

Conference Bulletin

Midwest Reproductive Symposium International (MRSi) Abstracts - 2023

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North American Proceedings in Gynecology & Obstetrics

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The Midwest Reproductive Symposium International held its annual international meeting in Chicago June 7th – 11th, 2023. NAPGO was there to participate with, and learn from, world leaders in reproductive medicine. Strong themes of artificial intelligence, equal access to care, and increasing the number of fertility providers to meet surging demand permeated this exciting international conference.

1) HYPOGONADOTROPIC HYPOGONADISM IS ASSOCIATED WITH A LOWER INCIDENCE OF OVARIAN CANCER

Authors: Sarah Hmaidan DO, Michelle Roach MD, Donna Session MD

Institution: Vanderbilt University, Boston IVF

Objective: Persistent high levels of gonadotropins have been associated with an increased risk of ovarian cancer, which is supported by reduced risks with combined oral contraceptives and pregnancies; based on this theory, we hypothesized that individuals with hypogonadotropic hypogonadism (HH) have a lower incidence of ovarian cancer.

Design: Retrospective case-cohort study.

Materials and Methods: This was a retrospective case-cohort study performed in an academic tertiary care facility. The synthetic derivative, a de-identified patient database, was utilized to query female patients from 2002 to 2022. The HH group included the diagnoses of panhypopituitarism, Kallmann Syndrome, necrosis of the pituitary gland, and Sheehan Syndrome (n = 2636). The control group included patients without the diagnosis of HH (n = 756,963). Both groups were queried for diagnosis of ovarian cancer.

Results: No cancers were identified in the HH group, compared to 1400 in the control group. Fisher exact analysis demonstrated a p-value 0.0187 (p-value <.05) for individuals in all age groups.

Conclusions: It's now widely accepted that most cases of ovarian cancer arise in the fallopian tubes. In addition, gonadotropin receptors are present in the fallopian tube and FSH increases the expression of a tumorigenesis associated gene in the fimbria epithelium. This evidence suggests that lower levels of gonadotropins may reduce the risk of ovarian cancer. Therefore, strategies to reduce gonadotropins such as gonadotropin releasing hormone analogs may be protective, particularly for those at greatest risk for ovarian cancers such as those with hereditary cancer genes.

2) ASSOCIATION OF EMBRYO GRADE WITH OBSTETRIC OUTCOMES IN FRESH AND FROZEN SINGLE EMBRYO TRANSFERS

Authors: Ariene Go MD

Institution: UT Health San Antonio

Objective: To identify any association between inner cell mass (ICM) and/or trophoctoderm (TE) morphologic grade and obstetric outcomes such as gestational age at delivery, birthweight, neonatal complications and presence of pregnancy induced hypertensive disorders (PIH).

Design: Retrospective chart review at a university-based fertility clinic

Materials and Methods: Both SART CORS database and electronic medical record were queried for single fresh and frozen blastocyst transfers resulting in live birth between 2011 and 2021. The Gardner- Schoolcraft morphologic grade of ICM and TE for each transferred blastocyst were noted, as well as gestational age at delivery, birthweight, neonatal intensive care unit (NICU) admission, neonatal defects and presence of PIH. Continuous data was analyzed with unpaired T-test and categorical data was assessed with Fisher's Exact. A p-value of <0.05 was considered significant.

Results: A total of 123 embryo transfers met inclusion criteria, 49 fresh and 74 frozen. The average patient age was 33.4 years and average body mass index was 26.8. There was a higher rate of PIH among embryo transfers with TE grade B/C (25%) as compared to TE grade A (18%), however this did not reach statistical significance. There was no association between embryo grades and birth weight overall, however in a subgroup analysis of fresh embryo transfers, an ICM of B/C was associated with a lower birth weight than the A grade cohort (2111g vs 3142g, p = 0.04). This difference was not consistent in the frozen embryo transfer group. There were no significant differences between ICM or TE grades in regard to gestational age at delivery, neonatal defects or NICU stay, although the association between

B/C TE grade and NICU stay did approach significance ($p = 0.06$).

Conclusions: This study confirms prior findings that ICM grade is positively associated with birth weight in fresh embryo transfers. Lower TE grade seemed to carry an increased risk for PIH and NICU stay, which may be clinically significant however did not reach statistical significance. Embryo grade was not associated with gestational age at delivery or neonatal defects. Overall, attention to ICM and TE grades as separate entities may help guide embryo selection when considering adverse obstetrical outcomes and the route of transfer, fresh or frozen.

3) ASSESSING INFERTILITY LITERACY AND KNOWLEDGE GAPS AMONG PATIENTS WITH CYSTIC FIBROSIS

Authors: Farah Rahman MPH, Katherine Campbell MD, Nicholas Debeel MD, Armin Ghomeshi MD, Mohammed Zarli MD, Ranjith Ramasamy MD

Institution: University of Miami, Wake Forest University, Florida International University, Nova Southeastern University

Background: Fertility concerns are rising within the cystic fibrosis (CF) community. We hypothesized that patients are unaware of how CF impacts their reproductive potential and the role of assisted reproductive technology in helping them conceive.

Objective: Employ a cross-sectional survey to understand experiences, preferences, and current concerns in the CF community around infertility education and healthcare access.

Materials and Methods: We distributed a voluntary and anonymous Qualtrics survey to CF patients and CF advocacy organizations to assess patient understanding of infertility within CF. The survey consisted of 21 questions and aimed to capture demographics, reproductive education specific to CF, preferences on infertility education, and current conception practices. The Likert scale was used to assess preference questions, and free-text responses were provided to understand personal experiences.

Results: Forty-one respondents completed the survey (median age of 36 ± 14 years). The median age for learning about CF-associated infertility was 18 years. Respondents preferred topics about reproduction and infertility to be discussed either younger than 18 years (43%) or between 18-24 years (50%). Over three-fourths of responders (77%) regarded the inclusion of reproductive health within their treatment plan as 'extremely' or 'very' important. Of the respondents trying to conceive, the majority (69%) have yet to be offered a semen analysis.

Conclusion: These findings highlight a strong need to strengthen the communication between CF care teams and fertility specialists. Both men and women with CF would benefit from receiving respective guidance from embryologists and andrologists to maximize their chances of conception.

4) WHOLE EXOME SEQUENCING IDENTIFIES RARE CFTR MUTATION IN BROTHERS WITH CONGENITAL MALFORMATIONS OF THE VAS DEFERENS

Authors: Jason Codrington BA, Katherine Campbell MD, Alexandra Dullea MD, Kajal Khodamoradi MD, Ranjith Ramasamy MD

Institution: Desai Sethi Urology Institute

Objective: Congenital bilateral absence of the vas deferens (CBAVD) and congenital unilateral absence of the vas deferens (CUAVD) are two congenital malformations of the male reproductive tract. These phenotypes have been associated with CFTR variants; the pathognomonic mutation responsible for cystic fibrosis. In this study, we aimed to identify genetic mutations in two siblings with congenital anomalies of the vas deferens.

Design: Two brothers, identified on physical exam to have CBAVD and CUAVD, respectively, underwent whole exome sequencing of their peripheral blood.

Materials and Methods: One man was identified to have CBAVD on infertility evaluation and on clinical history, it was found that his brother had CUAVD. DNA was extracted from the blood of the two men and then whole exome sequencing (WES) was performed. Potentially pathogenic variants shared between the brothers were filtered based on clinical interest. Immunohistochemistry (IHC) of testis biopsy and vas deferens, for the CBAVD and CUAVD patient, respectively, was performed to investigate variation in protein expression.

Results: Both brothers (CBAVD phenotype and CUAVD phenotype) were found to have the rare CFTR mutation p.r347h. IHC with a CFTR antibody showed differential expression of the protein in the two tissue types which was confirmed on quantification.

Conclusions: A rare missense mutation in a single nucleotide of the CFTR gene was detected in two brothers who exhibited distinct phenotypes. Our findings emphasize the clinical significance of whole-exome sequencing (WES) in identifying genetic mutations in complex and diverse genetic disorders. The potential of CFTR mutations to cause a debilitating disease and the significant emotional and financial challenges associated with infertility highlight the importance of understanding carrier status and relevant genetic mutations for individuals seeking fertility treatment.

