Original Article

Abnormalities of semen and incidence of azoospermia in Sukkur Region

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ABSTRACT

Objectives

To evaluate various abnormalities of semen and assess azoospermia in Sukkur region of Sindh.

Methods

Five hundred seven semen samples were analyzed. They were either advised by their clinicians, consultants or out of their self-awareness of semen analysis. Individuals using the facilities available in laboratory for this purpose opted either for masturbation or intercourse. These fresh samples were kept at 37^0C for ½ an hour for liquefaction. Semen samples were examined within 1 hour.

Results

Out of 507 samples, these were age groups: 15-24, n=85, 25-34, n=302, 35-44,n=101, 45-54,n=15, and 55-onwards,(n=4. Various abnormal shapes of spermatozoa were observed and small round headed with short tailed (29%), small-round headed with long tailed (16.56%) and small round headed with short and long tailed spermatozoa (37.28%) were recorded . Predominant abnormal forms of spermatozoa were of small round headed with short and long tailed (n=122) were observed. The total percentage of azoospermia was 17% and major age group affected was (25-34) followed by age group (35-44) and (15-24).

Conclusion

It was concluded that 17% of individuals tested were affected by azoospermia. Efforts are to be focused on the determination of the factors causing variations in sperm cells, low count and azoospermia in developing countries. (Rawal Med J 2010;35:).

Key Words

Semen analysis, spermatozoa, azoospermia.

INTRODUCTION

The seminal fluid or semen, a white or grey liquid, is a suspension of spermatozoa in seminal plasma, which is a mixture of secretions from the prostate, seminal vesicles, epididymis, urethral glands, Cowper's glands, and vasa deferentia.[1, 2] Usually, each milliliter of semen contains millions of spermatozoa (sperm), but the majority of volume consists of secretions of the glands in the male reproductive organs.[3] Spermatozoa use fructose anaerobically to produce the ATP necessary for (swimming) motion. Semen clots almost immediately after ejaculation, forming a sticky, jelly-like liquid. It will liquefy again in 5 to 40 minutes.[4] In Pakistan the prevalence of infertility is 21.9%. This comprises about 3.9% as primary infertility and 18.0% as secondary infertility.[5]

The head of normal sperm is oval head shaped, an intact central or "mid" section and an uncoiled, single tail.[6] Cytoplasmic droplets along the tail may indicate an immature sperm.[7] While the prevalence of azoospermia leading to sperm count and abnormalities in spermatozoa has been reported worldwide, no data exists from Sucker region. The objective of the present study was to evaluate the sperm abnormalities in various individuals of Sukkur region ans assess the incidence of azoospermia.

SUBJECTS AND METHODS

The study was conducted at the Safeway Diagnostic and Research Laboratory, Sukkur from 2002-2004. The individuals were either advised by doctors or were self referrals. The standard procedures of collection, transport, and counting of semen samples were applied,[8] except 30 minutes were used for liquefication instead of 60 minutes. The persons were given clean, dry, leak-proof containers and were requested to collect a specimen of semen at the laboratory following 3-7 days of sexual abstinence. They were

instructed to provide a complete ejaculate for analysis. These fresh samples were kept at 37^0C for ½ an hour for liquefaction and examined within 1 hour.

Sodium bicarbonate-formalin (diluting fluid) and Neubauer ruled chamber based procedure was applied for performing sperm count and number of spermatozoa were calculated in 1 ml of fluid by multiplying the number counted by 100,000. Morphology of spermatozoa was examined in the preparation (s) for normal and abnormal spermatozoa using 40 x objective and 100 x objective was used to confirm abnormalities. 100 spermatozoa were counted and percentage showing normal morphology and percentage that appear abnormal was estimated. Normal spermatozoa was considered as 50-70 µm in length and each consisted of an oval-shaped head (with acrosomal cap) measuring 3-5 x 2-3 µm, short middle piece, and a long thin tail (at least 45 µm in length. Normal total sperm count (40-200 millions/ml) was considered as standard normal count in this study.

RESULTS

Five hundred seven semen samples of varying age groups were analyzed. These belonged to following age groups: 15-24, n=85, 25-34, n=302, 35-44, n=101, 45-54, n=15, and 55-onwards, n=4 (Table 1). The highest motile average (56.36%) was in the age group of 25-44 and the highest non-motile (63.33%) was in the age group of 35-44 (Table 1).

Table 1. Various abnormalities of sperms seen.

