SEMINOGRAM IN MALE PARTNERS OF INFERTILE COUPLES ATTENDING INFERTILITY CLINIC IN CALICUT, KERALA

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ABSTRACT

BACKGROUND

Rising trends of male factor infertility has been reported worldwide. Lifestyle, food habits and even cell phone usage has been implicated in this. The aim of this study is to assess the prevalence of seminal abnormalities in infertile men attending the infertility clinic.

MATERIALS AND METHODS

A retrospective study of seminal parameters in male partners of infertile couples attending the infertility clinic in Institute of Maternal and Child Health, Calicut, between October 2015 and November 2016.

RESULTS

A total of 1072 semen analysis reports were reviewed. As per the reference standards set by the 2010 World Health Organization manual of semen analysis, normozoospermia was found in 4.9%, asthenoteratozoospermia in 56.6%, oligoasthenoteratospermia in 14.08%, severe oligoasthenospermia in 17.8% and azoospermia in 4.3%. Teratozoospermia was found in 1.58%.

CONCLUSION

Asthenoteratozoospermia was the commonest semen abnormality found in male partners of infertile couples. Severe male factor, that is, severe oligoasthenospermia and azoospermia together constitute around 22% of the abnormalities. Combined factor abnormalities are more prevalent than single factor abnormalities.

KEYWORDS

Seminal Fluid Abnormalities, Male Factor, Azoospermia, Oligoasthenozoospermia.

HOW TO CITE THIS ARTICLE: Narayanan P, Suresh S. Seminogram in male partners of infertile couples attending infertility clinic in Calicut, Kerala. J. Evid. Based Med. Healthc. 2017; 4(10), 549-551. DOI: 10.18410/jebmh/2017/106

BACKGROUND

Infertility is defined as failure to conceive after one year of unprotected sexual intercourse by the National Institute for Health and Care Excellence Guidelines (NICE). Even though, many tests are available for evaluation of infertility semen analysis is a basic, inexpensive and simple test for the evaluation of the male, which can provide valuable information. Semen analysis is the cornerstone of the workup, diagnosis and treatment of male infertility[1] and provides an indication of the testicular function and integrity of the male genital tract. Semen parameters (e.g. appearance, volume, pH, liquefaction, concentration, motility, morphology, viability and presence of leucocytes) have been found to be important determinants of functional competence of the spermatozoa.[2,3] Population studies suggest that 30%-50% of infertility is male factor in origin.[4] Semen parameters are affected by occupation, habits, environmental factors, age, etc.

Financial or Other, Competing Interest: None.
Submission 02-01-2017, Peer Review 09-01-2017,
Acceptance 18-01-2017, Published 01-02-2017.
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DOI: 10.18410/jebmh/2017/106

AIMS

Aim of this study is to review patterns of semen fluid abnormalities in order to establish prevalence of male factor contribution to infertility and help future identification of responsible aetiologies and possible treatments.

MATERIALS AND METHODS

The semen samples of the male partners of infertile couples attending the infertility clinic between October 2015 and November 2016 was analysed according to World Health Organization 2010 guidelines.

After 2-7 days of abstinence, semen samples were collected by masturbation into a wide mouthed plastic container. Patients were instructed to maintain the samples at body temperature (37°C) and to deliver them within 1 hour after collection. All samples were analysed after liquefaction by the same andrology trained technician to avoid interobserver variation. Parameters analysed included semen volume, sperm concentration, morphology and

sperm motility. Semen volume was assessed using transfer pipette. Concentration and motility was assessed using Makler counting chamber. Morphology was assessed after preparing a smear and staining with eosin-nigrosin stain. Two replicate samples were examined to confirm all parameters readings.

RESULTS

Seminal fluid samples collected from 1072 men were analysed (Table 1).

Azoospermia was diagnosed if two semen analysis showed no sperms in the ejaculate after centrifugation and examination of the pellet.

The following cut offs were used to define the various semen abnormalities-

Oligozoospermia ⟶ Sperm concentration <15 million.
Severe oligozoospermia ⟶ Sperm concentration <5 million.
Asthenozoospermia ⟶ Progressive motility <32%.
Teratozoospermia ⟶ <4% of the sperms showing normal morphology.

Normozoospermia was found in only 53 (4.9%) of the subjects. Azoospermia was encountered in 47 (4.3%). Asthenoteratozoospermia was found in 609 (56.8%) subjects and was the commonest abnormality.

Oligoasthenoteratozoospermia was found in 151 (14.08%) of the males.

Severe oligoasthenospermia (concentration <5 million) was found in 191 (17.8%) of subjects.

Single factor abnormalities like absolute teratospermia in 17 (1.58%) and asthenospermia in 4 (0.37%) was also encountered rarely.

Age wise analysis of seminal fluid abnormalities showed an overall similar picture across various age groups except for azoospermia, which was more common in the 30-40 and >40 year age groups compared to 20-30 years (4.8 and 4% versus 0.03%, respectively) (Table 2).