Support: Supported by NIH R01 DK130991 to Ranjith Ramasamy

5) IMPACT OF OPERATING ROOM SETTING ON IN VITRO FERTILIZATION OUTCOMES IN PATIENTS WITH CLASS 3 OBESITY

Authors: Emily Spurlin MD, Rachel Paul MPH, Kelsey L. Anderson MD, Emily S. Jungheim MD, MSCI, Patricia T. Jimenez MD, Tessa Madden MD MPH

Institution: Washington University in St. Louis, Northwestern University, Yale University

Objective: Challenges exist in providing safe, quality care

for women with obesity undergoing in vitro fertilization (IVF). For women over a certain body mass index (BMI), select clinics have policies requiring oocyte retrievals be performed at an off-site hospital operating room with access to higher level anesthesia care given safety concerns. This study aims to assess IVF cycle outcomes between retrievals performed in a hospital operating room (Hospital OR) compared to an ambulatory site (Amb-OR) adjacent to the lab for patients with class 3 obesity (BMI > 40) at a single academic center.

Design: Retrospective cohort study

Materials and Methods: At our center, patients with a BMI of ≥ 45 must have their retrievals performed in the Hosp-OR per anesthesia guidelines. Follicular fluid from Hosp-OR procedures is transferred 0.5 miles via a small handheld portable warmer to the embryology lab. From January 2018 to August 2022, there were 207 cycles involving patients with BMI > 40, 33 of which were performed in Hosp-OR setting. Cycle characteristics and outcomes were compared between retrieval sites. Descriptive and comparative statistics were performed using SPSS v.28.

Results: The median BMI was 42.7 for Amb-OR compared to 48.4 for Hosp-OR ($p < 0.001$). Cycles performed at Hosp-OR required higher total doses of gonadotropins ($p = 0.04$) and required longer stimulation ($p = 0.02$). The peak estradiol (E2), total mature (MII) oocytes, and zygotes obtained were similar between groups. The expected MII oocyte yield did not differ between groups (Amb-OR 96% yield, Hosp-OR 83% yield, $p = 0.14$). Both groups had similar oocyte competence given similar fertilization rate (71% vs 75%; $p = 0.84$) and number of high quality blastocyst development (2 vs 1; $p = 0.77$). Similar clinical pregnancy rates per retrieval were noted.

Conclusions: Despite obtaining oocytes off-site in the Hosp-OR group, cycle outcomes and clinical pregnancies were similar between the Hosp-OR and Amb-OR groups. Given BMI thresholds are increasingly common, the use of a low-cost portable warmer system can increase access for patients where anesthesia concerns preclude Amb-OR retrievals and Hosp-OR retrieval is possible.

6) QUALITY OF LIFE IN PATIENTS WITH POLYCYSTIC OVARIAN SYNDROME IS RARELY PREDICTED BY TYPE OF CONTRACEPTION USED

Authors: Emily Spurlin MD, Rachel Paul MPH, Kelsey L. Anderson MD, Emily S. Jungheim MD, MSCI, Patricia T. Jimenez MD, Tessa Madden MD MPH

Institution: Washington University in St. Louis, Northwestern University, Yale University

Objective: To compare self-reported quality of life in individuals with polycystic ovarian syndrome (PCOS) by type of contraception used (combined hormonal, progestin only, and non-polycystic ovarian hormonal or no contraception).

Design: Cross-sectional survey study

Materials and Methods: We administered a survey to individuals with PCOS recruited from a dedicated PCOS clinic

and community advertisements. Individuals provided brief demographic characteristics, a contraceptive history, and completed the Polycystic Ovary Syndrome Health-Related Quality of Life Questionnaire (PCOSQ), a validated, 26-item measure that assesses five domains: body hair, emotions, weight, infertility, and menstrual problems. Total scores and domain scores range from 1 (poorest function) to 7 (optimal function). We compared PCOSQ scores between patients using combined hormonal contraception, progestin-only contraception, and no hormonal contraception using Kruskal-Wallis test.

Results: Sixty-one respondents completed the survey; the median age of the sample was 28 years (IQR: 24-31). At the time of the survey, 55.7% were using non-hormonal contraception or no contraception, 29.5% were using combined hormonal contraception (CHC), and 14.8% were using progestin-only contraception. The median PCOSQ total score was 3.5 (IQR 2.5-4.6). PCOSQ total and domain scores varied widely within, and between contraceptive groups. Individuals using progestin-only contraception reported significantly higher function in the menstrual problem domain compared to those using CHC or no method ($p = 0.03$). There were no significant differences in the total score or other domains.

Conclusions: In this small sample, individuals with PCOS using progestin-only contraception reported better quality of life with regards to menstrual problems compared to those using a CHC or those not using contraception or using a non-hormonal method. Overall, median scores were low; more than half were less than 3.5, the midpoint of the PCOSQ scale. This study highlights the heterogeneity of quality of life in individuals with PCOS and underscores a need for further research to identify optimal treatment strategies to improve health-related quality of life in this population.

7) TREATING BASED ON B-CELL LYMPHOMA 6 (BCL6) TESTING IN IN-VITRO FERTILIZATION (IVF) PATIENTS WITH RECURRENT PREGNANCY LOSS (RPL) OR RECURRENT IMPLANTATION FAILURE (RIF) MAY NOT AFFECT OUTCOMES.

Authors: Arti Taggar MD, MPH, M. Sanders MD, C. Benadiva MD

Institution: University of Connecticut

Objective: We aim to characterize a practice's experience testing BCL6 in patients with RPL/RIF. **DESIGN:** Retrospective chart review.

Materials and Methods: Results using standard immunohistochemical staining for BCL6 on endometrial biopsies from 10/ 2019- 3/2023 were obtained. RPL was defined as ≥ 2 prior pregnancy losses and RIF as ≥ 2 prior failed blastocyst embryo transfers (ET). For the IVF patients with a positive BCL6 result (HSCORE ≥ 1.4), post-biopsy interventions based on the positive result were then compared to positive patients who did not receive treatment for their BCL6 positive result. Outcomes for the ET cycle immediately after

that biopsy/intervention were analyzed. Descriptive statistics with independent t-tests for continuous data, and chi squared or Fischer's exact tests for categorical data were used. A two-sided p-value of <0.05 was considered statistically significant.

Results: 33/80 endometrial biopsy results from patients with RPL/RIF were positive for BCL6. Their baseline characteristics, interventions, and ET outcomes were similar with no statistically significant differences between the groups.

Conclusions: There were no differences between the baseline characteristics or outcomes for RPL/RIF patients who had positive BCL6 testing, regardless of treatment. Though this data is limited by its sample size, newer basic science single cell data also supports that clinicians should be cautious in using single marker testing for diagnosing and treating endometriosis in patients without strong additional therapeutic evidence.

8) INSTRUCTIONAL VIDEO AS PHYSICIAN EXTENDER: THE USE OF VIDEO LEARNING ENHANCES PATIENT EDUCATION AND SATISFACTION PRIOR TO IN VITRO FERTILIZATION

Authors: Bailey McGuinness MD, Emma Gargus MD, PhD, Sabrina Rangi MD, Elliott Richards MD, PhD

Institution: Cleveland Clinic Foundation

Objective: To assess the benefits of adding a patient education video after consultation with an in vitro fertilization (IVF) provider.

Materials and Methods: This was a quality improvement project at a single academic center. Seven fertility physicians contributed to a 47-minute-long patient education video compiled using common teleconferencing software that reinforced necessary logistical and medical aspects of the IVF process at the institution. A survey was administered following IVF consultation that included 8 knowledge questions and 2 Likert items about comfort and knowledge about the IVF process. Patients then watched the 47-minute video and completed a post-video survey, which included the same 10 questions from the pre-video survey plus 3 Likert items rating the video's usefulness and the likelihood that patients would recommend the video for future use. Descriptive statistics and a one sample t-test for survey score change were performed. A p-value < 0.05 was deemed significant.

Results: 70 patients were invited to watch the video and complete the pre- and post-video surveys, with a 62.8% (n=44) response rate. Of the eight knowledge-based questions, 33, 10, and 1 of respondents scored higher, the same, and lower on the post-video survey respectively. There was a median improvement of 2.0 ± 2.0 correct knowledge-based questions per participant ($p < 0.0001$). In addition, 63% and 28% of patients perceived an improvement in their knowledge and comfort about the IVF process respectively. No patients reported the video as not useful. Despite the long run-time and simplistic mode of video capture, none of the patients said they would be unlikely to recommend

the video to other patients.

