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Evaluating the parameters of male infertility in Karachi

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ABSTRACT

Introduction: Male infertility is a major contributor to failure of conception in married couples seeking consultation for assisted reproduction, accounting for 20-30% of the cases. The present study attempts to assess the magnitude of the problem in relation to age groups among such males in Karachi.

Objective: To document infertility parameters through semen analysis of males seeking consultation at a public hospital of Karachi.

Materials & Methods: This descriptive case series was carried out at Karachi City from 1st January 2015 to 31st December 2015. In this study subjects were divided by age differences into three groups (Group I, 21-30 years; Group II, 31-40 years; and Group III, more than 40 years). Samples were collected through masturbation, after liquefaction of samples, analysis was performed on light microscopy. Motility and morphology analyses were performed in presence and absence of debris, agglutination and microbial contamination were noted.

Results: Despite the age difference, young generation have more abnormal semen percentage (56%) compared to group II (50%) and near to group III (58%). Most prevalent abnormality among three groups was asthenoteratospermia. It seems that young generation in terms of abnormality is at elevated risk of infertility. This is due to environmental change, change in lifestyle and nutritional intake of youth.

Conclusion: Further directed research would help overcome this alarming situation and save fertility-cum-inheritance of our youth.

Keywords: Semen Cytology; Infertility, Male; Fecundity; Spermatozoa.

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INTRODUCTION

The long-established microscopic semen evaluation method provides useful information about motility and morphology, despite variation of parameters from past to new analysis and difference in performing methods among technicians and laboratories. Such an evaluation has utility in predicting reproductive performance in standardized assisted reproductive settings.[1]

Approximately 15% of couples attempting their first pregnancy meet with failure. Most authorities define these patients as primarily infertile if they have been unable to achieve a pregnancy after one year of unprotected intercourse. Incumbently there are 48.5 million infertile couples worldwide,[2] from which pure male factor accounts for 20-30%,[3] whereas in Pakistan male infertility is 21.91%.[4] A semen analysis is performed when a health practitioner thinks that a man or couple might have a fertility problem. Still routine semen evaluation is the main pillar to investigate male fertility. For semen evaluation WHO published first manual in 1980 to help investigators. The recent modified manual was published after the assessment of 4500 men from 14 different countries.[5] The lower reference values for men who are unable to conceive within 12 months of unprotective sex are: semen volume 1.5 per ml; total sperm count 39 million per ejaculate; sperm count per ml 15 million; 58% vitality; progressive motility 32%; total motility 40%; and normal morphology 4%.[5]

Prediction of male infertility with limited power has been reported from 1980 till present;[6,7] both microscopic and macroscopic parameters were included in the analysis. Before confirmation of normal or infertile status, multiple analyses should be carried out due to large variation in the spermatozoa parameters.[8]

The macroscopic parameters are: a) *Volume*- an accurate indicator of various abnormalities; b) *Appearance*- absence of spermatozoa in sample gives translucent appearance and non-sperm components render opaque appearance; c) *Liquefaction*- a sample that liquefies after ejaculation within 15 - 30 minutes

is normal in the absence of obstruction of seminal vesicle; a sample that lacks secretions from seminal vesicle fails to coagulate. Prolonged liquefaction is due to inflammation and causes poor prostatic secretion; d) *Viscosity*- another property considered abnormal when the length of thread exceeds 60 mm.

If these cases are associated with low sperm motility, the sperm transportation will be compromised.[5,6] Microscopic attributes of the seminal fluid include sperm concentration, motility, viability, morphology as well as non-sperm cellular components in the form of leukocyte concentration and immature germ cells. Among the parameters reported in a routine semen analysis, it is not yet known which one would be the most associated with fertility. While many Andrologists' reports point to sperm morphology as the valuable parameter, others indicate sperm concentration and/or motility as the most valuable.[9]

In addition, a higher prevalence of primary and secondary infertility has been seen among repeated spontaneous aborters. Reports show that despite a normal fertilization rate, a higher rate of early spontaneous abortions occurred in patients with <4% morphologically normal spermatozoa as assessed by Kruger strict criteria.[10] This observation indicates that the main problem with morphologically abnormal spermatozoa was not an impaired fertilization, but rather that these spermatozoa may have resulted in a higher percentage of abnormal embryos which were aborted early in gestation.

Several studies have suggested that human semen quality and fecundity have been declining during the past decades.[11,12] Nevertheless, other works have obtained contradictory results indicating that these changes have not taken place homogeneously in the world.[13,14] Geographical differences in semen quality also support the fact that semen quality may have declined only in some areas.[15,16] Changes in seminal samples are recent[17,18] and may be related to environmental or occupational pollutants, changes in lifestyles, exposure to toxins, or dietary habits.[19,20]

MATERIALS & METHODS

This descriptive case series was carried out at Karachi City from 1st January 2015 to 31st December 2015. This study is composed of 807 male subjects who came for treatment of infertility and wanted to know the cause of their infertility at Dr. Ruth K M Pfau Civil Hospital Karachi. Subjects were divided into three age groups such as Group I (21-30 years), Group II (31-40 years) and Group III (more than 40 years). Samples were collected with recording of abstinence period and collection time; the entire ejaculate was poured in a wide mouth sterile container.

