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Presentation Abstracts

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Oral Presentation Abstracts

Systematic Review of Vaginal Lubricants Impact on Human Sperm Function

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Despite being labelled as sperm-safe or sperm-friendly, some vaginal lubricants have been shown to adversely affect sperm function, and therefore, potentially fertility. Additionally, many other vaginal lubricants are yet to be tested. Knowing the likely effect of a vaginal lubricant to sperm function is particularly important for couples trying to conceive, both naturally and via assisted conception. However, to date no official guidelines are present from the NHS or other relevant professional bodies in the UK. In an attempt clarify whether there is currently enough published literature to create such a guideline, we performed a systematic literature review in accordance with the PRISMA guidelines to assess the effects of lubricants that are available commercially on in-vivo and in-vitro sperm function.

PubMed and Scopus databases were searched with the following search criteria: (Title-Abstract-Keywords ("Lubricants" AND "sperm") AND Keywords ("sperm motility" OR "sperm function" OR "DNA integrity" OR "DNA fragmentation" OR "glycerine" OR "glycerol")). We excluded animal studies, non-English articles, not discussing lubricant use against sperm function, reviews, and commentaries.

The initial search yielded 50 articles from PubMed and Scopus. Following removal of duplicate articles and irrelevant articles to our study aim after abstract and full-text reading, 23 publications remained. 4 more studies were added as related articles and references, thus totalling 27 publications for lubricant data analysis. 49 unique lubricating compounds have been identified, 37 are currently available to purchase over the counter (OTC), 8 that were studied but are not OTC, and 4 are currently discontinued or unavailable. KY Jelly, Pre-Seed, and Astroglide have been the most studied lubricants, in-vitro, that are available OTC with 9, 8, and 4 publications, respectively. KY Jelly and Astroglide were commonly reported to exhibit detrimental effects to sperm motility and DNA integrity, whilst Pre-Seed was reported to have a no-to-positive impact on sperm motility.

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Comparison of Cost Per Ongoing Pregnancy/Live Birth for Surgical Sperm Retrieval Methods in Azoospermia: A Pilot Study in a Mid-Sized Fertility Clinic

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INTRODUCTION

Surgical sperm retrieval (SSR) in azoospermia can be performed through PESA, MESA or TESE depending on the type (obstructive or non-obstructive). MESA and TESE require general anaesthesia and longer surgical time but carry lower sperm retrieval rates than PESA. This study aimed to compare cost effectiveness of SSR procedures and assess the impact of male FSH levels on ICSI outcomes.

METHODS

Men with female partners <40 years old, attending a mid-sized fertility clinic for SSR between 2018-2021 were included (n=47). Anonymised data on SSR outcome, male FSH, ongoing pregnancy, and live births after first embryo transfer were collated.

Primary outcome was cost per ongoing pregnancy/live birth for each procedure. Secondary outcome was impact of male FSH on ongoing pregnancy/live births.

Cost effectiveness was calculated as cost per ongoing pregnancy/live birth (number of ongoing pregnancies/live births divided by cost of SSR (PESA=£2,225, MESA/TESE=£3,075)) plus cost of 1 cycle of ICSI (£6,700). Outcomes were compared using risk ratios (RR) and 95% confidence intervals (CI).

RESULTS

The ongoing pregnancy/live birth rate for PESA followed by ICSI (52%: 7 ongoing pregnancies and 7 live births amongst 27 cycles) was not significantly different from MESA/TESE followed by ICSI (40%: 3 ongoing pregnancies and 1 live birth amongst 10 cycles) (RR for combined ongoing pregnancy/live birth=1.25, 95%CI 0.66, 2.36).

The cost per ongoing pregnancy/live birth was lower with PESA (£17,480) than MESA/TESE (£28,913).

After a successful MESA/TESE, 38% (3/8) men with FSH under 12 achieved a live birth/ongoing pregnancy with subsequent ICSI, while none (0/2) of the men with FSH>12 achieved either (RR=1.6, 95%CI 0.94, 2.74).

CONCLUSION

Assuming a blanket cost for different SSR procedures may not be reflective of the true costs. Male FSH levels could also be a marker of successful pregnancy following ICSI. A further multi-centre analysis is underway to explore these results with greater power.