Conclusions: Patient education videos can be used to improve patients' knowledge about and comfort with the IVF process. Given the complexity of the IVF process, patients are likely to respond favorably to the addition of video educational materials following consultation with their fertility provider.

9) CHATGPT AS A PATIENT EDUCATOR? ASSESSING THE READABILITY AND ACCURACY OF PATIENT EDUCATION MATERIALS BY GENERATIVE ARTIFICIAL INTELLIGENCE IN 2023

Authors: Kim Hanna MD, Elliott G. Richards MD PhD

Institution: Cleveland Clinic Foundation

Objective: To assess readability and accuracy of generated patient education material using OpenAI's GPT-4 large language model as compared to similar material published by a professional society.

Design: Descriptive survey

Material and Methods: Three topics ("bioidentical hormone replacement therapy", "premature ovarian insufficiency," and "testosterone use and male infertility") were chosen from a professional society's publicly available educational material website. GPT-4 was used to generate patient education material using a prompt that requested a sixth grade reading level with the same title and section subheadings as the existing materials. Six independent physicians compared the GPT-4 generated material to the original educational materials using a standardized form to provide subjective feedback on suitability and to calculate the number of missing, false, and additional facts in each subsection. Intraclass correlation coefficient was calculated, and student's t-test was used with a p value of 0.005 as statistically significant. Readability scores were evaluated using Flesch Kincaid grade level, Gunning Fog score, SMOG index, Coleman Liau index, and Automated Readability index.

Results: GPT-4 generated materials were superior to existing published materials in their accessibility: for each of the three prompts, average reading levels for published materials were 11.76, 12.14, and 13.92; for GPT-4, average reading levels were 7.56, 7.14, and 9.22 (p-values: 0.00018, 0.00054, and 0.0057). All reviewers rated overall accuracy score of GPT-4 materials to be 3.5 or 4 (out of 5) and subjective readability to be 4.5 or 5 (out of 5). Only one section of one topic ("bioidentical hormone replacement therapy") generated by GPT-4 had a consensus by the reviewers to contain one or more false facts. The majority of reviewers remarked that they were likely to use one or more of the GPT-4 materials with patients in the future.

Conclusions: Current language models in the field of generative artificial intelligence have the ability to create patient education materials de novo that, while providing overall accurate information, are able to tailor content to specific reading levels of patients and in a manner that may be satisfactory to most physicians.

10) THE EFFECT OF PATERNAL AGE ON FERTILIZATION RATES AND BLASTOCYST FORMATION USING DONOR EGGS IN OOCYTE THAW CYCLES

Authors: Katerina Poulos BSc, Tyler Soy MS, Katerina Portokalis, Roohi Jeelani MD, Angie Beltsos MD

Institution: Kindbody, Chicago, IL USA

Objective: To determine the correlation between paternal age and egg fertilization rates and blastocyst formation rate in frozen donor oocyte thaw.

Design: A retrospective chart review was conducted on patients who underwent an oocyte thaw with donor eggs at a private, multi-site fertility center.

Materials and Methods: Patients who underwent an oocyte thaw cycle using frozen donor eggs between 2018 and 2023, were compared to determine fertility outcomes. These outcomes were defined as fertilization rates and blastocyst formation rates. Fertilization rates can be defined as the amount of eggs fertilized out of the amount of eggs inseminated. The blastocyst rate refers to the amount of embryos that developed to the blastocyst stage. Linear regression and t-tests were used to analyze the data and determine significance.

Results: There were 201 patients included in this study with an average male age of 43 years old. In this set, the average fertility rate was 75.96% and the average blastocyst rate was 43.69%. Given these results, there is no statistically significant correlation between paternal age and fertility outcomes and blastocyst rates. The significance was greater than 0.05 leading to no significant conclusion.

Conclusions: The data showed a potential correlation between paternal age and oocyte outcomes however, was lacking statistical significance. The results of this study suggest that paternal age may not be a limiting factor on IVF outcomes and when using frozen donor eggs. There are many factors that this could be due to, considering the egg donors are young and healthy is important. To further this study, isolating samples with DNA fragmentation and poor semen analysis' to see effects on egg donors would be beneficial. Further studies could also be conducted specifically focusing on paternal age and its effects on aneuploidy rates.

11) A CORRELATIVE STUDY ON ANEUPLOIDY RATES IN THE EMBRYOS OF *FMR1* CARRIERS

Authors: Zeljana Djukic, Christian M. Pareja

Institution: Reproductive Genetic Innovations

Objectives: The role of the *FMR1* gene (Fragile X) in the risk for neurological deficiencies through the pre-mutation and full mutation range has been well established through clinical studies (Greco et al., 2017; Tassone & Hagerman, 2012). A recent study has explored the role of the *FMR1* mutation in the manifestation of premature diminished ovarian reserve (Eslami et al, 2016). A study conducted in 2021 by Jaswa et al. reported a diminished rate of euploidy in embryos. This study identifies whether there is a differ-

ence in aneuploidy rates in embryos of *FMR1* carrier patients compared to the control population. Data analysis was derived from PGT-M (Preimplantation Genetic Testing for Monogenic Single Gene Defects) and PGT-A (Preimplantation Genetic Testing for Aneuploidy) outcomes from 63 *FMR1* patients.

Materials and Methods: The outcomes of PGT-A and PGT-M testing from 63 *FMR1* patients were recorded for the number of embryo biopsy samples detected to be aneuploid. The observed data were analyzed along with data from 2 control groups: PGT-A and PGT-M outcomes among patients tested for monogenic conditions and for X-Linked conditions excluding Fragile X. A One-Way Analysis of Variance (ANOVA) was utilized to compare the observed rate of aneuploidy in embryo biopsy samples among the three groups with $p < 0.05$

Results: Among each of the three sample populations (*FMR1*, Monogenic Conditions, X-Linked Conditions), PGT-A and PGT-M outcome data were analyzed from 63 patients from each group. The total number of embryos tested per group is as follows: *FMR1* = 126 embryos, Monogenic Conditions = 113 embryos, X-Linked Conditions = 110 embryos. The rate of aneuploidy among *FMR1* patients was observed at 47.1% while Monogenic condition patients had a rate of 48.4% and X-Linked Condition patients had a rate of 53.2%. The statistical analysis conducted through ANOVA found that there is no significant difference in aneuploidy rates among the 3 study groups ($p = 0.415$).

Conclusion: Our study compared the aneuploidy rates of *FMR1* patients to the rates of aneuploidy among patients testing for monogenic conditions and X-Linked Conditions. There is a body of literature that suggests aneuploidy rates are higher in individuals who are carriers of Fragile X. Our data set did not demonstrate this but we did have the limitation of a lower study population.

12) DONOR SCREENING: LEVEL OF SENSITIVITY IN KARYOTYPE WITH GTG BANDING VS PGT-A WITH NGS

Authors: Naveena R. Daram MD, Meghan Ozcan MD

Institution: Wright State University, Reproductive Endocrinology & Infertility

Objective: To describe a patient case that illustrates the differences in chromosomal error detection between karyotype with GTG banding versus PGT-A using Next Generation Sequencing.

Design: Case Report

Materials and Methods: Genetic analysis has long been used in reproductive endocrinology for patients with history or family history of genetic conditions, or those with past recurrent miscarriages. For initial screening, karyotyping with Giemsa banding (GTG) is often done. An advantage is that it can show large chromosomal abnormalities in a karyotype and is relatively cost-effective. However, it can miss more subtle genetic abnormalities as a GTG band is usually 5-10 x 10⁶ base pairs. During IVF cycles, embryos can be tested for aneuploidy with preimplantation genetic testing (PGT-A), usually with next-generation sequencing

(NGS). Commercially available platforms report a minimum sensitivity of 4×10^6 base pairs for detecting base-pair changes. We describe a case below of a patient with normal GTG karyotype who underwent IVF with PGT-A resulting in identical abnormalities in chromosome 8 identified in two separate embryos.

