Commentary

Guidelines on sperm DNA fragmentation testing

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Male factor subfertility is present in more than 50% of the couples treated with assisted reproductive techniques. Routine semen analysis provides information on semen volume as well as sperm concentration, motility, and morphology. Standardized methods have been published by the World Health Organization (WHO) (1). Nevertheless the investigation of male factor involvement should always include a complete medical history and physical examination. Endocrine evaluation, ultrasonography, specialized tests on semen and sperm, and genetic screening are additional tests to be used if required.

The etiology of sperm DNA fragmentation is multifactorial and it should not be forgotten that it affects both nuclear as well as mitochondrial DNA (2). Sperm DNA fragmentation (SDF) tests evaluate sperm DNA integrity and have been added to the diagnostic arsenal recently. They are mentioned in recent guidelines (3) and time has come to prepare a review about the tests available.

The authors (4) have summarized the various tests which are used and have evaluated in a very comprehensive way the advantages and disadvantages of each of them. They have marked the terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL), sperm chromatin structure assay (SCSA) and Halo test as the most popular ones. The availability of the technique and the costs and needs for expensive instrumentation are also important issues to compare. Each center has to decide which test to use and also to evaluate its results and define its cut off levels individually. The same authors (5,6) sometimes changed their values between one study and another. In a small study about the predictive value of the sperm chromatin dispersion test in cases of unexplained infertility treated with intra-uterine insemination in our centre (7), we found that DNA fragmentation >20% resulted in a lower pregnancy outcome. Mostly a threshold value of 27% to 30% is mentioned in literature (8). Although SDF is performed on the whole sperm, some authors suggested to analyze only motile sperm (9,10) or morphologically normal sperm cells (11). Most authors agreed that dead sperm cells in a sample may influence the results from most assays (10). Further fine tuning of the tests used is still recommended.

Which patients should be tested by means of SDF and what are the treatment strategies in various clinical situations? New techniques often come and go and in the beginning overconsumption looks around the corner. The authors tackled it in a very pragmatic way. They collected cases from daily practice and reviewed the literature for four groups:

(I) Clinical varicocele;
(II) Unexplained infertility/recurrent pregnancy loss/intrauterine insemination failure;
(III) IVF and/or ICSI failure;
(IV) Borderline abnormal (or normal) sperm analysis with risk factors.

They formulated recommendations and graded them to quality of evidence. That's how guidelines should be used: an objective analysis followed by ready to use information for treatment.

Some challenges for the future may be formulated. Damaged spermatozoa can fertilize an oocyte and a conceptus with a suboptimal paternal integrity may develop. So further research for technology methods to select individual DNA-intact sperm cells must continue.

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Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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