Analysis was done within 1 hour of collection to limit the deleterious effects of dehydration, pH or changes in temperature on motility. After the liquefaction of the sample at 37°C whole sample was mixed thoroughly by pipetting in & out; then a drop of 5-10µl was poured on slides and covered with coverslip. Then slide was put on bench top incubator to maintain 37°C temperature of the drop. The microscopic study was carried out on bright field microscope noting the parameters to evaluate and record the values on record register. In the end, results were analyzed and conclusions made. All the parameters were analyzed and recorded according to WHO criteria except 4% morphology, which was according to the analysis at IVF laboratory[18] that advises caution when interpreting the new WHO reference values because they have not yet been accurately defined to discriminate fertile from infertile men; hence the morphology parameters of 30% were retained as per reports from most of the IVF laboratories of Pakistan. Inclusion criteria were according to those of WHO, while samples having a major liquefaction problem, and subjects under 20 years of age were excluded from study. The cases were assessed for the following parameters: teratospermia, asthenospermia, azoospermia, Necrospermia, oligospermia and their combinations. All data were analyzed by computer software SPSS 17.0.

RESULTS

Semen parameters were compared among the age groups as shown in Table 1. Group I had higher (54%) abnormal semen analysis compared to group II (50%) and near to group III (58%) despite the age difference. While analysing other parameters it was found that morphology and motility in combination have no significant difference among Groups I (17%), II (16%) and III (18%). In terms of count, motility and morphology (Oligoasthenoteratospermia), Group I (12%) had significant difference ($p<0.05$) from Group II (<1%), but there was no significant difference while comparing Group I (12%) to Group III (13%). Analysis of motility and morphology defects revealed that they increased as age of the subject increased. Analysing morphology (Teratospermia), it was seen that with increase in age there was a mild increase in defects based on comparison done among the groups (Group I = 10%, Group II = 09% and Group III = 13%). Besides these, no noticeable difference was found while studying other parameters among the groups.

Table 1: Comparison of semen parameters among the age groups (%ages)

Semen Parameters	Group I	Group II	Group III
Normal	46	50	42
Abnormal	54	50	58
Asthenoteratospermia	17	16	18
Oligoasthenoteratospermia	12	<1	13
Teratospermia	10	09	13
Azoospermia	08	07	09
Asthenospermia	03	08	07
Oligoasthenospermia	03	09	<1
Oligospermia	01	<1	00
Necrospermia	<1	01	00

Furthermore, it was found that the most prevalent abnormality among the age groups was motility (Group I = 70%, Group II = 51% and Group III = 61%), as shown in Figure 1.

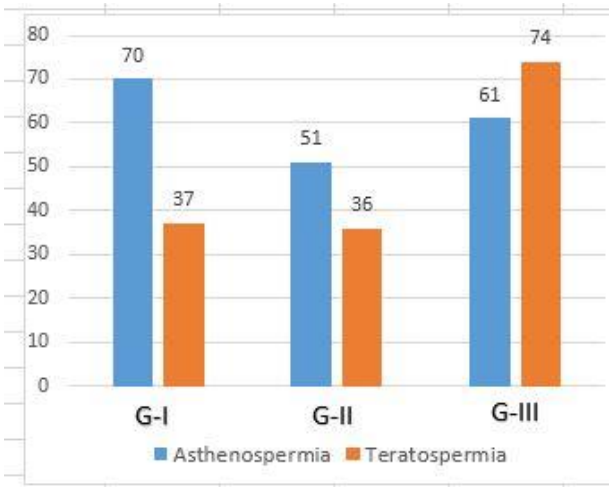

Figure 1: Most prevalent abnormalities among the groups.

DISCUSSION

The distribution of men according to age shows most patients were between the ages of 31-40 years (48%). It is well established by the study of Merino and Carranza-Lira et al. and found in this study also, that only small percentage of men attending the infertility clinics are older than 40 years (10%).

In the present study in terms of abnormality, when Groups II (50%) and III (58%) were compared, it was found that there was increase in abnormalities as age increased but comparing Group I (54%) to II & III there is significant difference. There are two possibilities, first due to awareness, young generation is step forward in diagnosis to cope problem at earliest, second is that due to changing lifestyle, nutritional intake and environmental changes, young generation is badly encircled in infertility.

While analysing different parameters it was found that morphology and motility in combination had no significant difference among the Groups I (17%), II (16%) and III (18%). In terms of count, motility and morphology Group I had no significance difference with Group II but there was significant difference while comparing Group I to Group III. It was found that young generation is also severely affected by these parameters and its alarming situation for youth regarding infertility. This incumbent situation is similar to the studies of Carlsen E et al (1992),[11] Swan SH (2006),[12] and Homan GF et al (2007)[20] that there is decrease in semen quality over the past 5 decades.

According to Nieschlag et al[21] there is a significant decrease in sperm motility in older men, but in the present research it was found that there were only mild decreases in sperm motility in older men with no significant difference among the age groups more than 30 years (Group I = 03%, Group II = 08% and Group III = 07%) of Karachi males sampled.