Results: This was a 37-year-old G1P0100 who desired IVF and PGT-A with donor sperm. She had a history of one prior termination at 29 weeks gestation due to multiple chromosomal abnormalities. Patient's previous karyotype with GTG banding was normal. As part of routine screening the donor also had a normal GTG karyotype. The patient underwent stimulation, oocyte retrieval and ICSI. PGT-A resulted in two embryos with identical deletion/duplication abnormalities in chromosome 8. Given previously normal karyotype for the patient and with PGT-A using NGS showing chromosome 8 abnormalities, single nucleotide polymorphism (SNP) array of chromosome 8 was recommended for the female which was revealed to be normal. The donor bank was contacted to recommend further testing, and it was noted that this donor already has multiple ongoing pregnancies. Previous investigations have reported a higher incidence of segmental aneuploidies from parent ally derived chromosomes. (1) PGT with SNP matching is now being performed to evaluate the genetic source of this chromosomal abnormality. Moreover, the patient is now undergoing another IVF cycle with an alternate donor.

Conclusions: Chromosomal screening tests offer different resolutions. It is important to note, however, that a normal GTG-karyotype may not eliminate a chance of genetic abnormality passed to the embryo. Particularly given the higher risk of paternal inheritance pattern for segmental aneuploidies, it may be time to consider moving to a more sensitive screening platform.

13) MELATONIN SUPPLEMENTATION MAY BE ASSOCIATED WITH REDUCED OOCYTES AT RETRIEVAL FOR PATIENTS UNDERGOING IN VITRO FERTILIZATION WITH PREIMPLANTATION GENETIC TESTING FOR ANEUPLOIDY

Authors: Tejeshwar Singh Bawa MD

Institution: University of Connecticut

Objective: Melatonin has become a popular supplement in Assisted Reproductive Technology cycles due to its potential to improve pregnancy outcomes. This study investigates the effects of melatonin supplementation on number of oocytes retrieved as well as maturation, fertilization, and blastulation rates in in vitro fertilization (IVF).

Design: A retrospective cohort study performed at a university-affiliated private practice included patients undergoing IVF with preimplantation genetic testing for aneuploidy (PGT-A) between January 2015 and March 2023.

Materials and Methods: 1,558 patients completed 2,371 IVF with PGT-A cycles. Exclusion criteria included cycles with non-autologous oocyte donation, thawing and fertilization of previously cryopreserved autologous oocytes,

and embryos batched for PGT-A. Electronic medical records were reviewed to include maternal age at cycle start; melatonin use; number of eggs retrieved; maturity, fertilization, blastulation rates; and embryo biopsy outcome. A sub-analysis was performed to assess euploid rate per oocyte retrieved and per embryo biopsied with patients age stratified: <35, 35-37, 38-40, 41-42, and >42 years. T tests were performed in Minitab v21 with $P < 0.05$ as significant.

Results: Melatonin was used in 73 cycles (3.1% of cycles). Patients taking melatonin had fewer eggs retrieved compared to those who did not take melatonin (12.70 vs. 14.48, $P = 0.028$). When stratified by age, this remained statistically significant only in the <35 year group. In the 41-42 age group, fertilization rate was higher for patients taking melatonin (0.896 vs. 0.690 $P = 0.025$) and blastulation rate was lower for patients taking melatonin vs those who did not (0.355 vs. 0.499 $P = 0.001$). Other age groups had no significant changes.

Conclusion: Overall, melatonin use was associated with few oocytes obtained at retrieval. Further research may elucidate the effects of melatonin on oocyte development, maturity, fertilization, and blastulation.

14) DEMOGRAPHIC AND PSYCHOSOCIAL FACTORS ASSOCIATED WITH SUICIDE MORTALITY AMONG CHILDBEARING-AGED WOMEN: A CASE-CONTROL STUDY

Authors: Katerina Furman BA, Leah M. Hecht PhD, Amy M. Loree PhD, Hsueh-Han Yeh PhD, Lyubov GavriloVA BS, Joslyn Westphal MPH

Institution: Henry Ford Health

Objective: The goal of this study was to examine demographic and psychosocial factors, including pregnancy, postpartum status and perinatal loss associated with suicide among a large, diverse sample of childbearing-aged women.

Design: This study used a case-control study design, with 290 childbearing-age women who died by suicide matched with 10 childbearing-age individuals who did not die by suicide.

Materials and Methods: The study sample was obtained from nine health care systems in the Mental Health Research Network. 290 childbearing-age women who died by suicide (cases) during 2000-2015 were matched with 10 childbearing-age individuals who did not die by suicide during the same time period. Conditional logistic regression was used to investigate the relationship between pregnancy/postpartum status and suicide death.

Results: Childbearing-age individuals who died by suicide were more likely to have mental health disorder diagnoses including substance use disorders (aOR=2.69, 95%CI: 1.69, 4.26), and more likely to have visited the emergency department in the year prior to index date (aOR=3.44, 95%CI: 2.50, 4.73). Childbearing-age individuals who were pregnant, gave birth, or experienced perinatal loss within a year before the index date had a lower risk of dying by suicide compared to women who had not experienced these events

(aOR=0.42, 95%CI: 0.23, 0.77). However, within this subsample, perinatal women who died by suicide had a higher rate of perinatal loss (40%, 6 out of 15) compared to perinatal women in the control group (7.7%, 21 out of 271).

Conclusion: While pregnancy and delivery may be protective against suicide, perinatal loss may be associated with higher suicide rate. Perinatal women with anxiety, depression, or a substance use disorder diagnosis, and those who visited the emergency department in the year prior, may be especially vulnerable to suicide and should be monitored and screened routinely. Future studies should examine associations between type of perinatal loss (e.g., early infant death, miscarriage, abortion, stillbirth) and suicide mortality.

Support: This research was supported by The National Institute on Mental Health (R01 MH-103539 and U19 MH-092201).

15) THE IMPACT OF TITLE X GAG RULES ON PATIENT'S KNOWLEDGE OF ABORTION ACCESS AND REGULATIONS

Authors: Parmida Novin MD, Rocco Rossi MD

Institution: University of Cincinnati

Objectives: Our goal was to assess patients seeking Title X services and their understanding of abortion access and regulations. Additionally, we aim to determine the role that Title X services play in providing education regarding abortion services and identify the impact that the Health and Human Services (HHS) Title X gag rules, now and in the future, would have on patients' ability to control this aspect of their reproductive health.

Methods: A questionnaire including patient demographics and multiple-choice questions regarding abortion was created and administered to women receiving Title X services in the Cincinnati Health Department. The portion of the survey that included multiple choice questions was analyzed for statistical significance using the Kruskal-Wallis Test, Wilcoxon Two-Sample Test, and Fisher's Exact Test. This study received IRB approval through the University of Cincinnati and the Cincinnati Health Department.

Results: This study demonstrates that women seeking Title X services in Ohio have limited knowledge regarding abortion access in Ohio regardless of race, ethnicity, marital status, prior obstetric history, education, or income level. When looking at overall knowledge regarding abortion, few women knew up to how many weeks they would be able to terminate a pregnancy either surgically or medically (7.6 and 8.4 % respectively) and did not know what a dilation and evacuation was (5.6%). Comparatively, more women knew where you could receive abortion services in southwest Ohio (57.6%). Less than 15% of women answered the questions regarding abortion correctly, aside from the question regarding normal pregnancy length which 65% of woman answered correctly.

Conclusions: This study stresses the importance of increasing education through the Title X program to woman across the nation regarding abortion. Abortion education and knowledge has become increasingly important con-

sidering the Supreme Court's *Dobbs* decision and the now ever-changing legal landscape throughout the United States.

16) OVARIAN STIMULATION WITH A LOW-DOSE CLOMIPHENE CITRATE ANTAGONIST (CA) PROTOCOL IS ASSOCIATED WITH HIGHER EMBRYO QUALITY THAN A HIGH-DOSE MICRODOSE FLARE (MF) PROTOCOL IN PREDICTED POOR RESPONDERS

Authors: Lauren Poston BS, Rebecca K Chung MD, Sung Tae Kim PhD, Rebecca Flyckt MD, Rachel Weirnerman MD

Institution: University Hospitals Cleveland Medical Center

Objective: To compare in-vitro fertilization (IVF) and pregnancy outcomes following fresh or frozen transfer derived from a low-dose CA protocol or a high-dose MF protocol in predicted poor responders.

Design: Retrospective chart review

Materials and Methods: IVF cycles utilizing either CA or MF protocol from 2017-2021 were reviewed. Both protocols are used in our institution for patients predicted to be poor responders based on AMH or previous poor response. CA protocol included clomiphene citrate (CC) 100mg for 5 days and follicle-stimulating hormone (FSH) 150 IU \pm human menopausal gonadotropin (HMG) 75 IU was initiated on day 4 of CC. MF utilized 20 units microdose leuprolide acetate and 200-450 IU FSH \pm HMG. Demographics, cycle characteristics, and outcomes were assessed with T-tests (or non-parametric equivalent) and chi squared test. Multiple regression models were performed. $P < 0.05$ was considered significant.

