RESULTS: The average percentage of live PtdSer positive 7AAD negative sperm in the samples was 42.3%±3.8. Results from sperm-myoblast fusion assays revealed a fusion index of 7.8±0.93 and this was blocked with annexin as well as cytochalasin D.

CONCLUSIONS: Our previous studies in the mouse show that PtdSer on sperm plays an important role in sperm-egg fusion. Results from these studies demonstrate that PtdSer is expressed on live human sperm and that human sperm can fuse to myoblast cells in a PtdSer-dependent manner. It is now recognized that PtdSer plays an essential role in myoblast as well as trophoblast cell fusion. We suggest that PtdSer can be an important biomarker to assess fusogenic sperm.

IMPACT STATEMENT: These results support the premise that PtdSer is on live human sperm and the sperm-myoblast fusion assay could be a surrogate assay for human sperm-egg fertilization.

P-457 6:45 AM Wednesday, October 26, 2022

OXIDATIVE STRESS IN THE NATIVE AND PROCESSED SEMEN AS PREDICTORS OF FERTILIZATION AND PREGNANCY IN THE IVF MODEL. Hassan Sallam, MD, PhD, FRCOG,[1] Nooman Sallam, MD, MCh,[2] Ashraf Farrag, MD, MCh[2] [1]Alexandria University Faculty of Medicine, Alexandria, Egypt; [2]Alexandria Fertility Center, Alexandria, Egypt.

OBJECTIVE: We have previously shown that oxidative stress (OS) in the native semen is a good predictor of fertilization and pregnancy in the IVF model. The aim of the current work was to compare OS in the native versus the processed semen as predictors of fertilization and pregnancy in the IVF model.

MATERIALS AND METHODS: This prospective cohort study was conducted between September 2017 and December 2018. In order to study the fertilizing capacity of the sperm, couples with unexplained infertility treated with combined IVF/ICSI were recruited but only IVF results were analyzed in this current work. Couples in their first cycle of treatment from whom at least 12 oocytes were retrieved were included in the study. Three of these oocytes were inseminated by conventional IVF and the rest by ICSI for fear of total fertilization failure. If good embryos resulted from IVF, 2 were transferred. If no fertilization occurred from IVF, 2 embryos resulting from ICSI were transferred. All remaining embryos were frozen. OS was determined in native semen and in processed semen by measuring oxidative reduction potential (ORP) using the MiOXYS system and the results correlated with the fertilization (FR) and clinical pregnancy rates (CPR).

RESULTS: A total of 107 couples were enrolled but only 25 fulfilled the criteria. A total of 575 oocytes were retrieved from the 25 patients (mean ± SD = 20.5 ± 5.6 oocyte/cycle). Out of the 108 oocytes inseminated with conventional IVF, 36 reached the 2PN stage (FR = 33.3%). The mean (±SD) ORP in the processed semen was 3.05 (±1.86) mV/10^6 sperm/ml. This was significantly higher than the mean (±SD) ORP in the native semen (1.0723 ±1.2984) mV/10^6 sperm/mL) (P < 0.0001). The mean (± SD) ORP in the native semen in couples with =>50% IVF fertilization was 1.02 ± 0.1 mV/10^6 sperm/mL which is significantly lower than in couples with <50% fertilization (2.05 ± 0.7 mV/10^6 sperm/mL) (P<0.02). On the contrary, there was no significant difference between the mean (±SD) ORP in the processed semen in couples with =>50% fertilization rate [2.9490 (± 1.7345) mV/10^6 sperm/ml] and those with <50% fertilization rate [3.2077 (± 2.0020) mV/10^6 sperm/ml] (P = 0.8129). The ORP in the native semen was evaluated as a predictor of fertilization in IVF. A receiver operating characteristic (ROC) curve was constructed and the area under the curve (AUC) was found to be equal to 0.854167 with a cut-off point at 1.57 mV/10^6 sperm/ml. On the contrary, the ROC curve for the processed semen had an AUC equal to 0.5267 with a cut-off point at 2.75 mV/10^6 sperm/ml. The ORP in the native semen was also evaluated as a predictor of pregnancy in IVF. The ROC curve showed an AUC equal to 0.800 with a cut-off point at 0.75 mV/10^6 sperm/ml, while the AUC for the processed semen was equal to 0.1800.

CONCLUSIONS: It is concluded that ORP in the native semen but not in the processed semen is a good predictor of the fertilizing capacity of the sperm and of clinical pregnancy in IVF treated couples.

