfer of PGT-A embryos reported as mosaic; Perspectives of a UK mainstream PGT genetic counsellor group.

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

The experience and views of seven UK specialist genetic counsellors supporting patients considering transfer of putative mosaic embryos was sought. Key themes emerged. The most prominent were challenges patients face managing uncertainty confronting a potential genetic finding with unknown clinical impact. These are compounded by the variability in reporting and interpretation of mosaic results provided by laboratories using different technology platforms.

Consensus for the relevance of high or low level mosaic findings was unclear due to clinic requests to mask mosaic reporting, non-standardised allocation of mosaic call levels between laboratories, and the utility attributing a level when testing a sample of unknown size, estimated between 4-8 trophectoderm cells. Embryos reported as low or high mosaic for chromosomes 13, 18, 21, X and Y could be transferred with personalised genetic counselling, and recommendation for prenatal diagnosis.

Advice around prenatal testing which leaned towards amniocentesis as the preferred option due to lack of validation for NIPT across all 24 chromosomes. While CVS could provide reassurance, the inability to detect the occurrence of CPM was noted. The group reflected that few patients sought testing for chromosome balance for pregnancies arising from an IVF-PGT-A transfer of euploid or mosaic embryos. Also noted was difficulty obtaining follow up data from patients

undergoing prenatal testing, as this does not take place in fertility clinics and results are not necessarily shared.

Also addressed was the current evidence on follow up studies of mosaicism persisting in ongoing pregnancies given as 1.2%; PGT-A error rate is cited at ~1-2% potentially equating an anxiety risk equivalent to transferring a euploid embryo. The group consensus provided re-assurance for practice and highlighted the need for continued dialogue as new evidence becomes available in this field.

PW8 Poster Walk

Abstracts presented in Rapid Fire Sessions on this day will also be featured in the Poster Walk, but the abstract itself is shown in the Rapid Fire Session in this publication and not repeated.

177. Ethics of artificial intelligence in fertility and reproductive medicine: a review of evidence

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Category

Psychosocial

Sub-Category

Clinical

Abstract

Background and Objectives: As Artificial Intelligence (AI) garners increased attention in fertility and reproductive medicine, evaluation of its ethical implications becomes critical. This scoping

review aimed to explore ethical issues associated with the use of AI in fertility and reproductive medicine.

Methods: This review was conducted in a systematic manner based on PRISMA guidelines for scoping reviews. PubMed, Embase and Google Scholar were used for literature searches for articles relevant to the use of AI in fertility, reproductive medicine, which were between 2014 and 2024.

Results: Searches yielded 2097 unique articles, with 27 meeting the inclusion criteria. Analysis included 27 articles which explore ethical considerations (directly or in an extrapolated manner) in reproductive medicine and were mapped to the World Health Organization (WHO) "six key principles application of AI for health" proposed in 2021 (1) encompassing: (a) protect human autonomy (85% of studies, 23/27), (b) promote 'human well-being and safety and the public interest' (100%, 27/27), (c) ensure 'transparency, explainability and intelligibility' (96%, 26/27), (d) promote 'responsibility and accountability' (89%, 24/27), (e) ensure 'inclusivity and equity' (93%, 25/27) and (f) promote 'AI that is responsive and sustainable' (41%, 11/27). The most frequently discussed ethical principle was patient safety (non-maleficence), while sustainability of AI tools was the least represented in literature related to ethics of AI in reproductive medicine.

Conclusion: AI application in fertility and reproductive medicine has complex and dynamically evolving ethical implications. Adoption of AI-assisted reproductive care requires a continuous ethical discourse, especially around patient-centricity and stakeholder engagement.

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133. Time to revisit 'freeze-all for all'? A matched cohort study of over 9,000 embryo transfers.

Jemma Garratt[1,2], Trina Shah[1], Balsam Al-Hashimi[1], Catarina Moreira[1], Bhavna Raikundalia[1], Nick Macklon[1], Kamal Ahuja[1], Elena Linara-Demakakou[1]

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

Introduction: The efficacy of vitrification methods has led to segmentation between the ovarian stimulation and embryo transfer cycle being increasingly applied. Randomised controlled trials have shown that for high responders, or those at risk of ovarian hyperstimulation syndrome, a freeze all embryos (FAE) strategy may be favourable. However, whether FAE approach applied in routine clinical practice improves outcomes in a broader group of patients remains unclear.