Results: 314 cycles were evaluated. MF patients (n=244) had higher AMH than CA patients (n=70), used a higher maximum dose of FSH (300 IU [231-375] vs 150 IU [150-206]) and had higher peak estradiol (E2) compared to CA patients ($p \leq 0.001$). Other characteristics were not significantly different. Although more mature oocytes were retrieved in MF cycles compared to CA cycles (6 [4-8] vs 3 [2-5], $p \leq 0.001$), the overall number of embryos utilized per retrieval and number of high quality embryos did not differ between groups. The CA protocol was associated with higher embryo utilization per mature oocyte (CA: 69.3% vs MF: 51.4%, $p \leq 0.001$) and a higher percentage of embryos that were high quality (CA: 33.8% vs. MF: 22.9%, $p \leq 0.001$). Multiple regression models confirmed the IVF outcomes were independent of age, race, AMH, and BMI. For all transfers, there was no difference in live birth rates between the two protocols (CA: 21.4% vs MF: 26.9%, aOR 1.23, 95% CI 0.68-2.29).

Conclusions: Although low-dose CA protocol resulted in fewer mature oocytes at retrieval, this protocol yielded a higher number of utilized embryos per mature oocyte and higher percentage of high quality embryos compared to high-dose MF protocol in poor responders. Live birth rates are similar. Therefore, a low-dose CA protocol would likely be similarly effective as a MF protocol in poor responders but be more cost effective with lower FSH requirement.

17) ALCOHOL AND CANNABIS USE AMONG WOMEN WITH INFERTILITY: ASSOCIATIONS WITH PSYCHIATRIC SYMPTOMS, ATTEMPTS TO CONCEIVE, AND ENGAGEMENT IN FERTILITY TREATMENT

Authors: Genevieve Joseph-Mofford MS, Leah M. Hecht PhD, Rory Iacobelli BS, Amy M. Loree PhD, Lana Abdole MD, Lisa R. Miller-Matero, PhD

Institution(s): Wayne State University School of Medicine, Henry Ford Health, Michigan State University

Objective: A diagnosis of infertility can lead to severe distress. Although substance use among women of reproductive age is common and is also linked to distress, little is known about substance use among those with an infertility diagnosis. This is important to understand as those with an infertility diagnosis often try to conceive, and substance use can have implications for fertility and pregnancy. The purpose of this study was to estimate the rate of alcohol and cannabis use among women with infertility and examine whether substance use had associations with psychiatric symptoms, attempts to conceive, and engagement in fertility treatments.

Materials and Methods: Patients from a single healthcare system were eligible if they received a female infertility diagnosis within the past 2 years. Participants (N=188) completed an online questionnaire on their alcohol use, cannabis use, and psychiatric symptoms.

Results: The rates of hazardous alcohol use, any cannabis use, and hazardous cannabis use were 30.3%, 30.9%, and 8.5%, respectively. Hazardous alcohol use was not associated with depression or anxiety ($p > .05$). Those with any cannabis use were more likely to have higher depression scores than those without ($p = .02$). Those with hazardous cannabis use were also more likely to have higher depression scores ($p = .001$) and higher anxiety scores ($p = .03$). Substance use was not associated with actively trying to conceive. However, those who were pursuing fertility treatments were less likely to engage in hazardous alcohol use ($p = .02$).

Conclusion: Substance use among women with infertility is common. Cannabis use was associated with depression and anxiety scores, suggesting that cannabis may be used to cope with distress. Though many women engage in hazardous alcohol or cannabis use, pursuing fertility treatments may serve as a protective factor. Clinicians treating patients with infertility may want to screen for substance use.

18) GENETIC VARIANTS IN HUMAN SPERM FOLLOWING EXPOSURE TO RADIO FREQUENCY ELECTROMAGNETIC RADIATION (RF-EMR): A PRELIMINARY PROSPECTIVE INVESTIGATION

Authors: Jodinger Bidhan MSc, Katherine Campbell MD, Anthony J. Griswold MD, Kajal Khodamoradi MD, Ranjith

Ramasamy MD

Institution: Desai Sethi Urology Institute, Miller School of Medicine University of Miami

Objective: The human body can absorb radiofrequency-electromagnetic radiation (RF-EMR) emitted by modern cell phones. RF-EMR exposure may harm spermatogenesis by increasing oxidative stress and triggering the formation of free radicals. Our previous work indicated that semen samples exposed to RF-EMR through WiFi calling exhibited decreased sperm motility and viability. The goal of this study was to explore the impact of modern smartphone technology on genetic variation in sperm.

Design: Six semen samples from healthy, normozoospermic men that were exposed to RF-EMR underwent whole exome sequencing.

Materials and Methods: Six healthy, normozoospermic men aged 25-35 years old provided semen samples for this study. A current generation smartphone was used in WiFi calling mode, specifically through WhatsApp voice call, to serve as the source of RF-EMR. The call duration was 6 hours. Semen samples were analyzed based on the 2010 WHO guidelines before and after the call. DNA was extracted from semen samples of each participant from specimens before and after RF-EMR exposure. Whole exome sequencing with alignment to the reference genome was performed. Genetic variants were compared for each participant before and after RF-EMR exposure.

Results: Sperm progressive motility was found to be significantly decreased after 6 hours of exposure ($p < 0.05$). Median number of exonic, nonsynonymous variants present after exposure that were not present before exposure was 4 (IQR 3). Across four samples that successfully sequenced, a total of 20 new, exonic, nonsynonymous variants were present after RF-EMR exposure. Of these, 12 are expressed in male reproductive tissues, 5 of which are involved in ciliary function and 2 are involved in mitochondrial function (Table 1).

Conclusions: Based on a pilot study, we observed decrease in sperm progressive motility and an increase in potentially related genetic variants associated with sperm motility after 6 hours of exposure to RF-EMR. Further research into the effect of RF-EMR exposure on semen parameters and the clinical relevance of these genetic variants is necessary.

Support: Supported by NIH R01 to Ranjith Ramasamy

19) THE EFFECT OF GROWTH HORMONE ON MISCARRIAGE RATES IN PATIENTS WITH DIMINISHED OVARIAN RESERVE

Authors: Tyler Soy MS, Roohi Jeelani MD, Cathy Chi, Janelle Jackman, Angeline N. Beltsos MD

Institution: Kind Body Fertility

Objective: To determine the effect of human growth hormone supplementation during ovarian stimulation on the rate of miscarriage after frozen embryo transfers in patients diagnosed with diminished ovarian reserve (FET)

Design: A retrospective chart review was conducted on patients who underwent a FET at a private, multi-site fertility center.

Materials and Methods: Patients with a fertility diagnosis of “Diminished Ovarian Reserve” (DOR) were divided into two groups: One group received HGH in the form of Omnitrope during ovarian stimulation. In contrast, another age-matched control group did not receive any—the pregnancy outcome after their FET was then charted. Only transfers in which PGT normal embryos were used were included. We defined miscarriages based on ACOG guidelines as losing a pregnancy within the first trimester, and a two-sample proportion t-test was run to determine statistical significance.

Results: 1308 patients were included in this study, with an average age of 37 in both groups. 972 patients were in the HGH treatment group with an overall miscarriage rate of 7.4%. In the control group, 336 patients did not take human growth hormone during their IVF cycle and had an overall miscarriage rate of 13.75%. Our results demonstrate that the incorporation of human growth hormone in IVF treatment protocols may significantly reduce the likelihood of miscarriage for IVF-poor responders ($p=0.004$)

Conclusions: Prior studies show how human growth hormone acts on the ovaries to affect ovarian steroidogenesis, follicular development, and overall oocyte quality. In this follow-up study, we explored the difference these embryos created may have on miscarriage rates specifically for patients with poor IVF response. These patients experience the most benefit from GH supplementation, and this study suggests that the benefits may extend past

just ovarian factors but also may play a role in lowering the chance of miscarriage for patients with DOR. Further isolated studies need to be done studying the mechanism GH has on endometrial receptivity, mitochondrial function, and pregnancy outcomes post-FET.

