ASSESSMENT OF SPERM NUCLEAR DNA DAMAGE IS PREDICTIVE OF THE OUTCOME OF ASSISTED REPRODUCTIVE TECHNIQUES (ART) IN COUPLES WITH MALE FACTOR INFERTILITY

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Introduction and Objectives:
The objective of our study was to examine the significance of assessment of sperm DNA damage in predicting the outcome of ART in couples with male factor infertility.

Methods:
Ninety-two infertile couples with normal female partners were included in this study. A group of fertile donors (n = 16) served as controls. Standard semen analysis was performed according to the World Health Organization (WHO) guidelines. Levels of sperm nuclear DNA damage were determined by sperm chromatin structure assay. Thirty-three out of the 92 couples underwent ART procedures [intrauterine insemination (IUI) (n = 19), in-vitro fertilization (IVF) (n = 10), or intra-cytoplasmic sperm injection (ICSI) (n = 4)], while the remaining 59 did not.

Results:
Sperm DNA damage (%COMPαt) and motility were significantly correlated with pregnancy (P = 0.04 & 0.03). Levels of DNA damage were negatively correlated with pregnancy, naturally (P = 0.01, r = 0.5), or through IUI (P = 0.01, r = 0.5), IVF (P = 0.009, r = 0.7), but not ICSI (P = 0.2). No pregnancy was reported at DNA damage > 28%, naturally or through any ART. The diagnostic measures of sperm DNA damage and motility to predict pregnancy in couples with male factor infertility are illustrated in the table.

Conclusions:
Sperm DNA damage test may be a potential tool for predicting the outcome of ART in couples with male factor infertility. Since level of DNA damage >28% is inconsistent with initiation of pregnancy, it may be wise to consider canceling an ART cycle when sperm DNA damage exceeds this level.

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients (n = 92)</td>
<td></td>
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<tr>
<td>DNA Damage &lt;28%</td>
<td>100</td>
<td>43</td>
<td>19</td>
<td>100</td>
<td>0.04</td>
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<tr>
<td>Motility ≥50%</td>
<td>82</td>
<td>56</td>
<td>20</td>
<td>96</td>
<td>0.03</td>
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<td>Patients attempting ART (n = 33)</td>
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<tr>
<td>DNA Damage &lt;28%</td>
<td>100</td>
<td>58</td>
<td>47</td>
<td>100</td>
<td>0.04</td>
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<tr>
<td>Motility ≥50%</td>
<td>78</td>
<td>71</td>
<td>50</td>
<td>89</td>
<td>0.03</td>
</tr>
</tbody>
</table>

PPV = positive predictive value; NPV = negative predictive value; P = p-values from logistic regression using DNA damage (%) and motility (%) as continuous variables to predict pregnancy

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