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The potential demand for Embryo Adoption: A pilot study

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Over the last decade, the number of high-quality embryos created and cryopreserved in IVF couples has increased significantly. When the storage period expires, patients are left to decide whether to discard or donate their embryos. The spike in embryo availability has prompted us to investigate the need for embryo adoption and the use of donated embryos as a treatment option for infertility in a population of patients undergoing or considering fertility treatment. Couples with failed reproductive treatments, or that are likely carriers of genetic disorders could benefit substantially from donated embryos. Given Scotland's long donor gamete waiting lists and the increasing number of surplus embryos, embryo adoption may also be a viable alternative for determining the fate of surplus embryos resulting from fertility treatments and the growing concern of donor gamete shortage. This initiative will also explore the attitudes of prospective patient demographics toward embryo adoption as infertility treatment.

It is a prospective single-center pilot study of patients (N=70) from Dundee's Ninewells ACU, currently on the long waiting list for donor gametes. The potential participants on this list represent a diverse demographic and are comparable to similar patient groups at other Scottish fertility centers. The data will be gathered through anonymised surveys, and quantitatively analysed between March and April 2022.

As of date, we are awaiting responses from participants to analyse their views and decision-making factors, which may include financial motivations, moral, ethical, or legal considerations, or a mix of these variables. The statistics will offer insight into the demand for surplus embryos as a treatment alternative. We hypothesize that the data analysis will enable us to offer embryo adoption as a fertility therapy option. Further, a similar study with other patient populations including single women, transgender individuals, likely carriers of genetic disorders, and same-sex couples, may be conceivable.

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A universal policy of extended embryo culture to day 5 regardless of patient prognosis does not compromise clinical outcomes

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With the advance of extended culture systems, clinical practice now promotes day 5 over day 3 embryo transfer. Our unit aimed to answer if an exclusive day 5 embryo transfer policy is detrimental to clinical outcomes. A retrospective, analytical, observational study of clinical outcomes for all fresh embryo transfers of standard in vitro fertilisation and intracytoplasmic sperm injection treatment cycles which were completed in our unit across a year was carried out. This cohort-study included 594 fresh embryo transfer procedures with a total of 95 and 602 embryos transferred on day 3 and day 5 respectively.

Live birth rates per number of embryos transferred were significantly higher in the day 5 population (36%) compared to the day 3 population (15%) ($p < 0.0001$). Miscarriage rates were lower, although not significant, in the day 5 population (31%) compared to the day 3 population (48%) ($p = 0.1095$). Double embryo transfer rates were equivocal between the two populations (17% for day 5, 19% for day 3) with reduced multiple birth rates observed in the day 5 population although not significant (2% versus 9%) ($p = 0.1234$). Our unit's success rate at culturing embryos to day 5 across this time period was 58.4%. Using this value and dataset, if extended culture was applied to the day 3 population, a predicted increase in the number of live births (12 to 19) with a simultaneous reduction in the number of transfers (55 from 95) was determined.

Despite initiating an intention to treat policy with embryo transfer exclusively on day 5, our unit continues to perform day 3 transfers for poorer prognosis patients. These findings would support a universal day 5 embryo transfer policy that would not be detrimental to clinical outcomes.

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It's all about ICSI ... or is it?

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Background: use of ICSI for non-male factor indications has increased over recent years but current evidence suggests ICSI has no advantage over IVF in patients without male factor infertility. ICSI also carries a greater risk to offspring and financial cost.

Aims & Objectives: to analyse trends in levels of ICSI use and indications for ICSI in the UK at national, regional and clinic level.

Materials & Methods: a retrospective analysis of all ART cycles reported in the UK between 2009 and 2019 was performed using data collected by the Human Fertilisation and Embryology Authority (HFEA). It includes all patients undergoing fertility treatment, but not solely for fertility preservation.