Age Group (years)	**Number**	**Average count (Millions/ ml)**	**Motile average**	**Non-motile average**	**Abnormal average**	**SRH,* STS** ***	**SRH, * LTS*** **	**SRH,* S&LTS* *****	**Azoospermia**
15-24	85	40.6	37.5%	62.5%	30.05%	28	15	30	12
25-34	302	42.21	56.36%	43.64%	29.28%	89	51	112	50
35-44	101	41.15	34.66%	65.34%	31.28%	27	16	38	20
45-54	15	39.26	36.66%	63.33%	32.66%	02	01	08	04
55-onward	04	47.25	37.5%	62.5%	58.2%	02	01	01	Nil
	507					29.2%	16.56%	37.28%	17%

*SRH; Small round headed, **STS; Short tailed spermatozoa, ***LTS; Long tailed spermatozoa, ****S&LTS; Short and long spermatozoa

The highest non-motile (65.34%) was in age group of 35-44 and lowest (43.64%) was in 25-34, respectively. The highest abnormal spermatozoa (58.2%) were observed in the age group of 55 and above where as lowest (29.28%) was in 25-34 age groups.

Table 2. Leukocytes, erythrocytes and epithelial cells.

Age Group (years)	Number	Average count (millions/ml)	Epithelial cells	Erythrocytes	Leukocytes
15 – 24	85	40.6	2.94-4.31%	1.56-2.74%	5.76-6.02%
25 – 34	302	42.21	5.92-8.29%	1.0-1.6%	6.8-9.26%
35 – 44	101	41.15	2.47-3.46%	Nil	2.73-3.81%
45 – 54	15	39.26	5.52-8.71%	Nil	Occasional
55 – Onward	04	47.25	Occasional	Nil	7.04-9.16%

The total percentage of azoospermia was 17% and major age group affected was (25-34) showing majority of the cases followed by age group (35-44) and (15-24) respectively (Table 1). Predominant abnormal forms of spermatozoa were of small round headed with short and long tailed (n=122) were observed.

Table 3. Different shapes and forms of the sperms.

Age Group (years)	Number	Nos. of cases/ SRH*, STS**	Nos. of cases/ SRH*,LTS***	Nos. of cases/ SRH*,S&LTS****	Nos. of cases/ Azoospermia
15 – 24	85	1:0.32	1:0.176	1:0.353	1:0.14
25 – 34	302	1:0.33	1:0.169	1:0.371	1:0.165
35 – 44	101	1:0.26	1:0.158	1:0.376	1:0.198
45 – 54	15	1:0.133	1:0.066	1:0.533	1:0.266
55 – Onward	04	1:0.5	1:0.25	1:0.25	Nil

*SRH; Small round headed, **STS; Short tailed spermatozoa, ***LTS; Long tailed spermatozoa, ****S&LTS; Short and long spermatozoa

The presence of leukocytes, erythrocytes and epithelial cells was also observed in all age group and Table 2 demonstrates various age groups and percentage of frequency of these cells in semen samples. The ratio of different shapes/forms of the sperm cells, ratio of average count to motile, non-motile and abnormal sperms and ratio of cases to the cells are presented in Table 3.

DISCUSSION

We observed that approximately 17% individuals had azoospermia. This finding is not surprising as it is already reported that about 25% of infertility is related to male.[11] Adiga et al have previously reported that there has been a trend (13 years observations) of declining in sperm count (30.3%), sperm motility (23%) and morphology (51.25%) respectively.[9] A recently discovered defect may be responsible for 13% of the cases of azoospermia, was believed by researchers that this flaw arises spontaneously and is not inherited, although genetic abnormalities are rarely suspected.[10]

The possible reasons of male infertility include genetic factors which affect germ cell development, differentiation, function and ultimately results in spermatogenesis impairment. It is reported that primary infertility affects 15-20% of couples who wish to conceive and approximately, one third of cases result from male factors, one-third from female factors, and one third from combined factors.[11] In Pakistan, previous workers [12,13] reported the occurrence of 17.5% azoospermia and 8,5% obstructive azoospermia. In India, there is regional variation in the prevalence of azoospermia, being 38% in Karnool and 37,4% in Jodhpur while in Karnool, prevalence of oligozoospermia was 51%.[14] In Sweden, in and andrology unit in patients with infertility, 27.6% had oligospermia and

72.4% had azoospermia.[15] Our figure of 17% coincides with Japanese men where 15-20% (Av. 17.5%) of infertile men has azoospermia.[16] Number of previous workers[17-19] have suggested the possible factors of male infertility including pathological infertility, physiological, genetically, and sexually transmitted infections.

This is for the first time that the findings regarding semen analysis of individuals from Sukkur region is being reported. However, there were many bottlenecks in this study and many questions are unanswered such as exact factors or mechanisms responsible for low male infertility, azoospermia and kinds of azoospermia. It will be of great interest if studies are directed on multidimensional approaches such as genetically, environmental, nutritional, and socioeconomic and biochemical approaches. These combined and interlinked efforts may determine the factors causing variations in sperm cells, low count and azoospermia.

CONCLUSION

In our study, we observed 17% males who were suffering from azoospermia in Sukkur region. To find out exact mechanisms of this low-infertility, combined efforts are required and should focus on the aspects of physiology, genetics and sexual disorders in men.

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