Analysing morphology, it was seen that with increasing age there was increase in defects of morphology in spermatozoa while comparison done among the groups (Group I = 10%, Group II = 09% and Group III = 13%). Besides this, studying azoospermia parameter in groups (Group I = 08%, Group II = 07% and Group III = 09%), there is no noticeable difference, and this Azoospermia condition also appears when Y-chromosome microdeletion occurs. It would seem that youth is prone to it; researchers must study why this is happening to overcome the cause and save youth fertility.

It was found that the most prevalent abnormality among the age groups (Group I = 70%, Group II = 51% and Group III = 61%) is motility in combination along with the other parameters. Adding to this it seems that morphological defects increases as age increases (Group I = 37%, Group II = 36% and Group III = 74%). These two are considered most important while treating male-infertility. Other parameters such as necrospermia, oligospermia and others in combination have no significance difference among the three groups.

CONCLUSION

In this research, most prevalent abnormality is asthenoteratospermia in three groups. Besides, it seems that young generation in terms of semen abnormality is at high risk of infertility.

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REFERENCES

1. Christensen PC, Liboriussen HT, Lehn-Jensen H. Implementation of flow cytometry for quality control in four Danish bull studs. Anim Reprod Sci. 2005;85:202-8.
2. Agarwal S. Reproductive biology and endocrinology. 2015; 13:37.
3. Sharlip ID, Jarow JP, Belker AM, Lipshultz LI, Sigman M, Thomas AJ, et al. Best practice policies for male infertility. Fertil Steril. 2002;77:873–82.
4. Gohel K, Jojera A, Soni S, Gang S, Sabnis R, Desai M. Bacteriological profile and drug resistance patterns of blood culture isolates in a tertiary care nephrourology teaching institute. Bio Med Res Int. 2014:5.
5. Cooper TG, Noonan E, von Eckardstein S, et al. World Health Organization reference values for human semen characteristics. Hum Reprod Update. 2010;16(3):231-45.
6. Glazener CM, Coulson C, Lambert PA, et al. The value of artificial insemination with husband's semen in infertility due to failure of postcoital sperm-mucus penetration-controlled trial of treatment. Br J Obstet Gynaecol. 1987;94:774-8.
7. Swan SH. Semen quality in fertile US men in relation to geographical area and pesticide exposure. Int J Androl. 2006;29:62-8.

8. Keel BA. Within- and between-subject variation in semen parameters in infertile men and normal semen donors. Fertil Steril. 2006;85:128-34.
9. Lewis SE. Is sperm evaluation useful in predicting human fertility? Reproduction. 2007;134:31-40.
10. Hamamah, S, Fignon A, Lansac J. The effect of male factors in repeated spontaneous abortion: Lesson from in-vitro fertilization and intracytoplasmic sperm injection. Hum Reprod Update. 1997;3:393-400.
11. Carlsen E, Giwercman A, Keiding N, Skakkebaek NE. Evidence for decreasing quality of semen during the past 50 years. BMJ. 1992;305:609-13.
12. Swan SH. Does our environment affect our fertility? Some examples to help reframe the question. Semin Reprod Med. 2006;24:142-6.
13. Bujan L, Mansat A, Pontonnier F, Mieusset R. Time series analysis of sperm concentration in fertile men in Toulouse, France between 1977 and 1992. BMJ. 1996;312:471-2.
14. Paulsen CA, Berman NG, Wang C. Data from men in greater Seattle area reveals no downward trend in semen quality: further evidence that deterioration of semen quality is not geographically uniform. Fertil Steril. 1996;65:1015-20.
15. Fisch H, Goluboff ET. Geographic variations in sperm counts: a potential cause of bias in studies of semen quality. Fertil Steril. 1996;65:1044-6.
16. Swan SH, Brazil C, Drobnis EZ, Liu F, Kruse RL, Hatch M, et al. Geographic differences in semen quality of fertile U.S. males. Environ Health Perspect. 2003;111:414-20.
17. Irvine S, Cawood E, Richardson D, Macdonald E, Aitken J. Evidence of deteriorating semen quality in the United Kingdom: birth cohort study in 577 men in Scotland over 11 years. BMJ. 1996;312:467-71.
18. Esteves SC, Zini A, Aziz N, Alvarez JG, Sabanegh ES, Agarwal A. Critical appraisal of World Health Organization's new reference values for human semen characteristics and effect on diagnosis and treatment of subfertile men. Urology. 2012;79:16-22.
19. Tielemans E, Burdorf A, te Velde ER, Weber RF, van Kooij RJ, Veulemans H, et al. Occupationally related exposures and reduced semen quality: a case-control study. Fertil Steril. 1999;71:690-6.
20. Homan GF, Davies M, Norman R. The impact of lifestyle factors on reproductive performance in the general population and those undergoing infertility treatment: a review. Hum Reprod Update. 2007;13:209-23.
21. Nieschlag E, Lammers U, FreischemcW, Langer K, Wickings, EJ. Reproductive functions in young fathers and grandfathers. J Clin Endocrinol Metabol. 1982;55:676-81.