Key Findings: although total number of IVF cycles increased (+49.0%, $p < 0.001$), total number of ICSI cycles remained constant (-5.7%, $p = 0.121$). Mean percentage of cycles using ICSI decreased overall (-22.5%, $p < 0.001$), in England (-23.9%, $p < 0.001$) and Wales (-26.8%, $p < 0.001$) and in the majority (83.9%) of clinics but no significant change was seen in Scotland (-9.5%, $p = 0.514$) and Northern Ireland (-3.7%, $p = 0.971$). Percentage change in individual clinics ranged from -67.9% to +49.6%. Mean percentage of male factor treated with ICSI decreased (-24.4%, $p < 0.001$). Mean percentage of ICSI cycles performed for non-male factor increased overall (+44.1%, $p < 0.001$), in Scotland (+155.0%, $p < 0.001$) and England (+41.4%, $p < 0.001$) and in the majority (76.8%) of clinics but no significant change was seen in Wales (+8.4%, $p = 0.743$) and Northern Ireland (-17.3%, $p = 0.329$). Percentage change in individual clinics ranged from -58.2% to +229.0%.

Conclusions: use of ICSI for non-male factor infertility is increasing in the UK despite little change in overall levels of ICSI use. This goes against current guidelines and indicates a significant problem. Trends in ICSI use are not consistent across regions and substantial variation exists between clinics. Analysis is limited by discrepancies in terminology and cut-off semen parameters.

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Poster Presentation Abstracts

Cost-Effectiveness Comparison of intrauterine insemination (IUI) and in-vitro fertilisation (IVF) using donor sperm

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Background: Intrauterine insemination (IUI) with donor sperm is less expensive and less invasive than in-vitro fertilisation (IVF), and guidelines recommend six IUI cycles prior to IVF. However, this does not fully consider the patient's age, available cost-effectiveness data and the increasing costs of donor sperm.

Method: The Human Fertilisation and Embryology Authority (HFEA) database from 1991 till 2018 was used to source information on unstimulated IUI (uIUI), stimulated IUI (sIUI) and IVF cycles with donor sperm for women of different age groups (<35 years, 35-37 years, 38-39 years, 40-42 years, 43-44 years and >45 years). The primary outcomes were live birth rate (LBR) and cost per live birth (CLBR), and the subgroup analysis assessed the 1st, 2nd, 3rd, 4th, 5th and 6th (or more) cycles of IUI to assess variation in success and cost-effectiveness.

Result: Among women aged <35 years, the LBR for IVF was 33.6% (CLBR £20669). The LBR for the 1st uIUI was 15.8% (CLBR £13950), the 3rd uIUI was 13.2% (CLBR £16638), the 5th uIUI was 12.2% (CLBR £17967) and the 6th uIUI (or above) was 11.2% (CLBR £19570). In contrast, for women aged 38 to 39 years, the LBR for IVF was 23.0% (CLBR £30277). The LBR for the 1st uIUI was 9.5% (CLBR £23228), the 3rd uIUI was 8.7% (CLBR £25352), and the 6th uIUI (or above) was 7.2% (CLBR £30250).

Conclusion: For women aged <35 years uIUI remained cost favourable up to the 5th cycle and closely matched IVF for the 6th uIUI cycle. However, for women aged 38-39 years uIUI remained cost-favourable till the 3rd cycle as compared with IVF, but subsequently matched (or exceeded) the CLBR for IVF. Thus, this indicates a need to individualise the threshold for the number of IUI cycles according to age group before advising IVF.

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The GnRH-agonist trigger alone can be used for egg maturation in altruistic egg donors using long-acting reversible contraceptives without compromising the outcome.

Nathali Guimaraes Nobrega, Embryologist, TFP GCRM Fertility

Introduction:

GnRH-agonist triggers are recommended for altruistic egg donors to reduce the risk of ovarian hyperstimulation syndrome (OHSS). LARC removal before starting ovarian stimulation incurs inconvenience and unintended pregnancy.

Methods:

Electronic records of 56 altruistic egg donation cycles with a GnRH-agonist trigger between January 2017 and December 2021 performed at GCRM were retrospectively analysed. Of these, 38 were not on contraception or using non-hormonal contraceptive methods (Nil group), 5 were using oral contraception (Pill group), 9 had a copper or levonorgesterol intrauterine device in situ (IUCD group) and 4 had a LARC in situ (LARC group). The number of retrieved oocytes and their maturity were recorded. Results are presented as median and interquartile range (IQR).