IMPACT STATEMENT: In couples with unexplained infertility all oocytes should be treated with ICSI if the ORP in the native semen is >1.57 mV/10^6 sperm/ml.

SUPPORT: None

P-458 6:45 AM Wednesday, October 26, 2022

GEOGRAPHIC VARIATION IN SEMEN PARAMETERS FROM DATA USED FOR THE WORLD HEALTH ORGANIZATION SEMEN ANALYSIS REFERENCE RANGES. Ido Feferkorn, MD,[1] Liat Azani, MSC,[2] Einav Peero Dr, MD,[3] Ranit Hizkiyahu, MD,[4] Guy Shrem, M.D.,[5] Mali Salmon-Divon, Ph.D,[6] Michael H. Dahan, M.D.[7] [1]Division of Reproductive Endocrinology and Infertility, McGill University Health Care Center, Montréal, Canada; [2]Ariel University, Israel; [3]McGill University Health Center, Momtreal QC, Canada; [4]McGill University Health Center; [5]McGill University, Montreal, QC, Canada; [6]Ariel, Israel; [7]Division of Reproductive Endocrinology and Infertility, McGill University Health Care Center, Montreal, QC, Canada.

OBJECTIVE: To study geographic variations in sperm parameters using data from the trials that defined the reference ranges of the World Health Organization (WHO) 2021 manual.

MATERIALS AND METHODS: Retrospective evaluation of the data used to define the WHO reference ranges. The data from 11 studies, including 3484 participants across five continents, were divided according to geographic locations. Semen parameters' distribution were presented using boxplot as a function of location. P-values were calculated by the Kruskal Wallis rank-sum test followed by Dunn post-hoc test. Analyses were conducted using the R programming language.

RESULTS: Semen volume was significantly lower in samples from Asia and Africa than in other regions. Sperm concentration in the USA was significantly lower than in Europe and highest in Australia. Total motile count (TMC) and total progressive count (TPC) were significantly lower in Africa compared to other regions. TMC and TPC in Asia (median 126.1 and 97.2 million) and in the USA (median 142.8 million and 133.2 million) were significantly lower than in Europe (median 160.6 million and 142.9 million) and Australia (median 179.6 million and 162.7 million). The 5th percentile of sperm concentration was the lowest in the USA (12.5x10^6/ml) and highest in Australia (21.4x10^6/ml). The 5th percentile for the normal sperm morphology was lowest in the USA (3%) and highest in Asia (5%). The 5th percentile for TMC and TPC were lowest in Africa (TMC 15.08 million, TPC 12.06 million) and the USA (TMC 18.05 million, TPC 16.86 million) and highest in Australia (TMC 29.61 million, TPC 25.80 million).

CONCLUSIONS: Significant geographical differences in sperm parameters exist, regional fertility societies should consider adding their own reference limits based on local experience.

IMPACT STATEMENT: The geographical differences in sperm parameters noted questions the generalizability of the WHO reference ranges.

SUPPORT: none

P-459 6:45 AM Wednesday, October 26, 2022

MEN WITH LOW CAP-SCORE™ HAVE SIMILAR FERTILIZATION RATES WITH ICSI, SIMILAR EUPLOIDY RATES, AND SIMILAR FET LIVE BIRTHS COMPARED TO MEN WITH NORMAL SCORES. Fady I. Sharara, M.D.,[1] Anna Lysenko-Brockman, MS,[1] Haneen Taha, MS[2] [1]Virginia Center for Reproductive Medicine, Reston, VA; [2]Fairfax, VA.

OBJECTIVE: Men are often assumed fertile if they have enough morphologically normal, motile sperm. This is despite the fact that it is well known that most male fertility problems are a result of poor sperm function/fertilizing ability that are not detected by traditional semen analysis. Lack of such a diagnostic assessment of fertilizing ability has led to most male infertility cases being classified as "idiopathic," or unexplained. One quantifiable measure of sperm function is capacitation status. Use of the percentage of sperm in an ejaculate that capacitate (the Cap-Score Test, Androvia LifeSciences, Mountainside, NJ), has been validated and used commercially to assess capacitation status of a semen sample. Men with low Cap-Scores have a low chance at natural or IUI conceptions and are often treated using ICSI. However, it is not known if men with low Cap-Scores (< 27.6%) have similar fertilization rates with ICSI, and whether they have lower ART success compared to men with normal Cap-Scores.

