

STUDY OF SPERMATOZOA AND THEIR RELATIONSHIP WITH FERTILITY IN MEN OF ARUNACHAL PRADESH

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Abstract : 172 semen samples were collected from a cross section of the infertile population of North-East India, consisting mainly of tribal people and were analysed and evaluated for different parameters. Significant negative correlations were found between sperm count and motility, sperm count and morphology and between motility and abnormal morphology in this series. The percentage of abnormal morphology was very high and prospective study on the aetiology of this factor in these tribal people is warranted.

Key words : infertility semen sperm count sperm motility

INTRODUCTION

The desire to produce child is one of the most fundamental desires of human being. The fertility status of the man can be classified in the following manner, i.e. (a) fertile male - who can deposit normal semen at the cervix of his mate during the act of copulation; (b) subfertile male - who has either a deficiency of semen or a functional defect of the genitalia; (c) infertile male - who fails to produce and deliver normal semen and mature sperms and (d) sterile male - who has incurable absence of

spermatogenesis at any stage. The earlier results of the semen analysis are responsible for increase in our knowledge regarding physiology and biochemistry of human semen (1, 2).

The volume of semen matters only when it is either too small or unduly large (3). As for the sperm count Macleod and Gold (4) considers 20×10^6 per ml to be the dividing line in between the normal and the infertile. In their study on sperm motility, Macleod and Gold (5) concluded that a definite relation

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exists between sperm count and motile activity.

With the purpose of academic knowledge, the correlations of different parameters of semen analysis has not been done in detail earlier in North-East India and for this reason the present study has been undertaken to find out the semen profile of various tribal people of this region suffering from different degrees of infertility.

METHODS

The study was conducted at Arunachal Pradesh and in the Institute of Human Reproduction, Guwahati, Assam.

Out of 172 semen samples, 17 samples were azoospermic (9.88%). The remaining 155 persons were retained for the study. Azoospermic cases were not considered further for the study of different semen parameters.

The semen samples were collected by masturbation with an abstinence of five days, in a dry clean, sterilised graduated wide centrifuge tube. The semen sample with normospermic condition (6) was left for 30 minutes at room temperature for liquefaction (7). The sample thus collected was examined immediately for motility. Motility determination and sperm count were done according to the method of Sherin (8). Morphological study was done according to the method of Casarett (9). Three hundred spermatozoa were studied for their head, neck and tail abnormalities in each sample.

RESULTS

As shown in Table I, among the subfertile persons 45 (29.03%) were oligozoospermic and only 3 (1.9%) persons were having a sperm count above 100×10^6 per ml. The rest 107 (69.03%) persons were in the middle bracket. The mean sperm count was 41.5×10^6 per ml and the standard deviation 26.62.

TABLE I: Frequency distribution of subnormal motility and morphology of sperms in subfertile persons of N. E. India.

Sperm count ($\times 10^6$ per ml)	Frequency	Subnormal motility ($<50\%$ motile)	Subnormal morphology ($>30\%$ abnormal)
< 10	24	23 (95.83%)	24 (100.00%)
10 - 20	21	20 (95.24%)	21 (100.00%)
20 - 30	12	10 (83.33%)	12 (100.00%)
30 - 40	20	16 (80.00%)	19 (95.00%)
40 - 50	19	15 (78.95%)	17 (89.47%)
50 - 60	12	11 (91.67%)	12 (100.00%)
60 - 70	24	15 (62.50%)	21 (87.50%)
70 - 80	12	5 (41.67%)	12 (100.00%)
80 - 90	6	2 (33.33%)	6 (100.00%)
90 - 100	2	1 (50.00%)	2 (100.00%)
> 100	3	0 (0.00%)	2 (66.67%)
Total	155	118 (76.13%)	148 (95.48%)

In the present study, it was seen that 118 (76.13%) persons were asthenozoospermic. A dismal picture of the morphological characters of the sperm has been found, 148 (95.48%) persons being subnormal, the mean sperm abnormal morphology was 73.65 and standard deviation 15.46.

In correlating the motility and morphological parameters with that of sperm count, the subnormal motility decreases from 95.56% in the lower bracket of the sperm count (<20 x 10⁶/ml) to 57.63% in higher bracket of sperm count (>50 x 10⁶/ml) showing a high negative correlation (r = -0.91) as shown in Fig. 1A.

The <20% motility class showed remarkable improvement from 3.4% in >50 x 10⁶/ml sperm count group to 37.8% in <20 x 10⁶/ml sperm count group.

The subnormal morphologic characteristic also showed negative correlation with sperm count (r = -0.84), decreasing from 100% abnormal morphology in the lower bracket of sperm count to 93.22% in the higher bracket as shown in Fig. 1B.