Results:

The median age and AMH of the Nil group were 27.2 (IQR 25.4-29.3) years and 41.0 (IQR 33.0-65.3) pmol/L, for the IUCD group were 28.8 (IQR 24.8-29.3) years and 45.0 (IQR 38.0-54.0) pmol/L, and for the Pill group were 26.0 (IQR 24.0-27.2) years and 36.0 (31.0-40.0) pmol/L. Women in the LARC group were younger than in the nil group with a median age of 23.3 (IQR 22.6-23.6) ($p=0.016$), but with no significant difference in the AMH levels 32.6 (IQR 22.8-40.5) pmol/L.

There was no difference in the number of oocytes retrieved (Nil group = 18.5 (IQR 12-24); Pill group = 21 (IQR 21-23); IUCD group = 19 (IQR 18-20); LARC group = 23 (IQR 11-33)) or oocyte maturity rates (Nil group = 86%; Pill group = 83%; IUCD group = 89%; LARC group = 78%).

Conclusion:

Despite the small sample size, the finding that the GnRH-trigger alone can be deployed in women using LARCs without compromising egg numbers or maturity can give clinicians confidence to perform GnRH-agonist triggering for altruistic egg donors or others wishing to store eggs or embryos, thus maximising patient safety.

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Chemotherapy does not impair hormone production (AMH, inhibin B) in prepubertal human testicular tissue ex vivo.

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Background: The somatic cell populations of the testes are essential to support germ cell development. Chemotherapy can cause damage to germ cells in testes of boys undergoing chemotherapy. But it is still unclear whether such damage is also a consequence of loss or reduction of somatic cell functionality. This study aims to investigate the effect of chemotherapy drug cisplatin on Sertoli cell function in the prepubertal human testis.

Methods: Testicular biopsies were collected from prepubertal boys (n=3, age range 1-11y) prior to chemotherapy. Tissues were cultured in α MEM+10%KSR (Day1) and exposed to clinically relevant dose of cisplatin (0.5 μ g/ml) or vehicle control (Day2). On Day 3, testis fragments were moved into drug-free medium. Medium was collected daily (Day1-3) and hormone analysis was conducted by ELISA using Beckman Coulter Assays. Culture medium was first diluted 1:10 for Access-AMH assay, or 1:50 for INHIBIN-B-GEN-II-assay. Two-way ANOVA was performed using SPSS.

Results: There was no difference in the production of AMH between treatment groups on Day 1-3 (F-value:0.23, p-value:0.978) nor of inhibin B (F-value:0.03, p-value:0.971). Interestingly, in both treatment groups the production of AMH reduced over the three days (average AMH in pmol/ml= D1:677; D2:463; D3:418; Fvalue:1.506, p-value:0.268), while the production of inhibin B increased in both treatment groups (average inhibin B in pg/ml= D1:2050; D2:2033; D3:4833; Fvalue:2.206, p-value:0.153). However, these were not statistically significant.

Conclusions: Ex vivo exposure to chemotherapy drug cisplatin does not impair the function of the immature Sertoli cells after short-term culture of human prepubertal testis tissue, suggesting that germ cells are the primary off-target effect of chemotherapy. Maintenance of functional somatic niche supports feasibility of germ cell transplantation as a strategy for fertility restoration. Data here indicate potential changes over time in Sertoli cell functionality in cultured tissues; further research is required to understand somatic cell development ex vivo.

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Have online consent forms impacted the likelihood of patients consenting to training?

Dr. Morven Dean, Trainee Embryologist, NHS Tayside

It is essential that ART staff are appropriately trained to ensure competency to undertake clinical procedures to the highest standard of technical proficiency. This can only be achieved when gametes and embryos, surplus to treatment requirement, are available for training purposes with appropriate consent. There has been some concern that this availability has declined since the implementation of online consent forms.

The aim of this audit was to identify whether completion of consent forms online has reduced the likelihood that patients will consent to training with their gametes and embryos. Online and paper consent forms of 100 patients per format were evaluated in ACU Ninewells Hospital prior to and after the introduction of online consents. The consent to training with gametes and embryos within the relevant HFEA forms were recorded and compared, using a two-way ANOVA test.

When completing paper consents: 71% of female patients consented to training with their gametes, and 63% to training with their embryos; 70% of male patients consented to training with their gametes, and 64% with their embryos. When completing consents online: 57% of female patients consented to training with their gametes, and 49% to training with their embryos; 59% of male patients consented to training with their gametes, and 49% with their embryos. There was a significant decrease in the number of patients consenting to training following conversion to online consent completion.