Methods: This is a retrospective analysis of 8,481 fresh oocyte retrievals and 9,609 ETs, performed between 2016-2022 at a single UK-based centre. In total, 4,997 patients underwent 9,609 ETs; fresh or frozen. Cycles underwent 1:1 full matching for age, eggs collected, eggs fertilised, embryos created and embryos transferred using probit regression. Logistic regression analyses were fit to compare LBR superiority between the first transfer from each cycle.

Results: Standardised mean differences for variables after matching was <0.2. Across all ages, first FAE FET and fresh transfers were comparable (32% vs 29%, respectively; aOR 1; 95% CI 0.8-1.3). In both normal and low responders, the first FAE FET resulted in higher odds of a live birth than fresh (respectively 32% vs 27%; aOR 1.2; 95% CI 1-1.4 and 20% vs 17%; aOR 1.3; 95% CI 0.8-1.9). In contrast the odds of achieving a live birth in high responders did not differ (41% vs 39%, aOR 1,1; 95% CI 0.6-2). Across all ages, the transfer of a high-quality day 5 blastocyst resulted in significantly higher live birth rates after FAE FET, with a 2x greater odds of a live birth (43% vs 35% respectively, aOR 2.1; 95% CI 1.3-3.2). Cumulatively, FAE and fresh cycles reached similar predicted LBRs (65% vs 64%, respectively).

Conclusions: These findings challenge the emerging narrative that FAE cycles should be recommended only for those at risk of OHSS and in high responders.

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316. Comparison of Ovarian Hyperstimulation Syndrome (OHSS) rates using Buserelin, Triptorelin (modified-release) and Nafarelin agonist triggers in antagonist freeze-all treatment cycles.

Jennifer F Barcroft[1,2], Raashi Shah[2], Rana Al Odetalah[1], Kinjal Shah[1], Tia Hunjan[1], Rachel Roberts[1], Rajendra Rai[1,2], Rehan Salim[1], Emil Barsoum Derias[1], Danai Balfoussia[1], Sotirios

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective: Compare the rates of Ovarian Hyperstimulation Syndrome (OHSS) in GnRH antagonist freeze-all treatment cycles using various agonist triggers.

Methods: Retrospective review of antagonist freeze-all cycles with an agonist trigger between January 2023 and July 2024 at a London Fertility Clinic. Clinical data was extracted from electronic health records including female age, Antral Follicle Count (AFC), Anti-Mullerian Hormone (AMH), stimulation dose, trigger preparation, oestradiol level (trigger day), oocyte number and OHSS diagnosis.

Results: The dataset (312 cycles) had a median age of 34 years old (range: 17-47), AMH of 24.6 pmol/l (range:2.7-479.6) and AFC of 22 (range:2-85). The treatment indication included: male factor (n=88, 28.2%), fertility preservation (n=78, 25.0%), unexplained (n=59, 18.9%) and anovulation (n=33, 10.6%). The median dose of ovarian stimulation was 225IU (range:112.5-450). Agonist trigger preparations included: Modified-Release Triptorelin 0.75mg (n=123, 39.4%), Buserelin 2mg (n=113, 36.2%), Triptorelin 0.375mg + Menopur 150IU (n=46, 14.8%) and Nafarelin 1.6mg (n=30, 9.6%). The median oestradiol level (trigger day) was 12,779 pmol/L (range:354-46734) and number of oocytes collected was 19 (range:2-66).

43 (13.8%) patients met the RCOG diagnostic criteria for OHSS[1]: three (7.0%) mild, 24 (55.8%) moderate and 16 (37.2%) severe. Six patients (14%) required inpatient management, five to investigate shortness of breath and three were diagnosed with a pleural effusion. No patients required a chest or ascitic drain or had a venous thrombo-embolism. The trigger used in patients with OHSS included: Triptorelin (n=22, 51.2%), Triptorelin plus Menopur (n=14, 32.6%) and Buserelin (n=7, 16.2%). There were no OHSS cases with Nafarelin.

Conclusion: Using RCOG criteria[1], 13.8% of women were diagnosed with OHSS, but most were managed as an outpatient. In antagonist freeze-all cycles, using Modified-Release Triptorelin as

a trigger should be avoided due to the high rates of OHSS. Nafarelin or Buserelin should be used preferentially given the lower risk of OHSS.