MATERIALS AND METHODS: This single center study retrospectively evaluated 236 patients with known Cap-Score undergoing IVF/ICSI between 2018 and 2021. The Cap-Score Test was performed at the same

time as the initial semen analysis (performed within 3-4 months of IVF cycle start) by processing part of the semen sample and shipping the same day to Androvia Life Sciences. The localization patterns of the ganglioside G_{M1} within the plasma membrane was examined and the percentage of capacitated sperm determined. For those couples undergoing IVF, ICSI was performed routinely. The fertilization rates were compared between those with normal and low Cap-Scores, and the euploidy rate of those undergoing PGT-A was also assessed. In addition, the outcome of the first Frozen Embryo Transfer (FET) in 121 patients was compared between the two groups.

RESULTS: 76 men had low Cap-Scores (76/236, 32.2%). The ICSI fertilization rates were not different between those with normal or low Cap-Scores (84.3% vs 84.7%, P=0.88), nor were the euploidy rates (39.1% vs 38.9%, P=0.90). Of the 121 women who underwent a FET, 31 did not undergo PGT-A, and 90 did. There was no difference in first cycle live birth rates between those with normal or low Cap-Scores.

CONCLUSIONS: The Cap-Score identifies men with capacitation abnormalities which impacts their chances at natural conception and conception with IUI. However, once these men undergo IVF and ICSI is performed, they have equivalent fertilization rates, euploidy rates, and FET success rates as men with normal scores. Men with low Cap-Scores should therefore be counselled that their ART outcomes are as good as men with normal scores.

IMPACT STATEMENT: Men with low CAP-scores do not have worse outcomes to men with normal scores when ICSI is performed.

SUPPORT: None

REFERENCES:

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P-460 6:45 AM Wednesday, October 26, 2022

MAY GROWTH HORMONE HAVE A ROLE IN THE TREATMENT OF SEVERE OLIGOASTHENOZOOSPERMIA? A CONTROLLED TRIAL EVALUATING THE IGF-I SERUM LEVELS. Fabio Scarpellini, M.D.,[1] Marco Sbracia, MD[2] [1]CERM-HUNGARIA, Rome, Italy; [2]CERM-Hungaria, Rome, Italy.

OBJECTIVE: It is established that Growth Hormone (GH) affects gonadal function at hypothalamic, pituitary and gonadal sites, and the effect of GH/IGF-I axis on spermatogenesis is well known. IGF-I is secreted by Sertoli Cells, secondary spermatocytes, spermatids and spermatozoa, and abnormal sperm parameters seem to correlate with lower serum IGF-I serum levels. Some authors reported a beneficial effect of GH treatment in infertile men, with the increase of spermatozoa number and motility in cases of oligoasthenoteratozoospermia. On the other hand, other authors did not confirm these findings. The aim of this study was to evaluate the role of GH treatment in normogonadotropic oligoasthenozoospermic patients no responsive to gonadotropins treatment in improving semen characteristics, evaluating the role of patients IGF-I serum levels

MATERIALS AND METHODS: Sixty-two patients with severe oligoasthenospermia (sperm concentration less than 5 millions/ml, motility lower than 30%) were selected for the study: all patients did not showed improvement after gonadotropin treatment. 28 patients were treated with gonadotropin (75IU three times a week for 20 weeks), and 34 patients were treated with recombinant GH (0.15mg once a week for 20 weeks) plus gonadotropin in the same dosage of the other group. The patients of the two groups underwent to dosage of serum levels of FSH, LH, free Testosterone, and IGF-I before treatment, other than semen analysis before and after treatment.

RESULTS: The patients with severe oligoasthenospermia treated with recombinant GH showed no statistically significant differences for semen parameters, concentration, motility, and sperm morphology, with respect to controls. However, when the patients were divided in two groups depending on the IGF-I serum levels, chosen arbitrarily depending on the GH treatment effect on sperm concentration, lower than 180mg/L or higher, the group with low IGF-I levels (14 patients) showed a statistically significant improvement of all semen parameters (concentration: P<0.001, motility: P<0.005, sperm morphology: P<0.01) with respect to patients with normal IGF-I serum levels (20) and control group (28).

CONCLUSIONS: In patients with idiopathic severe oligoasthenospermia and low levels of serum IGF-I the treatment with GH associated with gonadotropin may be useful in improve seminal parameters.