20) WHAT IS THE STATE OF SOCIAL MEDIA PLATFORMS REGARDING REIFELLOWSHIP PROGRAMS?

Authors: Vania Nwokolo MD, Natasha Driver MD, Amanda Onyewuenyi MD, Vanessa McDonald MD

Institution: Howard University Hospital

Objective: Research has shown that residency applicants used social media platforms to learn about individual programs. However, not enough research has been done to assess fellowship programs. Reproductive endocrinology and infertility (REI) fellowships are competitive. Social media can be a tool to assist applicants in researching and assessing programs. The purpose of this study is to identify the number of REI fellowship programs with social media accounts.

Design: A cross-sectional, IRB exempt study, identifying social media sites for REI Fellowship Programs was done from January to February 2023.

Materials and Methods: The Association of American Medical Colleges Electronic Residency Application Service REI Directory was searched and 51 programs were found. A Google search was done using fellowship program name, “Facebook/Twitter/Instagram”, and “REI”. Search features on Facebook, Twitter and Instagram were also used with “Program Name” and “REI” or “fertility”. Instagram follow-

ers list was searched to see if other fellowship programs were followed. Once profiles were identified, creation date, number of followers, following, and posts were recorded.

Results: Of 51 REI fellowship programs, 11 (21.6%) had an Instagram account, 3 (5.9%) had a Twitter account, and 5 (9.8%) had a Facebook account. 2 (3.9%) had both Instagram and Twitter, 3 (5.9%) had both Instagram and Facebook, and 1 (2.0%) had both Twitter and Facebook. 1 REI fellowship program (2.0%) had all 3 social media sites. 39 programs (76.5%) had no form of social media site. Instagram creation date ranged from 2015 to 2022, with an average of 808 followers and 104 posts. Twitter creation date ranged from 2012 to 2022, with an average of 1,191 followers. Facebook creation date ranged from 2015 to 2022, with an average of 658 followers.

Conclusions: Most REI fellowship programs had no social media platform. This may be due to many reasons, such as some physicians may have their own individual platform they use for REI information. The most common was Instagram and the least was Twitter. This is consistent with research that showed Instagram was most popular. Since more REI fellowship programs are now going virtual for interviews, showcasing REI programs through social media can be helpful for future fellowship applicants.

21) A COMPARISON OF ETHNICITY REPRESENTATION BETWEEN CENSUS DATA AND A LARGE DONOR EGG AND DONOR SPERM BANK IN THE UNITED STATES

Authors: Lauren Isley, Scott Brown, Seda Gormus, Melissa Stratton, Colleen Lynch

Institution: Cooper Surgical

Objective: The objective of this analysis was to compare egg and sperm donor ethnicity representation from 2016 to 2020 at a US-based frozen egg bank and sperm bank to US Census data.

Design: A retrospective data analysis was performed to identify egg and sperm donors who had been qualified in respective US-based gamete donor programs from January 2016 – December 2020.

Materials and Methods: Racial categories of the qualified donors were extracted. Data was categorized, quantified, and compared to 2020 US Census data. Statistical analysis was performed using 2-tailed Chi square analysis with Yates correction.

Results: Most egg and sperm donors were White/Caucasian which was consistent with Census representation; however, statistical comparisons with Census data was not performed due to disparity of group sizes. The proportion of Asian sperm donors was significantly higher than that of egg donors 9.57% v. 4.7% ($p<0.0001$) and was overrepresented as compared to Census data (6%). The proportion of Black egg donors was significantly higher than sperm donors 7.62% v. 2.71% ($p<0.0001$). The percentage of both egg and sperm donors categorized as having a mixed ethnicity was higher than Census demographics; however, statistical significance could not be determined, as described.

Conclusions: This analysis supports current evidence indicating that availability of egg and sperm donors from certain racial groups is limited presenting challenges for recipients desiring a donor of a particular ethnic background. Similar trends related to limited racial diversity in gamete donors are observed in other countries, such as the UK. There are many complex factors contributing to this issue and barriers related to donor recruitment warrant additional research. Additionally, sub-analyses on Hispanic donors and other ethnic groups should be explored. Gamete programs should develop initiatives around their donor recruitment and qualification strategies to promote a more representative distribution of racial minorities available to recipients.

22) EVALUATION OF ANDROGEN RECEPTOR SIGNALING AND SATURATION IN ERECTILE DYSFUNCTION

Authors: Kajal Khodamoradi MSc, PhD

Institution: University of Miami

Objective: Testosterone (T) is a steroid hormone responsible for the development and maintenance of male secondary sex characteristics. T exerts this physiologic function throughout binding to the androgen receptor (AR). It is unclear how AR function varies as a function of serum T. It remains hypothesized that there is a saturation value for the AR above which excess T does not lead to increased binding or downstream activity. This study evaluated whether varied serum T level led to altered AR signaling in the penile tissue of men with erectile dysfunction (ED).

Materials and Methods: Men undergoing inflatable penile prosthesis (IPP) surgery were enrolled in the study. Corpus cavernosum biopsy was obtained during surgery. Serum testosterone level was also obtained the day of surgery. Penile tissue was processed and used for western blotting with downstream markers of AR function including AR, heme oxygenase (HO), inducible nitric oxide synthase (iNOS), and phosphodiesterase type IV (PDE-5).

Results: The mean age of participants was 62 (IQR 8.5) years. The mean serum T level was 300.2 (IQR 231.3). The results of the western blot showed that HO and PDE-5 signaling was similar in men with serum T greater 200 ng/dL compared to those with serum T below 200, while AR and iNOS expression was similar in men with serum T greater than 300 ng/dL.

Conclusions: Within a wide range of serum T values, AR signaling was similar in penile tissue above the normal value. The difference in AR function at hypogonadal ranges, may help explain the pathophysiology of penile disease such as erectile dysfunction as well as the function of pharmacotherapy such as PDE-5 inhibitors.

23) LONGITUDINAL FOLLOW UP OF PATIENTS DIAGNOSED WITH COVID-19 AND THEIR OVARIAN RESERVE AS DEMONSTRATED BY SERUM ANTI-MÜLLERIAN HORMONE (AMH) AT 3 AND 6 MONTHS

Authors: Kathryn Coyne MD, Jerry Tribout, BS, Heather Tribout BS, Rebecca Flyckt MD, Rachel Weinerman MD

Institution: University Hospitals Cleveland

Objective: To assess the impact of COVID-19 infection on ovarian reserve as measured by serum AMH in reproductive age females at 3 and 6 months post diagnosis of COVID-19 infection.

Design: Cohort study.

Materials and Methods: An institutional COVID-19 biorepository was used to identify females between age 18 and 41 with serum samples collected at time of COVID-19 diagnosis, 3 months post diagnosis, and/or 6 months post diagnosis. Serum samples were analyzed for AMH level. A power analysis revealed a sample size of 22 provides 80% power to detect a 0.85 ng/mL difference in AMH level ($\alpha=0.05$). The paired Wilcoxon signed rank test was used to determine significant difference in serum AMH levels over 2 time points and the Friedman test over 3 time points. $P<0.05$ was considered significant.

Results: 26 participants had serum samples over at least 2 time points. Mean age was 32.7 ± 6.5 years; mean BMI was 32.8 ± 8.6 kg/m². The majority were Caucasian (73.1%) or African American (26.9%). 3.9% were Hispanic; the remainder were Non-Hispanic (96.1%). 50% had received at least 1 dose of COVID-19 vaccine by the time of diagnosis. 18.2% were on oral contraceptives during at least 1 time point. None were smokers. There were statistically significant differences in median serum AMH levels between baseline and 3 or 6 months ($n=26$, 2.9 ng/mL [3.9] vs. 3.4 ng/mL [3.6]), and between baseline and 3 months ($n=21$, 4.0 ng/mL [4.3] vs. 4.2 ng/mL [4.0]). There were no significant differences between baseline and 6 months ($n=15$, 3.0 ng/mL [3.9] vs. 2.7 ng/mL [2.9]) or when AMH was assessed at 3 time points for patients with 3 and 6 month samples ($n=11$). There was a significant difference in baseline median AMH values between those vaccinated compared to unvaccinated (2.0 ng/mL vs. 5.1 ng/mL); however, after controlling for age, race, and BMI, the difference was not significant. There was no significant change in median serum AMH levels from baseline to 3 or 6 months in those vaccinated ($n=13$, 2.5 ng/mL [3.4] vs. 2.2 ng/mL [3.6]); there was a significant decrease in the unvaccinated group ($n=10$, 4.7 ng/mL [5.7] vs. 4.4 ng/mL [4.9]).