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60. Investigating fertility awareness and attitudes amongst midwives and nurses in Ireland

Jenny Stokes[1], Sarah Petch[1,2], Sharleen O' Reilly[3], Louise Glover[2], David Crosby[1,2]

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Category

Nursing

Sub-Category

Clinical

Abstract

Objective: Midwives and general practice nurses play a crucial role in providing support for people with infertility. This study aimed to explore their knowledge of, and attitudes towards, fertility investigation and treatment, referral pathways, and the newly introduced public funding for assisted reproductive technology (ART) in Ireland.

Methods: A cross-sectional online survey was distributed to midwives working in Irish maternity hospitals and general practice nurses between February and April 2024. The survey explored attitudes to, and knowledge of, ART including the publicly funded scheme. Free-text questions were analysed qualitatively using content analysis and descriptive statistics were used for quantitative analysis.

Results: Of the 86 respondents, 74% were midwives (n=64) and 26% nurses (n=22). Most midwives and nurses (88%, n=76) felt they would benefit from more education on fertility and diminished ovarian reserves. Forty-four percent of respondents (n=38) reported having no confidence in their ability to interpret Anti-Müllerian Hormone (AMH) and Follicle Stimulating Hormone (FSH) results. Eighty-three percent (n=70) felt those with a family history of early menopause or premature ovarian insufficiency should have AMH tested. Eighty-five percent (n=72) felt it was suitable to test AMH in individuals trying to conceive for over a year. Half of the respondents (n=42) thought it was reasonable to test AMH levels in those undergoing a 'fertility check' but not actively trying to conceive. Qualitative analysis revealed that the current access criteria for public ART were perceived to be too restrictive.

Conclusion: We demonstrated for the first time that there is a lack of knowledge regarding subfertility and its management amongst midwives and nurses as well as a desire for more education. With training and education, knowledge and awareness of fertility investigations and ART amongst Irish healthcare workers the care patients receive will improve.

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79. Calcium Ionophore containing medium significantly improves blastocyst formation and number in patients with previous poor blastocyst formation: a multicentre, retrospective cohort study

Jessica Wilkinson[1], Alison Campbell[2], Amy Barrie[3], Sue Montgomery[2], Alison Richardson[3], Victoria Sephton[4], Adam Balen[5,6], Arri Coomarasamy[7,8], Tom Bamford[1], Hannah Newby[1]

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Category

Fertilisation and embryo

Sub-Category

Basic Science

Abstract

Background: Artificial Oocyte Activation with calcium ionophore (CI) has been shown to improve fertilisation, and blastocyst development rates, in patients with a previous history of poor fertilisation and blastocyst development rates respectively[1]. The aim of this investigation was to evaluate the effectiveness of CI to improve blastocyst development, number of blastocysts formed and clinical pregnancy in patients where no, or a low proportion of blastocysts had previously formed.

Methodology: This multicentre, retrospective cohort study consisted of 774 cycles (between 2019 and 2024), where CI was used to aid blastocyst development. Following ICSI, oocytes were incubated for 15 minutes in CI enhanced medium, CultActive (Gynemed), before returning to a standard medium. Cycles were separated into two cohorts: those where no blastocysts formed in a prior cycle and those where previously 25% of fertilised oocytes formed blastocysts. The outcomes were blastocyst formation, number of blastocysts formed and clinical pregnancy rate. Outcomes of the CI and previous cycles were compared and adjusted for the following confounders: number of oocytes, endometrial thickness, age, parity, and BMI.

Results: CI significantly improved the likelihood of blastocyst formation compared with previous cycles without CI where no blastocysts were formed (adjusting for oocyte number) (OR 2.02; 95% CI 1.61-2.55; p=0.000) and patients were significantly more likely to have two or more blastocysts where CI was used (OR 2.07, 95% CI 1.65-2.60; p=0.000). Where a prior cycle had resulted in 25% of fertilised oocytes forming blastocysts, CI was associated with a significant increase in the number of blastocysts formed, analysed using linear regression (R^2=0.30, p=0.000). CI increased the odds of clinical pregnancy when adjusted for confounders (OR 3.68; 95% CI 2.70-5.00; p=0.000).

Conclusion: CI may offer an effective treatment option for patients with poor blastocyst development. However, prospective studies are needed to confirm this.

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83. Time from Freeze-All to FET - a retrospective analysis of livebirth rates

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Category

Assisted Conception

Sub-Category

Clinical

Abstract

Objective: To determine whether the time interval between oocyte collection and subsequent frozen embryo transfer (FET) affects livebirth rate outcomes following a freeze-all strategy to prevent ovarian hyperstimulation syndrome (OHSS).

