

HUMAN SPERM RESISTANCE TESTS AND ITS RELATIONSHIP TO SPERMATOGRAM CHARACTERISTICS

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SUMMARY

Seventy one semen samples from males of infertile couples attending the Reproductive Biology unit were subject for sperm resistance test after analysing for sperm density, motility and morphology. Significant variations in sperm resistance were observed with variations in sperm concentration, sperm motility and morphology. Sperm resistance test showed a good correlation with spermatogram characteristics.

INTRODUCTION

In spite of rapid advances in the field of investigations of male infertility, semen analysis remains the corner-stone of evaluation of infertile males. Usual spermatogram parameters viz sperm count, sperm morphology and sperm motility provides only partial insight into male infertility and at present there is no simple, single 'in vitro' test which truly reflects the 'in vivo' fertilizing capacity of human sperm. Heterologous in vitro fertilization test, although a confirmatory test of fertility potential of a man, is not readily available.

Therefore various indirect tests are associated with routine semen analysis to increase the reliability of trustworthy spermatogram parameters Yanagimachi 1976, But these tests also failed to provide an information regarding fertilizing capacity of human sperm with any certainty.

Sperm resistance test i.e. the resistance of sperm to the immobilizing effect of dilution with large volumes of 1 percent sodium chloride solution, is claimed to be useful in evaluating fertilizing capacity of semen sample particularly of animals. But its significance in the assessment of male fertility potential is doubtful. Therefore present study deals with

finding the relationship between spermatozoa resistance and semen quality in human being. (F) method.

MATERIAL AND METHOD

Seventy-one semen samples from males of the infertile couples attending the Reproductive Biology Unit of physiology department, were analysed for sperm count, motility and morphology as per method described by Sherins. R.J.(1986)

The subjects were asked to observe absolute abstinence of 3 days and semen was obtained by masturbation method.

The sperm resistance (R) was determined by the formula $R=V/V$ where V is the volume of 1 percent sodium chloride solution required to arrest, in a given volume of semen (v), all progressive movement of spermatozoa. The test is carried out with 0.1 ml. semen at 37C and sperm motility is assessed by microscopic examination after the addition of successive lots of 1 ml. 1 percent sodium chloride solution Mann T. 1964. The data was analysed statistically by analysis of variance

RESULTS

The variation of sperm resistance in relation to sperm density, percentage of motile spermatozoa, percentage of morphologically normal spermatozoa and grade of forward progression was as shown in the following tables (Table I-IV).

DISCUSSION

Mann T.(1964) has quoted following figures for sperm resistance in various animals-Bull: 300-20,000, Ram: 100-5000, Stallion: 100-1500, Dog: 200-600. In our study we found that human sperm resistance varies between 10-350. The present study also reveals that sperm resistance increases significantly with increase in sperm concentration, sperm motility, morphologically normal spermatozoa and grade of forward progression. A significant correlation is observed between sperm resistance and sperm count ($r=0.64$), sperm motility ($r=0.58$), sperm morphology ($r=0.56$) and grade of forward progression ($r=0.83$).

TABLE I
SPERM DENSITY WISE - SPERM RESISTANCE

Sperm density (millions/ml)	No. of Subjects	Sperm Resistance Mean \pm S.D.
< 40	20	87.5 \pm 60.94
40 - 80	35	181.42 \pm 81.71
> 80	16	184.37 \pm 80.99
Total	71	155.63 \pm 86.63

P < .01

F₂ 68 = 11.10

Coefficient of Correlation (r) = 0.64

TABLE II
MOTILE SPERM COUNT WISE SPERM RESISTANCE

Motile Sperm Count (Percent)	No. of Subjects	Sperm Resistance Mean \pm S.D.
< 60	17	63.52 \pm 30.19
60-80	36	161.38 \pm 71.03
> 80	18	221.11 \pm 83.44
Total	71	155.63 \pm 86.63

P < .01 F₂ 68 = 34
Coefficient of Correlation (r) = 0.58

TABLE III
MORPHOLOGY WISE SPERM RESISTANCE

Sperm Morphology (Percent Normal)	No. of Subjects	Sperm Resistance Mean \pm S.D.
< 60	15	86 \pm 55.00
60-70	41	166.58 \pm 85.45
> 70	15	191.33 \pm 83.31
Total	71	155.63 \pm 86.63

P < .01 F₂ 68 = 7.38
Coefficient of Correlation (r) = 0.56

TABLE IV
GRADE OF FORWARD PROGRESSION WISE SPERM RESISTANCE

Grade of Motility	No. of Subjects	Sperm Resistance Mean \pm S.D.
++	32	87.81 \pm 52.77
+++	15	156.66 \pm 33.30
++++	24	242.91 \pm 64.77
Total	71	155.63 \pm 86.65

P < .01 F₂ 68 = 34
Coefficient of Correlation (r) = 0.83

The excessive dilution of semen with saline is said to cause permanent loss of motility, metabolic activity and fertilizing capacity of spermatozoa. The exact mechanism of this phenomenon is not known, but it is postulated that excessive dilution must be somehow associated with removal or alteration of cellular sperm component and an upset in ionic exchange reactions involving potassium and perhaps also phosphate ions (Mann T.1964). The sperm resistance test is a simple, rapid and easy to perform test. The test can prove as a useful addition to routine semen analysis, if its results are evaluated by correlating it with 'in vitro' fertilization test. As the effects of dilution resemble with effects of extensive washing of spermatozoa, resistance test can be used as a screening test for selection of semen sample where Artificial Insemination Donor with washed spermato-

zoa is indicated. However the test needs further exploration for defining the lower limit of sperm resistance, below which semen can be considered as infertile with certainty.

REFERENCES

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3. Mann, T: *The Biochemistry of semen and of the Male Reproductive Tract.* (1st Ed) John Wiley and Sons inc. New York 1964, 343-3
4. Sherins, R.J.: *Howards, S.S. : The campbell's Urology* (5th Ed). W.B.Saunders Co. Philadelphia, 1986 P. 640.

TABLE IV
GRADE OF FORWARD PROGRESSION WIFE SPERM RESISTANCE

Grade of Sperm Resistance	No. of Subjects	Mean S.D.
++	12	1.2
+++	12	1.2
++++	12	1.2
Total	36	