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Sperm Functional Assessment: A predictor for successful fertilization after IVF?

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INTRODUCTION:
Traditional semen analyses are routinely performed to evaluate the classical "descriptive" parameters of specimens. However, the usefulness of these semen characteristics are still considerably debated since they provide only limited information on sperm functional competence. Additional assessments are required to ascertain the potential fertilizing ability of spermatozoa. Our Centre has implemented a Sperm Functional Assessment (SFA) package to identify whether a patient's sperm function is such that In-Vitro Fertilization (IVF) can be performed, or whether intracytoplasmic sperm injection will be required to reduce the risk of low/no fertilization. The SFA package includes a detailed morphology assessment, including the Teratozoospermia Index (TZI) according to ESHRE SIG Andrology standards, as well as an assessment of sperm kinematics in semen using computer-aided sperm analysis (CASA), and CASA analysis of sperm hyperactivation under capacitating conditions.

AIM:
To investigate possible relationships between various functional sperm parameters and the fertilization rate at IVF.

MATERIALS AND METHODS:
This retrospective analysis included patients who had IVF treatment during the 9 month period from January to September 2015. An IVOS-II CASA system (Hamilton Thorne, Beverly, MA, USA) was used to determine the concentration of progressively motile spermatozoa and the mucus penetration capable sub-population in semen. Spontaneous hyperactivation was assessed in the washed sperm population after a 1 h incubation in capacitating medium, as well as following a 1 h treatment with agonist (1 µg/ml progesterone + 3.6 mM pentoxifylline).

RESULTS:
Results were analysed using the MedCalc statistics package (see www.mecalc.be) employing a backward multiple regression and ROC curve analyses. Initial results (N = 72 IVF cycles) demonstrated a positive correlation between the fertilization rate (dependant variable) and hyperactivation (R = 0.2772, $P<0.05$) as well as between hyperactivation (dependant variable) and mucus penetration (R = 0.5165, $P<0.01$).

CONCLUSION/DISCUSSION:
During the past few decades, extensive research has been conducted aiming to develop tests that might identify particular aspects of sperm pathophysiology to aid in diagnosing male factor infertility and subsequently giving rise to better outcomes after assisted reproduction technology (ART). When interpreting the present results it must be remembered that the lower end of the patient population has already been truncated since some patients were excluded from IVF based on results from the SFA. Moreover, oocyte quality was not included in the analysis, therefore no conclusions can be drawn as to the relative importance of oocyte and sperm quality in determining fertilization rates or fertilization failure. This study illustrates that additional parameters are required in order to determine the likelihood of successful or failed IVF.