These preliminary findings create concern over the understanding of online consents, and whether patients are making informed decisions when completing these forms. Reduced consent for training purposes has significant consequences for the development of staff training and skills. Improved patient awareness is critical to prevent further decline in availability of gametes and embryos for training. Finally, it would be of interest to establish whether these results are consistent across all Scottish clinics.

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Accuracy of Patient Information on Endometrial Scratching in the UK

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Introduction: Endometrial scratching (ES) is a simple outpatient procedure; the scientific explanation and the clinical effectiveness of ES are inconclusive. In the UK, ES is rated 'Amber' by the Human Fertilisation and Embryology Authority (HFEA) traffic lights system which indicates this procedure is not recommended routinely because of a lack of sufficient evidence. According to HFEA report, more than half of the total centres (66%) were offering ES and the average cost was £264 in 2019.

Method: In an observational study, the request for information about ES was sent to UK fertility centres. Theme-based content analysis and quality analysis with an assessment table were used to assess 26 centres' patient information leaflets (PILs). The table was created based on HFEA guidance and recent high-quality studies. The cost analysis was performed at stand-alone price of 27 centres.

Results: For content analysis, 19 (73.7%) centres explained the suggested scientific explanation, and 24 (92.3%) mentioned the effectiveness of procedure. Moreover, 19 (73.7%) centres identified specific indications and 22 centres stated the safety and possible complications following ES. The centres were divided following categories by the quality of PILs through the assessment table: 0 (0%) excellent, 4 (15%) good, 15 (57.6%) fair, and 7 (26.9%) poor. To compare between NHS and private centres, the mean scores of assessment table were 4.3 and 3.4 respectively from 10, and no significant difference was found ($p=0.27$). The cost was ranged between £100 to £350, and the average cost was £227. When the charges in NHS and private were compared there was no significant difference ($p=0.17$).

Conclusion: The centres which offer ES do not provide accurate patient information on this procedure which is required by HFEA guidelines. Therefore, HFEA should apply more regulations on the use, cost, and information of ES in clinical practice.

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Fertility services in Germany and the impact of COVID-19

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Introduction: The COVID pandemic resulted in temporary cessation of IVF activity in the developed world, including Germany. The aim of the study was to estimate the effect of this short-term interruption on IVF activity and births, and longer-term trends in the German IVF sector.

Methods: Annual natality data and the German IVF Registry data for 2008-2019 encompassing 1,085,683 treatment cycles and 153,141 ART live births was used to predict future population level data for 2020 to 2024. For 2020, predicted cycle activity and nationally reported outcome data were compared to assess the effect of the pandemic.

Results: In 2020 despite temporary regulatory closure of IVF units for 21 days, 116,306 treatment cycles were undertaken (an increase of 4,519 treatment cycles compared to predicted, equivalent to 4.0% more cycles 95%CI -0.5%; 9.1%), and a 3-fold increase in annual growth during 2020 over the preceding 5 years. 2,332 more frozen cycles were undertaken in 2020 than predicted (5.16% more, 95%CI -1.67%; 12.9%), while 2,674 fewer stimulation cycles were commenced, and 1,274 more stimulation cycles were cancelled. The observed clinical pregnancy rate per embryo transfer in fresh (31.6%) and frozen cycles (29.2%) for 2020 showed no significant change compared to the prediction of 33.1% (95%CI 31.5%; 34.8%) and 31.1% (95%CI 29.0%; 33.3%) respectively. Collectively these changes in activity led to 1,241 fewer pregnancies (-4.6%, 95%CI -10.0%; 1.4%) than expected. By 2024 it is anticipated that Germany will undertake 13,515 (95%CI 188; 26,843) more treatment cycles than 2020, resulting in approximately 3,192 more children with an overall similar contribution of ART children to the German population (2020 2.8%, 2024 3.0%).

Conclusion: The temporary cessation of IVF activity in Germany had a limited impact on the number of pregnancies, due to an upsurge in demand, increased uptake of frozen embryo transfers and maintenance of pregnancy rates.