Design: A retrospective analysis of livebirth outcomes in patients who underwent FET cycles after all fresh embryos were frozen due to the risk of OHSS.

Materials and Methods: Data were collected from 234 medicated FET cycles performed between January 2017 and October 2023 in a fertility clinic. The study included women under 38 years of age at the time of embryo freeze, using their own oocytes, and undergoing a single embryo transfer. Patients were divided into two groups: Group A (n=89) started their FET cycle with their withdrawal bleed following oocyte collection, while Group B (n=145) began with their second menstrual cycle. Clinical pregnancy rate (CPR), livebirth rate (LBR), gestational duration, and birth weight in singleton live births were analysed. Fisher's exact test and t-test were used to calculate p-values.

Results: The average time from embryo freeze to transfer was 26.6 days for Group A and 58.4 days for Group B. There was no significant difference in the average number of oocytes retrieved (25.3 vs. 26.3) or age at the time of freeze (31.2 years vs. 31.8 years) between the groups. CPR (60.7% vs. 56.6%, p=0.6) and LBR (51.7% vs. 51.0%, p=1.0) were comparable between the two groups. Additionally, there were no significant differences in gestational age (39.3 weeks vs. 39.0 weeks, p=0.52) or birth weight (3562.9 g vs. 3488.6 g, p=0.4) among singleton deliveries.

Conclusion: The timing of FET following a freeze-all strategy to avoid OHSS does not significantly impact livebirth rates or other pregnancy outcomes. These findings suggest flexibility in the timing of FET without compromising clinical outcomes.

183. Attitudes toward sperm donation among men in Scotland.

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Category

Assisted Conception

Sub-Category

Translational

Abstract

Title: Attitudes toward sperm donation among men in Scotland

Purpose: Understanding male perspectives on sperm donation is essential for improving donor recruitment and addressing ethical challenges in assisted reproductive technology (ART). However, there is limited research on awareness, attitude and barriers towards sperm donation in Scotland. This study aimed to systematically evaluate the attitudes of Scottish men toward sperm donation to develop targeted recruitment campaigns.

Methods: An online survey of 169 men aged 18-45 in Scotland assessed demographics, attitudes toward sperm donation, willingness to donate, motivations, and views on donor identity disclosure. Recruitment was via online platforms, email, and fliers in major cities. Chi-square tests and Spearman's rank correlation identified significant associations between demographics and survey responses.

Results The analysis revealed positive attitudes toward sperm donation, with 86.4% viewing it as a generous act ($p<0.001$). Most respondents (85.2%) supported the right to choose between identifiable or anonymous donors ($p<0.001$), and 58.6% believed children conceived with donated sperm should know their genetic origin ($p<0.001$). However, 61.7% expressed discomfort with the removal of anonymity ($p=0.003$), and 70.7% were unaware of donor recruitment criteria ($p<0.001$). Younger, single, and non-parental men held more favourable views, with altruism as the primary motivator.

Conclusions: The findings indicate a broadly positive outlook on sperm donation among Scottish men, largely driven by altruistic considerations and recognition of the societal benefits. Younger respondents may see sperm donation as an option to confirm their fertility. However, the study highlights the need for targeted educational initiatives to improve awareness in younger

generation about sperm donor recruitment criteria, such as smoking cessation and support available. This approach would promote a healthy lifestyle and foster a supportive social culture around sperm donation in Scotland.

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179. Exogenous Rectal Administration of Progesterone for Frozen-Thawed Embryo Transfer

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Category

Pregnancy outcomes

Sub-Category

Clinical

Abstract

What is already known: Luteal phase exogenous progesterone for frozen-thawed embryo transfer (FET) confers advantages for the establishment and maintenance of an ongoing pregnancy[(1)].

Routes of administration include oral, sublingual, intramuscular, vaginal and rectal. Literature has suggested that rectal administration can achieve optimal absorption and serum progesterone levels[(2)(3)].

Study design: This prospective interventional study, spanned four months, included a cohort of 86 patients undergoing FET. All patients self-administered rectal progesterone by a suppository. Outcomes included negative, biochemical and clinical pregnancy rates. A secondary outcome, serum progesterone levels pre-transfer were also compared. The study was conducted from July 2023 to October 2023.