DISCUSSION

A properly performed semen analysis remains the cornerstone of assessment of male factor in infertility clinics worldwide. WHO 2010 guidelines provide the reference values for the various semen parameters.[5] Even though, semen analysis per se is thought to be poor predictor of fertility with a great overlap in values of various parameters from normal and infertile men, it still remains the first and often the only, fertility oriented investigation the male partner undergoes. Sperm function tests like sperm cervical mucus interaction tests, zona free hamster oocyte penetration test, human zona pellucida binding tests, acrosome reaction, etc., have been classified as research procedures in WHO 2010 manual. Routine use of sperm DNA (deoxyribonucleic acid) fragmentation tests is also controversial as the prognostic value is doubtful.[6]

Semen analysis performed in 1072 men revealed an abnormality in 95.1% that could contribute to the subfertility. This is higher than the 30-50% contribution of male factor in infertility reported in the literature.[7] This high rate of seminal fluid abnormalities may explain the low rates of success with conventional methods of treatment and the need for other modalities of treatment like IVF/ICSI.

Asthenoteratozoospermia is the commonest abnormality found in our study. Semen of infertile male was found to have a 52% of abnormal forms[8] in a study by Alenezi H et al. Ugwuja et al[9] reported 74% abnormal semen parameters in Nigerian infertile males with asthenospermia being the major sperm defect. (70%) attributed to increased genitourinary infections.

Oligoasthenoteratozoospermia was found in 14.8% and severe oligoasthenospermia was found in 17.8% of the males. This is comparable to a study by Kumar et al,[10] which assessed the prevalence of male factor infertility over a period of 10 years in Central India and the incidence of oligospermia was found to be 34%.

Azoospermia was found in 4.3% of the subjects in our study. A 2-5% incidence of azoospermia is found in general male population.[11]

Isolated teratozoospermia and asthenospermia was found rarely in our population and may warrant further investigations into the cause of this problem.

The production of reproductive hormones, sexual function and semen production are affected by increasing paternal age. These affect the fertility, pregnancy outcome and some birth defects and diseases in offspring are all linked to paternal age.[12] The impact of male age on histopathological aspects in the ageing testes leads not only to reduced numbers of Sertoli cells, Leydig cells and germ cells, but also to other changes like thickening of the basal membrane of the tubuli seminiferi parallel to a reduction of the seminiferous epithelium and defective vascularisation of the testicular parenchyma. Testicular size was found to be affected only in the eighth decade of life. Semen volume and seminal fructose concentration decrease with age, possibly due to a seminal vesicle insufficiency.[13] Sperm motility could be reduced due to altered function of the post testicular glands like prostate and seminal vesicles.[14] Semen parameters in older men may reflect the reproductive toxicity of various drugs as well as cumulative effect of environmental toxins.

Age wise analysis of seminal fluid abnormalities showed an overall similar picture of abnormalities across various age groups. Changes in sperm concentration with age are controversial with some studies showing a 3.3% decline with age while other data report no change in sperm concentration up to age 50.[15] Similarly, controversial relationship between ageing and other semen parameters have been reported.

This study is limited by selecting the male partners of infertile couples and may not represent the general population at large. Further, the effects of smoking, alcoholism, body mass index, medications, etc. has not been analysed.

CONCLUSION

Majority of the semen samples of male partners of infertile couples were abnormal. Further studies are needed to address possible aetiologies and treatment of oligospermia and teratospermia in our region to improve fertility rates.

ACKNOWLEDGEMENT

I acknowledge the efforts of Dr. Anaswara Kathot and Dr. Sejeesh in helping me with the data collection.

Semen Analysis Report	Prevalence
Normozoospermia	4.9% (53)
Asthenoteratozoospermia	56.8% (609)
Oligoasthenoteratospermia	14.08% (151)
Severe oligoasthenospermia	17.8% (191)
Azoospermia	4.3% (47)
Teratospermia	1.58% (17)
Asthenospermia	0.37% (4)
Total	**1072**

Table 1. Seminograms of 1072 Male Partners of Infertile Couples

	NS	AT	OAT	Severe OAS	AZS	TS	AS	Total
20-30 years	3.7% (5)	54% (72)	20% (27)	16% (22)	0.03% (4)	1.5% (2)	0.75% (1)	133
31-40 years	5.6% (39)	58% (397)	13% (90)	17% (117)	4.8% (33)	1.3% (9)	0.002% (2)	685
>40 years	3.5% (9)	55% (140)	13% (34)	20% (52)	4% (10)	2.4% (6)	0.4% (1)	254

Table 2. Age Wise Distribution of Seminograms

*NS - Normozoospermia.
†AT - Asthenoteratozoospermia.
‡OAT - Oligoasthenoteratospermia.
•Severe OAS - Severe oligoasthenospermia.
||AZS - Azoospermia.
**TS - Teratospermia.
††AS - Asthenospermia.

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