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Trend in Embryo Disposition at University Based Fertility Centre from 2014 to 2020

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Introduction,

Surplus cryopreserved embryos that are stored during the process of assisted reproduction are not always reclaimed by the patients. On the other hand, safe keeping of these unused and unclaimed embryos raises challenges for IVF programs and facilities worldwide. Options for unused embryos include donating them to another patient or couple for reproduction, discarding them, or donating them for research.

As good quality embryo disposition is encountered frequently and there is minimal information available, the aim was to identify the trend in embryo disposition in a tertiary care centre.

Methods,

This was carried out as a retrospective study in assisted conception unit Ninewells Hospital Dundee using the data from 2014 to 2020. Total number of embryo disposition during the period and their stage of development were analysed. An Infertility database for embryology and andrology (IDEAS) was used for data collection and analysis.

Results,

Total number of embryos discarded from 2014 to 2020 is 1172: of that 33% Day 1 embryos (n=393), 38% Day 2 embryos (n=452), 11% Day 3 embryos (n=129), 13% Day 5 embryos (n=157). Day 5 embryo disposal in 2014 is 0.4% (n=8), in 2019 33% (n=63) showing a linear rise in good quality embryo disposal over the time. As 2-year storage extension was offered in 2020 due to covid situation there was reduction in day 5 embryo disposition (13% N=23)

Conclusions

Discarding the embryos has been the most popular option among the couple who choose to no longer cryopreserve their embryos. The trend of disposition of good quality embryos has gradually increases over the time. Exploring the possibility of utilization of unused embryos for research and donation to other couples need to be further discussed with the patient to maximise their utility.

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Ethnic discordance in serum anti-Müllerian hormone in European healthy control, Indian healthy control and Indian infertile women: a population study from India and Europe

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Introduction: The age of natural menopause has significant implications for a woman's reproductive lifespan as well as her long-term health. Here in this study, we want to examine the cross-sectional association between Indian race/ethnicity and AMH.

Methods: Cross-sectional analysis of three prospectively recruited cohorts (n=2,758); healthy European women (n=758), healthy community cohort from Kolhapur, India (n=400) and infertility cohort from Kolhapur, India (n=1600). AMH was determined by Elecys® AMH plus. Ethnicity, age and cause of infertility were modelled using additive quantile regression models.

Results: Healthy Indian women had lower AMH than their healthy European counterparts (population estimates 20.0% lower (95% CI, 7.2-36.5)), with increasing discordance with increasing age; at 25 years AMH was 11.9% (95% CI, 9.4-14.1) lower, increasing to 40.0% (95% CI, 0-64.6) lower by age 45. Comparison of healthy and infertile Indian women revealed differences that were related to cause of infertility. Women whose male partner had severe oligoasthenoteratozoospermia (n=95) had similar AMH to controls, women with PCOS (n=220) had higher AMH, especially in those <30 years and women with a principal diagnosis of unexplained infertility (n=757) AMH was lower (median difference 22.6% lower 95% CI 9.1-37.7) than controls.

Conclusions: AMH is substantially lower in healthy Indian women at all ages than their European counterparts. Infertile Indian women have variable differences in AMH from their healthy Indian controls, with the extent and direction of differences primarily reflecting the underlying cause of infertility. Recognition of ethnic and cause specific differences are critical to ensure accurate contextualising of results and clinical outcomes for patients.

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Assisted Oocyte Activation: a clinical service evaluation of treatment for couples suffering fertilisation failure

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The Assisted Oocyte Activation add-on combined with ICSI treatment (ICSI-AOA) is the only treatment for Oocyte Activation Failure (OAF) which does not involve repeating conventional ICSI, or utilising donor gametes. It is a powerful strategy proven to overcome low or total fertilisation failure (Bonte et al. 2019).

The resulting calcium response from ICSI-AOA treatment is noticeably different from the traditional oscillatory pattern observed during conventional ICSI. While exposure to artificial agents during treatment is limited, concern has been raised regarding potential adverse effects in resulting children. This, in addition to the lack of large, randomised control trials demonstrating its effectiveness, has limited the HFEA traffic light guidance for ICSI-AOA to an amber recommendation (HFEA, 2020).