Conclusions: This study provides preliminary evidence demonstrating transient decrease in ovarian reserve after COVID-19 infection, but no significant long term effect.

Support: University Hospitals R&E Rapid Response COVID Pilot Grant

24) ONCOFERTILITY PUBLICATION TRENDS IN GYNECOLOGIC MALIGNANCIES

Authors: Emily Frisch MD, Hanna Kim MD, Camilla Yu MD, Andrea Dinicu MD, Lindsey Beffa MD, Elliott Richards MD,

Institution: Cleveland Clinic Foundation

Objective: To examine publication trends pertaining to fertility sparing management in women of reproductive age with gynecologic (gyn) malignancies.

Design: Literature review.

Materials and Methods: Ovid MEDLINE was used to aggregate publications on gyn oncology (onc) and reproductive endocrinology and infertility (REI) between 1946 and 2022. Publication information was extracted through systematic review. Individual authors' subspecialty credentials were each reviewed. Descriptive statistics were generated.

Results: The initial query generated 2,057 publications. 1,057 (51.4%) publications met search criteria, with the first study being published in 1991 and 16.6% of studies published in the last 2 years. 34 studies (5.5%) were published with REI and gyn oncology physicians in the United States. Gyn oncology comprised the majority of senior authors (50.9%), followed by REI specialists (18.6%). Topics of publications were centered on fertility sparing surgical management (43.1%), medical management (11.3%), and ovarian tissue preservation (6.0%). Publications focused on ovarian 349 (33.3%), cervical 299 (28.5%), and uterine/endometrial 258 (24.6%) malignancies. While the rate of publications on fertility sparing management has increased over the last 30 years, the majority of them are retrospective studies and case reports/series. In the last 10 years, only 5 studies were randomized controlled trials.

Conclusions: While oncofertility for gyn cancers is inherently a collaborative effort between the specialties of gyn oncology and REI, this is not reflected in the literature: only 5.5% of oncofertility publications were a combined research effort. There is a paucity of high-quality data in the form of clinical trials. Oncofertility is a growing field, as shown by the increasing number of publications overtime, but this study demonstrates the need for more collaborative, prospective research to determine the best strategies for managing fertility concerns in young gyn oncology patients.

25) IMPACT OF MANDATED INSURANCE COVERAGE OF ASSISTED REPRODUCTIVE TECHNOLOGY ON TRANSPARENCY OF PRICING AND FINANCING AS SEEN ON SOCIETY FOR ASSISTED REPRODUCTIVE TECHNOLOGY MEMBER CLINIC WEBSITES

Authors: Marisa Imbroane BS, Hanna Kim MD, Chloe Van Dorn MPH, Elliot Richards MD PhD,

Institution: Cleveland Clinic Foundation

Objective: The purpose of this study was to determine whether there is a difference in website transparency of service costs, accepted insurance plans, and financing op-

tions between Society for Assisted Reproductive Technology (SART) member clinics based on state insurance mandates for assisted reproductive technology (ART).

Design: Website review

Materials and Methods: SART member clinics (n=646) were identified using the SART online locator. Clinics were excluded for missing websites (n=315), duplicate clinics (n=12), broken websites (n=5), or permanent closure (n=3). Data was collected from 311 SART clinic websites on specific service costs, accepted insurance plans, and availability of financial assistance (special population discount programs [e.g. military, educator], medication discounts, payment plans, and grants). Mandated coverage by state was gathered on [resolve.org](https://www.resolve.org). A Chi-squared test and logistic regression were performed with p<0.05 considered significant.

Results: Of the 311 SART member clinics analyzed, 28.6% were in states that mandate ART coverage, and 71.4% were not. Clinics in states that have mandated coverage were more likely (29.2% vs 13.1%, p=0.001) to list specific prices on their websites. These clinics had 2.13 times the odds of listing specific costs (95% CI [1.19,3.81], p=0.01). There was also a significant difference between the percent of clinics in mandated coverage states (62.9%) and non-mandated states (41.4%, p< 0.001) that listed accepted insurance plans. These clinics had 2.44 times the odds of reporting accepted insurance plans (95% CI [1.47,4.05], p=0.005). There was no significant difference in the mention of financial assistance between the groups. Clinics in states with mandated coverage were more likely (46.4% vs 24.8%, p=0.002) to mention discount programs, but there was no significant difference for financing, medication discounts, payment plans, and grants.

Conclusions: SART member clinics located in states that mandate insurance coverage of ART are more likely to list specific costs, accepted insurance plans, and the availability of discount programs on their website. Patients living in states without mandated coverage are more likely to need to finance their own treatment, yet these patients are less likely to have nearby SART member clinics that provide financial transparency on their websites.

26) FERTILITY TRENDS IN MEN WITH A PRIOR HISTORY OF ANABOLIC STEROID USE: RESULT FROM A STANDARDIZED TREATMENT REGIMEN

Authors: Braian Ledesma BS, Alexander Weber MD, Akhil Muthigi MD, Ranjith Ramasamy MD

Institution: University of Miami

Objective: The management of infertility in men who have previously used anabolic steroids poses a complicated clinical problem. In the past, evaluating the effectiveness of treatments has been challenging due to the diverse range of treatment plans used. In this study, we present an analysis of sperm concentration trends and fertility outcomes in men who underwent a standardized treatment regimen at our institution.

Materials and Methods: In the period spanning from 2018 to 2022, a retrospective analysis was conducted on a cohort of men with a prior history of anabolic steroid usage, who presented themselves at the University of Miami Men's Health clinic for infertility treatment. The standardized treatment approach involved the cessation of testosterone therapy (T) and the administration of a combination regimen comprising clomiphene citrate and human chorionic gonadotropin (hCG) for a minimum period of 3 to 6 months. Subsequent to the treatment period, men were contacted in March 2023 to determine the most up-to-date pregnancy and live birth outcomes. Statistical analysis was performed utilizing SPSS version 28.0.0.0, employing Mann-Whitney U tests and logistic regression analysis for comparisons between groups and to establish a predictive mathematical model, respectively. The level of statistical significance was defined as $p < 0.05$.

Results: A total of 100 men (average age 40.7 ± 9.3 years) met inclusion criteria for this analysis. Mean duration of prior T use was 5.7 ± 6.3 years, with the two most common modalities consisting of injection therapy at 58% and oral therapy at 24%. Mean initial sperm concentration was 7.6 ± 15.8 million/cc, and initially 37.7% of patients presented with azoospermia. The average duration of hCG/clomid therapy was 1.4 ± 3.6 years. In men initially azoospermic (N:23), 6 (33%) progressed to severe oligospermia, 6 (33%) to oligospermia, and 1 (5.6%) to normozoospermia within the 6-month treatment window. The greatest relative change during the treatment interval was seen in progression from severe oligospermia (< 5 M/cc) to oligospermia ($5 - 15$ M/cc). A total of 28/60 (48.7%) couples who responded to follow-up call achieved a successful subsequent pregnancy [N:16 (57.1%) utilizing assisted reproductive technology and N:12 (42.9%) with natural pregnancy]. On logistic regression analysis, no significant predictors for improved semen parameters or successful pregnancy were identified.

Conclusions: Despite the implementation of appropriate treatment regimens, a significant proportion of men with a prior history of anabolic steroid use continue to exhibit severe oligospermia, with approximately 50% failing to demonstrate substantial improvement in their semen parameter seven after undergoing a six-month treatment protocol. Moreover, only a fraction of men, estimated to be 1 in 5, achieve normozoospermia following treatment.

27) TREATMENT AND PATIENT FACTORS CONTRIBUTING TO ADVERSE EVENTS USING THE EXAMPLE OF CONGENITAL HEART DEFECTS

Authors: Michael Davies MD, PhD

Institution: Adelaide University, Australia

Background: Congenital heart defects are a leading cause of death in the first year of life and occur in around 8 per 1,000 births natural conceptions, but in 16 per 1,000 after ART. We and others have reported previously that certain ART is associated with an increased risk of cardiac defect.

Further reporting of specific defect types and patient factors is an important step in identifying etiologic pathways. Objective Which congenital heart (CH) defects are associated with ART treatments and patient factors?