Method: Patients selected for the study were those undergoing a single, FET transfer of a day 5 blastocyst within the Assisted Conception Unit at Birmingham Women's Hospital. All patients received at least 6mg/24hours of oral oestradiol within the FET cycle followed by rectal administration of Cyclogest 400mg/12hours. Serum progesterone levels were taken the day before embryo transfer.

Results: 86 patients received rectal progesterone at single blastocyst transfer. The mean age of the patients at egg retrieval was 34.6years and mean BMI 26.9kg/m2. Mean serum progesterone level measured the day before embryo transfer was 51.3 nmol/L and 9 patients had progesterone levels below 10ng/ml resulting in cycle cancellation. The negative pregnancy rate, biochemical pregnancy rate and clinical pregnancy rates (at seven weeks gestation) were 44%, 19% and 37% respectively compared to vaginal progesterone administration over the similar period which were 40%, 9% and 51%. 27 patients required rescue IM progesterone Lubion in the rectal administration group compared to vaginal administration group were only 9.

Conclusion: Patients receiving rectal progesterone treatment had lower serum progesterone levels, higher biochemical and lower clinical pregnancy rates. Vaginal preparation offered improved reproductive outcomes, reduced cycle cancellation and therefore reduce clinic attendance.

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37. Sustainable IVF – introducing change; start now!

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Category

Other

Sub-Category

Translational

Abstract

Objective: In the UK, some clinics have introduced sustainable policies and recycling facilities. However, it's unclear what proportion of clinics have this in place and whether clinics actively recycle/repurpose waste. The number of consumables used per IVF/ICSI cycle, varies according to each lab. Two pilot surveys aimed to establish what proportion of clinics have access to recycling facilities and actively recycle, and impact of reducing number of dishes per cycle on sustainability.

Methods: Following introduction of recycling to our clinic in 2019, two online surveys were developed. The first was distributed to the HFEA-licensed clinics to ascertain the level of sustainability in their clinics. The second was sent to NHS-funded clinics in Scotland, to determine the number of culture dishes used during oocyte retrieval (OR) and ICSI.

Results: Forty responses were received, with an equal split of 20 from NHS and private clinics. 60% of clinics reported having a recycling policy whilst 85% had access to recycling facilities. Only 45% of clinics reported recycling packaging whilst 10% repurposed media bottles and one clinic reused cool-boxes for transport of biopsied samples. Comparing private and NHS clinic, no access to recycling was reported by 25% private vs 5% NHS clinics; whilst lack of recycling was reported by 70% private vs 35% NHS clinics.

Dish use in Scottish clinics varied from <2 to >5 dishes per OR, and three clinics used 7-10 dishes per ICSI cycle and one used <7.

Conclusion: Compared to private clinics, NHS clinics reported more access to and use of recycling facilities. If medium-sized clinics reduced OR-ICSI dish use by just one, this would save ~500 dishes/year and decrease plastic waste by ~3.5kg. We all have responsibility to provide a healthier planet for future generations. A proactive approach is encouraging clinics to act towards sustainable IVF.

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211. Dietary advice and fertility; is the content on social media accurate?

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Category

Other

Sub-Category

Clinical

Abstract

Objectives: This study evaluates the quality, credibility, and accuracy of information published on Instagram about the effects of specific nutrition or diets on female fertility.

Methods: Popular nutritional influencers focusing on diet, nutrition, PCOS and fertility were identified. Using their posts and the autocomplete function on Instagram, we identified the most popular hashtags posted. Using Keyhole®(1) we ran two trackers in real-time from April 15 to April 27 2024, over US National Infertility Awareness Week. One tracker identified posts including "#PCOS" or "#fertility" and "#diet," "#nutrition" or "#lifestyle." Another tracked #PCOSdiet.

We included content published in English, related to PCOS or fertility and providing advice or information regarding diet, nutrition or lifestyle measures. We excluded content related solely to the lived-experience of PCOS/infertility.

Posts were evaluated using validated instruments assessing: credibility (White Paper instrument(2)), quality (DISCERN instrument(3)) and readability (Flesch-Kincaid instrument(4)). Accuracy was assessed against NICE guidelines(5) and British Dietetic Association advice(6). We also performed thematic analysis of the Instagram posts which met the eligibility criteria.

Results: The data is currently being analysed, but 964 posts about PCOS or fertility that include the hashtags 'diet', 'nutrition' or 'lifestyle,' and 953 posts with #PCOSdiet have been collected.