ICSI-AOA can be performed through various stimulation techniques (Attia et al. 2022). This study assesses provision of AOA with calcium ionophore for patients suffering previous low or total fertilisation failure at the Ninewells Assisted Conception Unit, Dundee. Patients with fertilisation rates below 30% in conventional cycles were offered an ICSI-AOA treatment cycle. After injection during ICSI, oocytes were incubated in a ready-made media containing Ca²⁺ ionophore A23187, prior to washing and incubation as standard.

ICSI-AOA treatment resulted in a significant increase in mean fertilisation rate compared to couples' conventional index cycles (8.3% to 57.9%, $p < 0.0001$). Additionally, increased numbers of embryos were available for transfer on day 3 or 5 (0.45 to 1.0 embryos per cycle), and for cryostorage (0.0 to 0.75 embryos per cycle). ICSI-AOA resulted in decreased cycles cancellations due to total fertilisation failure (24/41 cycles 58.5%, vs 2/53 cycles 3.8%). The present study observed that following ICSI-AOA, a tenfold increase in live birth rate compared to index cycles was found (2.4% vs 24.5%). Together, these data demonstrate the power of ICSI-AOA treatment in cases of OAF.

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Poor Ovarian Responders: a clinical service evaluation

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Study question: Is GnRH antagonist regimen more effective than short GnRH agonist (flare) regimen for achieving higher live birth rate and cumulative live birth rate in poor responder patients?

Summary answer: GnRH antagonist protocol appears to be a more effective stimulation regimen for improving final clinical outcomes of poor responders.

What is known already: Among female patients who undergo IVF treatment, 10-24% of these patients respond poorly to controlled ovarian hyperstimulation, poor ovarian response continues to be a significant challenge in clinical practice and represents a source of extreme psychological distress and economic burden for couples undergoing IVF/ICSI cycles. In attempts to optimize the reproductive outcomes of this group several strategies have been suggested. Among the proposed strategies, antagonist and flare protocols are the most widely used treatment regimens to induce multi-follicular growth in poor responders. Research were conducted with an aim to determine which treatment strategy is superior to the other, however, results from existing literature are inconsistent and uncertainty remains in deciding the ideal stimulation regimen for poor responder patients.

Study design: A single-center, retrospective cohort analysis of antagonist versus flare protocol cycles that took place between (January 2015 - October 2020) in Ninewells Assisted Conception Unit.

Materials and Methods: This study included 146 poor responder female patients selected using the Bologna criteria. Patients undergone ovarian stimulation either with antagonist (n= 92), or flare protocol (n= 54). Live birth and cumulative live birth rates within 12 months of index cycle were taken as the primary outcome measures. The secondary outcome measures were the number of retrieved oocytes, number of normally fertilized oocytes (2PN), number of transferred and cryopreserved embryos, fertilization rate and clinical pregnancy rate.

Main results: In comparison to the flare group, the antagonist group had a significantly greater number of retrieved oocytes (4.6 3.4 vs 3.5 + 2.0) and cryopreserved embryos (0 [0—1] vs 0 [0—0]). Both antagonist and flare stimulation protocols had corresponding efficacy with in terms of fertilization and clinical pregnancy rates. Likewise, comparable live birth rate per embryo transfer for fresh cycles (25.7% vs 19.5%) and for frozen cycles (22.2% vs 0%), and cumulative live birth rate per embryo transfer (25.3% vs 17.8%) were found between the antagonist and flare treatment regimens.

Limitations of the study: The retrospective non-randomized nature of the study.

Wider implications of the findings: The findings from this study suggest that the antagonist regimen appears to be superior to the flare protocol with regard to number of eggs collected and embryos cryopreserved, and possibly better potential for achieving higher live birth and cumulative live birth rates. Therefore, in clinical practice it is more advantageous to use the antagonist regimen for controlled ovarian hyperstimulation in case of poorly responding patients. Furthermore, this study showed higher live birth rates in comparison to previous studies which imply that IVF/ICSI programmes can be the first management modality of such patients before resorting to alternative options such as oocyte donation, or adoption. There is a need for further Bologna-criteria based future studies to substantiate the results obtained from the current study.

Keywords: Antagonist protocol, flare protocol, poor ovarian responder, low ovarian reserve, Bologna criteria, IVF, live birth rate, cumulative live birth rate.

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