Abstract citation ID: deac104.108

Microfluidic Sperm Sorting (MF) optimize the reproductive outcomes?

1Oasis Fertility, EMBRYOLOGY, Hyderabad, India

Wider implications of the findings:
The effect of testicular endothelial cell-derived GDNF should be also of Sertoli cells was evaluated and GDNF groups compared to control (P<0.05). At 96th and 120th hours, structures forming spaces were found in the group treated with HGF and GDNF compared to the other groups (p<0.05). c-Met and p-c-Met protein expression levels were high in HGF, GDNF, HGF, and GDNF treated groups than in the other groups (p<0.05). The capacity of 15P-1 Sertoli cells to form tubule-like structures was higher in the HGF and GDNF administered. All groups were pursued on a matrigel-based 3D culture system for seven days. Experiments were repeated three times in vivo.

Main results and the role of chance:

Exogenous GDNF treatment together with hepatocyte growth factor (HGF) secreted from Sertoli cells affects the reproductive outcomes. Management for raised sperm DFI to optimize results.

Summary answer:

Sperm DFI reduction with MACS Vs MF Sperm Sorting:

- Blastocyst formation.
- MPR - 8% Vs 18% (p<0.0001)
- MR - 5.3% Vs 11% (p<0.0001)
- IR - 50% Vs 48% (p<0.1624)

What is known already:

1. What method to choose when sperm DFI is raised?
2. What is the best method to select sperm with raised DFI when sperm DFI is raised?
3. What is the optimum method to select sperm when sperm DFI is raised?

Data from this study doesn’t prove superiority of one processing method over another.

Limitations, reasons for caution:

- The study was conducted in a single center.
- The sample size was small.
- The study duration was limited.

Study design, size, duration:

- Couples with one failed IVF and, with raised sperm DFI were randomized into MACS (n=38) and MF (n=50).
- This is an ongoing Randomized Control Trial (RCT) with prior approval from institutional Ethical Committee (ECR/05/043439).
- Study design, size, duration:
- This trial is registered with Clinical Trials Registry India (CTRI) REF/2021/05/043439.
- Reproductive Outcomes of MACS Vs MF Sperm Sorting were:
  - Blastocyst formation.
  - MPR - 8% Vs 18% (p<0.0001)
  - MR - 5.3% Vs 11% (p<0.0001)
  - IR - 50% Vs 48% (p<0.1624)

Couples undergoing IVF stimulation with prior approval from institutional Ethical Committee (ECR/05/043439) were randomized into MACS (n=38) and MF (n=50). Sperm processing done with MACS or MF based on randomization on the day of Oocyte Retrieval (OPU). MACS/MF sperm processing done as per software. Sperm DFI testing was done with SCSA method and randomized using software.
Study question: How does computer-assisted semen analysis (CASA) (Lenshooke, LOGIXX) and at-home sperm testing (ExSeed) compare with manual methodology assessment of male fertility based on WHO criteria (5th Edition); a three-method comparison study.

Summary answer: All methods showed good agreement for concentration and limited agreement for motility highlighting the need for further development of alternatives to manual assessment.

What is known already: Several studies have shown good correlation between CASA systems and laboratory-based manual semen analysis, but only a few have carried out a three-way comparison study. One of which showed positive correlation with motility and concentration between a smartphone-based semen analysis and laboratory-based CASA system and positive correlation between concentration and motility between the smartphone-based CASA system and microscopic-based results. The at-home sperm test kit may play a role in motivating infertile males to visit clinics for early diagnosis and also reducing the need for multiple visits to the fertility clinic for repeat semen analyses.

Study design, size, duration: Fifty patients (between 29 and 56 years) attending a fertility clinic were included in the study between September 2021 to December 2021. Semen samples were split into 3 aliquots and evaluated using manual semen assessment (MSA) according to the WHO 5th Edition (2010) guidelines, the ExSeed Home Sperm Test (HST) and the LensHooke® X1 PRO Semen Quality Analyzer (CASA).

Participants/materials, setting, methods: The semen samples were collected from fifty participants at CARE Fertility Tunbridge Wells. The samples were placed in an incubator at 37°C for 30 minutes to liquefy. After liquefaction, sperm concentration, total motility, total motile sperm count (TMSC) and normal morphology were evaluated. Spearman’s Rank correlations (>0.7) and Chi-squared tests were used and the p-value < 0.05 was considered as statistically significant.

Main results and the role of chance: All variables were highly significantly (p < 0.0002) positively correlated between all 3 methods.

The greatest correlations were obtained for sperm concentration (CASA/HST: r = 0.826; MSA/HST: r = 0.870; MSA/CASA: r = 0.871) and TMSC (MSA/CASA: r = 0.792; CASA/HST: r = 0.800; MSA/HST: r = 0.854). Correlations of motility were markedly lower (MSA/HST: r = 0.611; CASA/HST: r = 0.717; MSA/LCASA: r = 0.750). The lowest correlation was found for morphology (MSA/CASA: r = 0.500). The HST device does not determine morphology.

As compared to MSA, using the HST device agreement for normal or low sperm concentration (>15 × 10⁶/mL or < 15 × 10⁶/mL respectively) was identified in 84.3% of the cases, whereas 94.0% with CASA. The agreement between CASA and HST was 82.0%. For total motility ≥ or < 40%, the agreements were 68.0% (CASA/HST), 56.9% (MSA/HST) and 82.0% (MSA/CASA), respectively.

For the identification of patients with normal morphology ≥4%, the agreement between MSA and CASA was 30%.

Limitations, reasons for caution: The small sample size was 50 cases. The home testing device does not assess morphology. Furthermore, it is difficult to ascertain whether a consumer would carry out the analysis with this device with the same accuracy as an embryologist.

Wider implications of the findings: The need for repeated semen analyses, the effect of the COVID-19 pandemic and the discomfort some patients feel in a clinical setting necessitate the need for evaluation of novel semen analysis approaches. These emerging technologies have potential to be more patient friendly, convenient and efficient than standard semen assessment methods.

Trial registration number: not applicable