

CORRELATION OF SEMEN ANALYSIS AND HYPOOSMOTIC SWELLING TEST WITH SUBSEQUENT PREGNANCIES

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The hypoosmotic swelling (HOS) test was evaluated in 40 men whose wives had no apparent fertility factors. Only one of 29 men with normal semen parameters had a subnormal HOS test, and that couple failed to conceive compared to 27 of 28 with normal HOS tests who did conceive. All five couples with husbands with subnormal semen parameters but with normal HOS tests achieved a pregnancy, but none of the three with abnormal HOS tests achieved a pregnancy. The results suggest that the HOS test might be of value in predicting which couples should be more patient despite low semen parameters.

Key Words: Hypoosmotic swelling test; Infertility.

INTRODUCTION

The hypoosmotic swelling (HOS) test is technically much simpler to perform than the hamster ova penetration test [6] and some have suggested a correlation between the HOS test and in vitro fertilization [7]. Theoretically, subfertile men with normal spermograms might be detected by demonstrating a defect in the functional integrity of the sperm membrane as evidenced by a subnormal HOS test score. Conversely, a normal HOS test might be able to predict those men with subnormal semen parameters who are still capable of achieving pregnancies. A study was thus designed to test the clinical significance of the HOS test in couples presenting with infertility.

MATERIALS AND METHODS

The couples enlisted in the study had to have a minimum of one and a half years of infertility upon initial presentation. The female partner may have been found to have some subfertility factors, but at the time of the eight-month-study period all female infertility factors must have been normal. Thus, the wife had to demonstrate a mature-sized, dominant follicle of an average 18 mm diameter using pelvic sonography [1] associated with a serum estradiol level over 200 pg/ml [5] with appropriate quality cervical mucus [4]. Furthermore, release of the ovum would be demonstrated by sonography [2] and the woman would have an appropriately dated, late luteal phase endometrial biopsy. A completely negative laparoscopy was required.

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TABLE 1 Correlation of Hypoosmotic Swelling Test and Semen Analysis as Evidenced by Pregnancies Achieved

HOS Test ^a	Semen Analysis					
	Superior			Subnormal		
	No. Patients	No. Pregnant	No. Patients	No. Pregnant	No. Patients	No. Pregnant
Normal	16	15	9	8	5	5
Grey zone	2	2	1	1	3	2
Subnormal			1	0	3	0

^aVariation of the HOS test for the two specimens averaged $\pm 2\%$.

Semen analysis was performed using a Makler chamber. The semen qualities were judged arbitrarily as superior if there were at least 50×10^6 sperm per cc with over 60% motility with a minimum of grade 3 of 4 quality; normal if there were between 21×10^6 to 49×10^6 sperm per cc with at least 60% motility, grade 3 of 4 quality, and subnormal for all other specimens.

The HOS test was performed as previously described [7]. The HOS test was considered normal for a score of 60% swelling or above, grey zone 50 to 59%, subnormal under 50%. Both the semen analysis and the HOS tests were performed twice and the numbers recorded represented an average of the two.

RESULTS AND DISCUSSION

The correlation of the quality of the semen analysis and the HOS tests and subsequent pregnancies achieved during an eight-month period of time is summarized in Table 1. Only one of 29 men with at least a normal semen analysis had an abnormal HOS test, and this couple failed to conceive in contrast to 27 of 28 with borderline or normal HOS tests who conceived (chi square analysis = $p < 0.01$). All five men with subnormal semen parameters but with normal HOS tests achieved a pregnancy compared to 0 of 3 with abnormal semen and abnormal HOS tests (chi square analysis = $p < 0.01$). Two of these three with abnormal HOS tests requested artificial insemination by donor and both achieved a pregnancy within three months.

Many studies concerning evaluation of semen analyses and subsequent pregnancies do not control the female factor. This study included only those infertile couples in whom the female factor was meticulously evaluated and either excluded or corrected. This would thus allow better assessment of the true clinical significance of the HOS test.

Previously, in a similar group of 100 infertile couples in whom all female factors were corrected and all men had normal semen parameters, no clinical correlation could be demonstrated between subnormal hamster ova penetration tests versus normal [3]. The hope in this study was that the HOS test might be able to predict those men who may be subfertile despite a normal semen analysis. The fact that 27 of 28 men with normal spermograms achieved pregnancies when the HOS test was in the grey zone or normal versus the failure in the only man with a normal spermogram, but subnormal HOS test, lends some optimistic hope that perhaps further evaluation will continue to demonstrate the HOS test to be one way to ascertain those men with apparent normal semen with cryptic infertility. Unfortunately, we inadvertently selected a highly fertile group since our normal expectations would normally be only 80 to 85% incidence of pregnancy over eight months in a group of infertility couples where all subfertile factors have been seemingly corrected. Larger numbers of patients with normal semen specimens and subnormal HOS tests are needed before any definite conclusions of the benefit of the HOS test in this situation can be made.

There were only 11 patients with subnormal sperm samples in this study. The dramatic difference between the 100% pregnancies in five patients with normal HOS tests versus 0% with subnormal strongly suggests that a normal HOS test may predict those patients with subnormal semen analyses who are still fertile.

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