IMPACT STATEMENT: The treatment with GH in oligoasthenospermia patients may be used in case of low levels of serum IGF-I. The patients with severe oligoasthenospermia should be assessed for IGF-I serum levels.

SUPPORT: None

E-POSTER ABSTRACT STATION: W3

P-461 6:45 AM Wednesday, October 26, 2022

COMPARISON OF SPERM DNA FRAGMENTATION(DFI) AMONG NON-SMORKERS, REGULAR SMORKERS, ELECTRONIC-CIGARETTE(E-CIGARETTE) SMORKERS AND REGULAR/E-CIGARETTE SMORKERS. Jin I. L. Lee, M.S., Chun Kyu Lim, PH.D., Suye Sung, M.S., Soyoung PARK, B.S., Jae Hee Cho, B.S., Eun ji Kim, M.S., Jeongwook Kim, R.N., Sung Hee Kang, R.N., Hak Cheon Lee, M.D., Se Jeong Kim, M.D., Kyung Eun Lee, M.D., Wonyun Choi, PH.D. CHA University Ilsan Medical Center, Goyang-si, Gyeonggi-do, Korea, Republic of (South).

OBJECTIVE: The integrity of sperm DNA is important for fertilization and development of healthy offspring and is cited as one of the leading causes of male infertility. Among them, increased sperm DNA fragmentation is one of the causes of infertility that affects changes in sperm integrity. Toxins from smoking are known to potentially affect sperm development and function and negatively affect semen parameters. Recently, the use of e-cigarettes is increasing. This new phenomenon is due to the fact that e-cigarettes are considered a safer alternative to regular cigarettes. The effects of smoking on male fertility have been extensively studied. The purpose of this study is to compare sperm DNA fragmentation patterns of non-smokers, regular smokers, and e-cigarette smokers according to current smoking trends, and to investigate the effects of smoking and smoking methods on male fertility.

MATERIALS AND METHODS: Semen samples were collected from 84 men (36.2±4.7 years old). Each patient was divided into non-smokers (n=34), regular smokers (n=12), e-cigarettes smokers (n=14), regular smokers / e-cigarette smokers (n=28). After semen liquefaction (30-60 minutes), semen analysis and halo-test (HT-HS10 kit) were performed. For statistical analysis, One-way ANOVA was done.

RESULTS: Semen analysis results and testosterone levels did not differ between groups. Sperm DFI was significantly different between groups. Sperm DFI was not statistically significant (p=0.474), but non-smokers (13.2±5.5) were lower than regulars (19.7±8.8), e-cigarettes (27.7±16.6), and regular/e-cigarette smokers (26.6±16.1). The sperm DFI of non-smokers was significantly lower than that of e-cigarettes (27.7±16.6, p<0.01) and regular/e-cigarette smokers (26.6±16.1, p<0.01). Although not statistically significant, it was confirmed that the sperm DFI in e-cigarettes was higher than in regular cigarettes.

CONCLUSIONS: The difference in sperm DFI was not statistically significant between nonsmokers and regular smokers, but the sperm DFI of smokers was higher than that of nonsmokers. However, the sperm DFI of non-smokers was significantly lower than that of e-cigarettes or regular/e-cigarette smokers. As a result, it was confirmed that e-cigarettes could be a factor more affecting sperm DFI than regular cigarettes, and it became evidence that e-cigarettes could have a detrimental effect on human reproductive organs like regular cigarettes. This shows that e-cigarettes cannot be considered an alternative to regular smoking. It is considered that additional research should be conducted on the correlation between the difference in DNA fragmentation by smoking type and embryonic development.

IMPACT STATEMENT: In this study, we confirmed that e-cigarettes are just as harmful as regular cigarettes and might be more harmful when used with regular cigarettes together.

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THE ASSOCIATION BETWEEN A HISTORY OF PATERNAL VAPING AND SPONTANEOUS ABORTION. Michael Eisenberg, MD,[1] Chiyuan Amy Zhang, BS,[2] Tanran R. Wang, MPH,[3] Alyssa F. Harlow, MPH,[3] Amelia K. Wesselink, Ph.D.,[3] Elizabeth E. Hatch, PhD,[3] Lauren A. Wise, Sc.D[3] [1]Stanford University IVF/ART Program, Stanford, CA; [2]Stanford University; [3]Boston University School of Public Health, Boston, MA.