Conclusions: By highlighting potential low-quality or inaccurate information, this study will allow clinicians to better inform and educate patients. Furthermore, it will demonstrate if intervention is needed to validate fertility content on social media. The volume of Instagram output on the topic of fertility and nutrition implies that women with PCOS or infertility are interested in implementing lifestyle measures to improve their outcomes. There is currently little evidence that women with PCOS benefit from a specific diet compared with obese women without PCOS(7). Women should be provided with evidence-based information from verified sources.

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181. Enhancing Efficiency in Assisted Reproductive Technology (ART) Laboratories through Digitalisation: a Failure Mode Effect Analysis (FMEA) Approach

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Category

Other

Sub-Category

Translational

Abstract

Introduction/Objective: The complexity of Assisted Reproductive Technology (ART) laboratory workflows increases the risk of errors and inefficiencies. This study evaluates the impact of a digital ecosystem on operational efficiency and error reduction in ART laboratories, using Failure Mode Effect Analysis (FMEA) to compare traditional manual data entry with advanced digital systems, including application programming interfaces (API) and automatic data capture.

Methods: The study was conducted across six fertility centres in the UK, Australia, and the USA, where manual data entry was replaced by an integrated digital ecosystem incorporating Embie's clinic management software, Cooper's RI Witness, Vitrolife's Embryoscope, and Fairtility's CHLOE EQ. FMEA identified potential failure modes in both manual and digital systems, assessing their severity, occurrence, detection, and calculating a Risk Priority Number (RPN). In the manual system, key failure modes included human error in data entry, delayed data availability, and communication breakdowns. For the digital system, failure modes such as API communication failures, system downtime, and insufficient user training were analysed.

Results: Digital integration led to significant reductions in RPN scores: an 85.9% reduction in human error in data entry, 61.9% for delayed data availability, and 67.3% for communication breakdowns. RPN values decreased from 320 to 45 for human error, 252 to 96 for delayed data, and 245 to 80 for communication breakdowns. Additionally, the digital system reduced clinician time by one hour, nursing time by 2.5 hours, and embryology time by two hours per cycle, while reducing manual data entry points from 209 to 18 per cycle.

Conclusions: FMEA analysis highlights the transformative impact of digital integration in ART laboratories, showing significant reductions in operational risks and improved efficiency. Adopting digital systems can enhance data accuracy, reduce errors, and improve patient outcomes, advocating for their widespread adoption in reproductive medicine.

235. Systematic reduction in oestradiol and testosterone measurements due to serum separator gel in blood collection tubes: implications for at-home fertility testing

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Category

Other

Sub-Category

Translational

Abstract

Objective: We compared measurements of nine key fertility-associated analytes (anti-Müllerian hormone, follicle-stimulating hormone, free thyroxine, luteinising hormone, oestradiol, prolactin, sex hormone-binding globulin, thyroid-stimulating hormone and total testosterone) to assess concordance between venous and capillary tubes, and the impact of serum separator gel.

Methods: Two trials were conducted. The first (Trial 1) used 34 paired blood samples taken from 13 participants collected into two capillary storage tubes: serum clot activator tubes (cS-CAT) without serum separator gel, and serum separator clot activator tubes (cSS-CAT) with serum separator gel. Trial 2 collected 27 sets of four concurrent blood samples from 26 participants into cS-CAT, cSS-CAT, venipuncture serum clot activator tubes (vS-CAT) without serum separator gel, and venipuncture serum separator clot activator tubes (vSS-CAT) with serum separator gel. Measurements of the analytes were log-transformed and each tube type compared via t test.

Results: Findings were similar in both trials. All four blood storage tube types yielded statistically similar measurements for seven of the nine analytes tested. Significantly lower measurements for both oestradiol (E2) and testosterone (T) (13% and 8% respectively) were observed for cSS-CAT compared to cS-CAT. Differences were greater between cSS-CAT and vSS-CAT (17% and 11%), and greatest between cSS-CAT and vS-CAT (19% and 14%). No significant differences were observed for the other seven analytes nor when comparing cS-CAT to vSS-CAT. Additionally, conversion formulas were developed to adjust E2 and T measurements between the most divergent tube types.