Design: Cohort study of all deliveries (n=302,811) and terminations of pregnancy in South Australia for the period Jan 1986-Dec 2002 that were linked to all cycles of ART (6,163 births) for the same time period. These data were linked to a State-wide birth defect registry to a child's 5th birthday.

Results: Compared to the fertile population, and after adjustment: a) Maternal age, pre-existing and gestational diabetes, epilepsy, and hypertension were each associated with CH defects. b) For IVF and ICSI combined, risk for 'Any cardiac defect' (BPA 74500-74799) was increased aOR=1.42, 1.13-1.80; as was Congenital Aorta Valve Stenosis aOR=3.20; 1.26-8.11; Patent Ductus Arteriosus aOR=1.88, 1.18-3.00. c) Increased risk of Patent Ductus Arteriosus was associated with Fresh IVF cycles aOR=2.69, 1.32-5.48 and frozen ICSI cycles aOR=4.59, 1.84-11.44. d) Comparison of 4 culture medias revealed one with an increased risk of Patent Ductus Arteriosus for both fresh IVF aOR=5.56, 1.31-23.53, and for fresh ICSI aOR=5.57, 1.08-28.71. e) A medical history of "infertility" with no IVF clinic contact was associated with Cardiac Septal Closure Anomalies aOR=1.90, 1.12-3.23; Atrial Septal Defect, 3.65, 1.88-7.12; Patent Ductus Arteriosus aOR=3.09, 1.26-7.56.

Conclusions: Both patient and treatment effects are associated with cardiac defects, mode of fertilization, cryopreservation with ICSI, and culture media. These observations can inform both mechanistic studies.

Support: Medical Research Future Fund (MRFF), National Health and Medical Research Council (NHMRC), Australia Research Council (ARC), Heartkids Australia, and the National Heart Foundation (NHF).

28) LOW DOSE HUMAN CHORIONIC GONADOTROPIN (HCG) IN A DUAL TRIGGER (DT) RESULTS IN A LOWER INCIDENCE OF OVARIAN HYPERSTIMULATION SYNDROME (OHSS) AMONG HIGH RESPONDING PATIENTS

Authors: Louisa Drake DO, Arti Taggar MD, Daniel Grow MD, Claudio Benadiva MD, Lawrence Engmann MD

Institution: University of Connecticut

Objective: To evaluate the pregnancy outcomes and incidence of OHSS in patients who received hCG at trigger (DT) versus hCG at vaginal oocyte retrieval (hCG at VOR).

Design: A retrospective study of in vitro fertilization (IVF) cycles from March 2011-2022 at an academic fertility center.

Materials and Methods: Patients were included if they were < 38 years of age, used a standard antagonist protocol with a GnRH agonist (GnRHa) trigger, planned a single fresh blastocyst embryo transfer (ET), and had a peak estradiol (E2) < 4000 pg/mL. Our primary outcome was ongoing pregnancy rate (OPR). Secondary outcomes included OHSS incidence and severity. Patients who traditionally received

a DT (1000 IU hCG plus 1mg leuprolide acetate) were compared to patients who received a GnRHa only trigger with 1500 IU hCG at VOR. Independent t-tests for continuous data and chi squared or Fischer's exact tests for categorical data were used. A two-sided p value of < 0.05 was considered statistically significant.

Results: The DT group consisted of 125 patients and the hCG at VOR group consisted of 122 patients. There were no differences in the mean age, day 3 FSH, antral follicle count, peak E2, luteinizing hormone level the day after trigger, number of oocytes retrieved or fertilized, or blastocyst development rates between the groups. The AMH was higher in the DT group (mean: 7.3±0.5 vs 6.0±0.3, p=0.04). 12 ETs were cancelled in the hCG at VOR group, 8 of which were for OHSS (4 with mild, 4 with moderate). No ETs were cancelled in the DT group.

Conclusions: A GnRHa trigger with low dose hCG for luteal support, regardless of whether the hCG was given at the time of trigger or VOR, provided high live birth rates. However, there was a higher incidence of OHSS in patients who received hCG at VOR. For high responder IVF patients desiring a fresh ET, low dose hCG at the time of GnRHa trigger allows for a lower rate of OHSS than hCG administration at the time of VOR.

29) WHY DO PATIENTS CHOOSE TO THAW AND BIOPSY PREVIOUSLY UNTESTED VITRIFIED EMBRYOS?

Authors: Marja Brolinson MD, Jordan Moliver MD, Alan DeCherney MD, Erin Rothwell MD, Kate Devine MD, Jeanne O'Brien MD

Institution(s): Georgetown University, NIH, Utah University, Shady Grove Fertility

Objective: To evaluate patient motivations for PGT-A testing on untested vitrified blastocysts

Design: Retrospective Cohort

Materials and Methods: This was a retrospective cohort study of patients with blastocysts undergoing multiple thaw and vitrification cycles for PGT-A biopsy at a single institution from 1/2016 to 12/2020. Cycles were categorized according to number of vitrification/thaw cycles and initial versus repeat trophectoderm biopsy. Groups included thaw and PGT-A biopsy of a previously vitrified blastocyst (delayed biopsy group) or repeat PGT-A biopsy of a previously biopsied and vitrified blastocyst, after initial biopsy returned as nondiagnostic (repeat biopsy group). Patients who returned for embryo transfer after a negative cycle, as well as after a successful live birth, were included. Charts were reviewed to abstract reasons or motivations for PGT-A biopsy, and the answers codified into nine unique categories.

Results: 724 transfers were included, 600 embryo transfers following delayed biopsy (Group A) and 124 transfers following repeat biopsy, after initial nondiagnostic fresh embryo biopsy (Group B). During the time frame studied there were 7238 transfers following fresh biopsy and a single vitrification/thaw cycle. Reasons for biopsy are listed in Table 1. The leading indication for delayed biopsy was miscar-

riage (37.1%). Of patients opting for biopsy following miscarriage, 19.2% did so following one miscarriage, 7.3% did so following two or more miscarriages, and 10.6% opted for genetic testing following a termination or miscarriage with known aneuploidy. The second most common reason for delayed biopsy was implantation failure (32.2%), with 15.4% making the decision to thaw and biopsy after 2 or fewer implantation failures and 16.6% making the decision after 3 or more failed transfers. Sex selection was the patient motivation for testing in 15.3%, and prioritization of supernumerary embryos for transfer was the patient motivation in 6%.

Conclusions: Patients have a wide range of reasons for pursuing PGT-A testing of previously vitrified untested embryos, with miscarriage and implantation failure being the most common motivations. Repeat biopsy and transfer following initial nondiagnostic fresh embryo biopsy was rare. Understanding patient motivations for pursuing PGT-A testing of previously vitrified embryos can improve patient counseling prior to initiation of the initial IVF cycle.

30) FAMILY BUILDING PRIORITIES AND THE ADAPTIVENESS OF GOAL STRIVING AND SWITCHING IN WOMEN EXPERIENCING INFERTILITY

Authors: Stephanie Schuette MA, Fernanda Andrade MD, Julia Woodward MD, Moria Smoski MD

Institution: Duke University

Objective: Assess the adaptiveness of goal striving and goal switching on mental health in those experiencing infertility.

Design: Cross-sectional, online survey.

Materials and Methods: Women (N=457) in the U.S. who identified as currently experiencing infertility completed self-report measures of depression, anxiety, posttraumatic growth, goal striving and goal switching. We used path analysis to explore the effects of goal striving and goal switching on depression, anxiety and posttraumatic growth, with duration trying to conceive as a moderator. Participants were further asked to rank the importance of certain goals related to family building.

Results: Lower goal switching and higher goal striving were related to higher depression and anxiety (p's < .031). Higher goal switching and goal striving were both positively related to post-traumatic growth (p's < .001). The effect of goal switching on anxiety was moderated by duration trying to conceive, such that goal switching became an adaptive coping strategy (associated with less anxiety) for women trying to conceive for over 3.4 years. Participants rated becoming a parent one way or another, maintaining a close and satisfying relationship with their partner, and being the one to give birth to their child, as top priorities. Participants were least concerned about others' perception of their infertility and potential side effects of medical interventions.

Conclusions: The ability to focus on meaningful life goals other than the goal to have a child is generally beneficial for

women's mental health while coping with infertility. Given patients' identified family building priorities, interventions to support those experiencing infertility should include education on donor gametes or adoption as well as focus on the couple's relationship.

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