

Effects of acrosomal activity and morphology on fertilization rates following ICSI

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Abstract

Introduction: Fertilization failures after ICSI may be due to different factors related to oocyte, sperm or both of them. Considering the importance of sperm morphology, acrosomal activity in oocyte activation and fertilization rates, this study was done to evaluate the relationship between a series of events occurring during spermiogenesis such as sperm morphology and acrosomal activity as an index for acrosomal integrity and the relationship between sperm ability to induce oocyte activation with fertilization rates following ICSI.

Materials & Methods: Semen samples from 68 infertile couples undergoing ICSI at Isfahan Fertility and Infertility Center were assessed. Some of each semen sample was analyzed for semen parameters according to WHO criteria, most of it was used for ICSI and the rest for Papanicolaou staining and gelatinolysis test to evaluate sperm morphology based on the strict criteria and acrosin activity respectively. The results were analyzed by SPSS software (Version 11.5) and correlation coefficient was determined. P-values less than 0.05 were considered statistically significant.

Results: Results from gelatinolysis showed that the mean halo diameter had a significant positive correlation with sperm concentration ($r=0.343$, $p=0.004$), motility ($r=0.282$, $p=0.020$), sperm morphology according to the WHO criteria ($r=-0.314$, $p=0.009$), fertilization rate ($r=0.270$, $p=0.026$) and the percentage of halo formation ($r=0.853$, $p=0.001$).

Conclusion: The results of the study revealed that during ICSI, spermatozoa with small acrosome, which are likely to have reduced gelatinolysis test parameters (Smaller percentages of halos and smaller mean halo diameters), have lower fertilizing potential. As gelatinolysis test is considered as an index for acrosomal and perinuclear theca integrity, lower fertilizing ability in these spermatozoa could be likely due to their reduced levels of sperm associated oocyte activating factors (SAOAFs). Therefore, studies for the identification and measurement of SAOAF levels in these kinds of spermatozoa are proposed.

Key Words: Acrosin activity, ICSI, Fertilization, Oocyte activation, Sperm morphology.

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