Conclusion: This study provides evidence that serum separator gel in capillary blood collection tubes systematically lowers measurements of E2 and T, and the magnitude of differences between tube types suggests a higher impact in small capillary tubes compared to larger venous tubes. Capillary tubes without gel perform similarly to venous tubes, suggesting they are the most suitable for at-home fertility testing.

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41. The effect of COVID-19 on Semen Evaluation: An In-Depth Analysis of Changes in Semen Quality and Sperm Parameters

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Category

Sperm and testes

Sub-Category

Basic Science

Abstract

Background: The COVID-19 pandemic has significantly impacted various aspects of human health, with recent studies suggesting potential effects on reproductive health.

Objectives: To investigate the impact of COVID-19 infection and different COVID-19 vaccines on sperm parameters.

Methods: Semen samples from male participants (n=100) were analyzed for sperm quality and morphology. Parameters assessed included non-progressive % (NP%), progressive % (PR%), immotile % (IM%), and normal morphology. The impact of COVID-19 infection was compared with non-infected controls. Additionally, the effects of different vaccines (AstraZeneca, Chinese, Moderna, Pfizer) and the number of vaccine doses on sperm quality were examined. Statistical analyses were performed using GenStat 12th Edi. With binomial logistic regression to determine odds ratios (OR).

Results: Infected individuals with COVI-19 had significantly higher NP% (OR = 0.884, P<0.01) and IM% (OR = 1.303,P<0.01), with lower PR% (OR = 0.73, P<0.01), normal morphology (OR =

0.69, P<0.01) and increased head abnormalities (OR = 1.45, P <0.001). Among vaccines, the Chinese vaccine was associated with significantly lower NP% (OR = 0.51, P<0.01) and PR% (OR = 0.26, P<0.01), and higher IM% (OR = 3.73, P<0.01). Pfizer showed lower normal morphology (OR = 0.71, P<0.01) and higher abnormalities (OR = 1.40, P<0.01). In contrast, Moderna had a minimal impact on sperm parameters. Individual who receiving three doses of any vaccine generally improved sperm quality compared to zero doses, with significant increases in NP% (OR = 1.47, P<0.01) and normal morphology (OR = 1.47, P<0.01), and decreases in overall abnormalities (OR = 0.71, P<0.01).

Conclusion: COVID-19 infection negatively impacts sperm quality. Vaccine effects vary by type, with some vaccines affecting sperm parameters more than others. Multiple vaccine doses appear to partially counteract the adverse effects of COVID-19 on sperm quality. Further research is needed to understand the long-term implications for male fertility.

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158. Optimising *in vitro* endometrial model systems to investigate the effects of heat stress.

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Category

Uterus

Sub-Category

Basic Science

Abstract

One of the most pressing issues facing the planet today is climate change. The importance of investigating the impact a warming environment will have on reproduction cannot be underestimated. These effects are multifaceted with potentially direct effects on human and animal germ cell production, embryo viability and pregnancy success. Furthermore, this may lead to failure of the offspring to thrive and reproduce, with knock-on effects for livestock production for food. Developing physiologically relevant tools to study the impact of changing environmental stresses is critical to understanding these fundamental reproductive processes. The highly dynamic endometrial tissue sits at the interface between the maternal and foetal systems and may have a key role in mediating a response to heat stress (HS). Our preliminary

studies involve optimising the *in vitro* cell culture systems and comparison of the biological tools currently available. Porcine endometrial epithelial and stromal cells were isolated from abattoir derived tissue and cultured with either RPMI or DMEM/F-12 media. We detected expression of key endometrial and heat stress response genes in our culture systems (*ESR1, PGR, VIM, KRT18, MUC1, IL-1β, HSP90AB, HSP90AA, HSPA8, IFNG)*. Culturing in DMEM/F-12 resulted in up-regulation of cytokeratin 18 (*KRT18*) and mucin (*MUC1*) gene expression, with small changes in estrogen and progesterone receptor (*ESR1* and *PGR*) expression. Porcine epithelial and stromal cells were then subjected to a 12-hour HS at 40°C, resulting in increased expression of heat shock proteins (HSP) and *ESR*, and down-regulation of interleukin-1β expression. Similarly, human adenocarcinoma cell line (Ishikawa) **Sub**jected to the same 12-hour HS resulted in changes to HSP. In conclusion, further studies are necessary to optimise the conditions for studying HS in physiologically relevant porcine cell models. Careful consideration of media choices after cell isolation is necessary to maintain the cells in a state representative of the *in vivo* environment.