Fig. 2 shows the distribution of sperm motility(%) against abnormal morphology(%). It shows a low negative correlation (r = -0.56) apparent from the wide scattering of dots well outside the line of regression (y = -0.49x + 73.99).

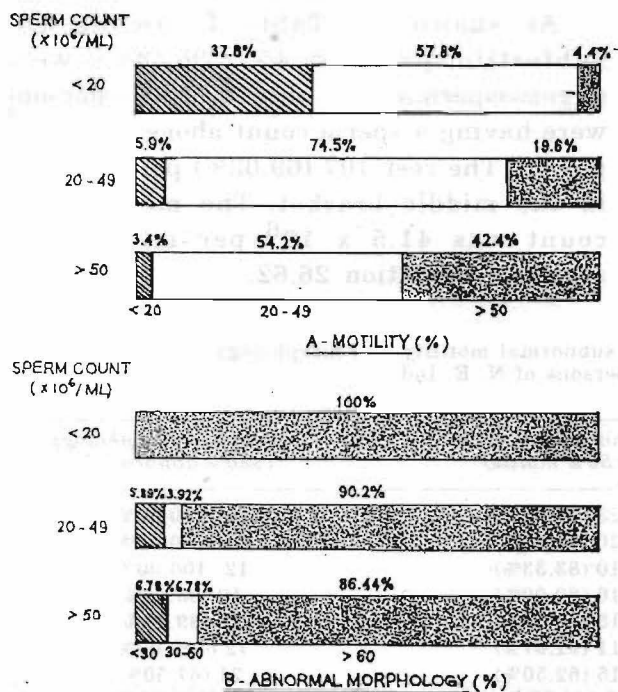


Fig. 1: Correlations of semen qualities of subfertile persons of N.E. India
 A - Sperm count with motility (%)
 B - Sperm count with abnormal morphology (%)

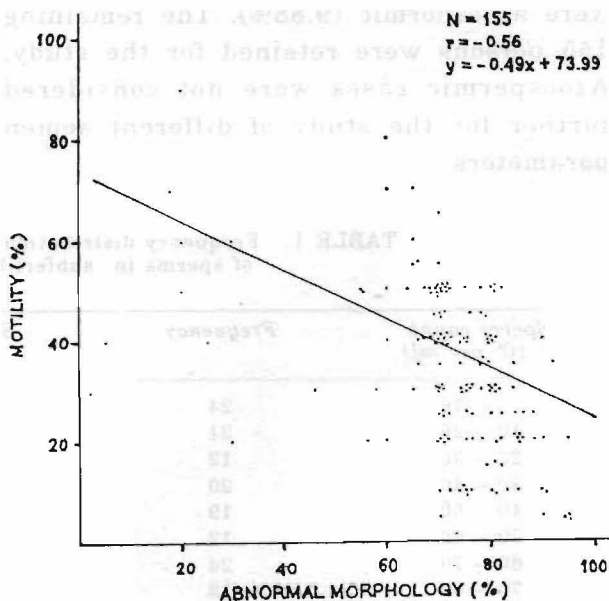


Fig. 2: Correlations of semen qualities of subfertile persons of N.E. India: Sperm motility (%) with abnormal morphology (%).

DISCUSSION

One of the significant characteristics of the present distribution of the semen quality is that a large number of cases are subnormal in one parameter or the other. Only 5 persons constituting only 3.23% of the total persons studied had satisfactory semen quality.

Subnormal motility in the present series (76.13%) is significantly higher and can be correlated with earlier report of Hartman (10) who reported the occurrence of 70.3% subnormal motility in case of barren marriages.

In the present study, it was found that the abnormal morphology alone was mainly responsible for male infertility. 95.48% of the total subfertile population was having subnormal morphology, a very high incidence in comparison to several earlier works (10, 11, 12).

Both the subnormal motility and morphology showed high negative correlation with sperm count ($r = -0.91$ and -0.84 respectively). It proves that the subnormal features of the semen go together. It is this combination (Oligoasthenoteratozoospermic) which is associated with reduced fertility.

The abnormal morphology and sperm motility has cause and effect relationship. When the morphological defect in the sperm (head, neck, tail or cytoplasmic inclusions)

increases it never allows the sperm to move in a normal way and so the percent motility decreases, which is shown by the negative correlation value ($r = -0.56$).

As we know fertility depends not only on the quantitative production of the sperms but also on the physiological efficiency of those produced. The oligozoospermic group, not the completely sterile group with azoospermia, constitutes the basic male sterility problem group in the present subfertile population. In this group, other subnormal semen qualities also accompanied which aggravated the fertility status of the persons concerned.

As defects in the sperm morphology posed serious deterioration of the semen profile in the subfertile population of North-East India, more prospective studies in different directions are required to find out the aetiologic factor (or factors) to account for the high incidence of male infertility problems in this region.

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