ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Analysis of Semen Parameters with Age of Infertile Male Subjects- A Pilot Study in an Urban Population Chennai.

Nirupa S[1], Kalaiselvi VS[2]*, Saraswathi[1], Prabhu K[3], Sivaram E[4], Prashanth Krishna G[5], and Seppan Prakash[6].

[1]Department of Gynecology & Obstretrics, Sree Balaji Medical College and Hospital,Bharath University, Chennai – 44, Tamil Nadu, India.
[2]Department ofBiochemistry, Sree Balaji Medical College and Hospital, Bharath University, Chennai - 44, Tamil Nadu, India.
[3]Department of Anatomy, Sree Balaji Medical College and Hospital, Bharath University, Chennai - 44, Tamil Nadu, India.
[4]Sree Balaji Medical College and Hospital, Bharath University, Chennai - 44, Tamil Nadu, India.
[5]Sri Ramachandra Medical College and Research Institute, Chennai – 116, Tamil Nadu, India.
[6]Department of Anatomy, Dr ALM PGIBMS, University of Madras, Chennai – 113, Tamil Nadu, India.

ABSTRACT

Infertility is a growing medical and social problem and 30-40% of it is attributed to male factor. As the quality of semen is a valuable indicator of male reproductive health, the purpose of this study is to focus on age related changes in semen parameters in men with infertility.The study was performed in men attending the infertility clinic of Sree Balaji Medical college and Hospital and Prashanth fertility centre of Chennai.The association of age with semen parameters like volume, concentration, motility was evaluated according to WHO criteria. Correlation and linear regression model were used to examine the relationship.The mean value of semen volume was 2.42 ml and semen concentration was 49.8 $\times 10^{6}$ per ml . The mean value for fast progressive motility was 17% and 21.43 % for slow progressive motility and 38.43% for total motility. In 50% of infertile men, the total motility value was below the threshold level according to WHO criteria 2010. Except volume and concentration other parameters like fast progressive motility, slow progressive motility and total motility showed significant negative correlation with age.Fifty percentage of infertile males do not fulfill the WHO threshold value of total motility.

Keywords: semen, infertile.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

Infertility which affects the basic function of reproductive organ is defined as inability to conceive after 12 months of unprotected intercourse. 15% couples of reproductive age experience infertility and more than 30-40% of infertility is attributed to male factors [1]. The quality of semen is the most valuable indicator of male reproductive health and plays a critical role in andrology.

It is well known that fertility potential of women decreases around 50 years of age. Men commonly do not experience complete reproductive senescence and maintain spermatogenesis well until they reach old. The functional disturbance within the hypothalamic pituitary gonadal axis, Neuro endocrine regulators, hypothalamic gonadotropin releasing hormone, pituitary gland gonadotropins and testicular testosterone gradually develop the aging process of testis [2-4]. Understanding the effect of male age on infertility has became important because nowdays many number of men are choosing to father a child at an older age.

Semen quality is mainly considered to be a measure of male infertility . Several studies mention the association between male age and semen parameters , but controversial report exists regarding the association of male age with semen parameters. Some investigators reported a significant reduction in semen quality over time [5, 6], while others reported no significant change in human semen quality [7][8]. Regarding Asian countries a very few studies have been conducted. Apart from semen volume, all other semen parameters showed a significant correlation with increasing age, total motility as well as Fast progressive motility (FPM) decreased with increase of age [9-11]. Kidd et al reviewed the literature on the association between male age and semen quality and concluded that increased male age is associated with a decline in semen volume, sperm motility and sperm morphology but not with sperm concentration [12]. In this study which is first of its kind in sample of Chennai population, seminal parameters were analyzed in terms of volume, concentration and total sperm motility with age.

MATERIALS AND METHOD

This study was approved by institutional ethical committee of Sree Balaji Medical College and informed consent has been obtained from all the participants. The subjects under this study include 435 infertile male subjects of various socio economic status with age in the range from 31-44 years. A questionnaire was given to all with details like age, height, weight, occupation , marital status, socioeconomic status, period of infertility, treatment details, and history of smoking, alcohol and chronic illness like diabetes and hypertension.

Semen Analysis

Semen samples were collected into a sterile, wide mouth, plastic container by masturbation after 2-7 days of abstinence in a comfortable room at Prashanth fertility Centre. Samples were allowed to liquefy for 30 minutes after which, semen appearance, liquefaction, viscosity, volume, sperm concentration, and sperm motility, pH were assessed according to WHO criteria(World Health Organization 2010) [13].

The volume was measured by aspiration into a 10ml pipette providing 0.1ml accuracy. The pH was measured with a pH tape (pH 6.5-10) and recorded after 20 seconds. For the assessment of sperm motility, 10µl of well mixed semen was placed on a clean glass slide (which has been kept at 37˚C) and covered with a coverslip. The preparation was placed on the heating stage of a microscope (37˚C) and immediately examined at a total magnification of x20. The microscope field was scanned systematically and the sperm were classified as either motile (WHO motility classes A,B or C) or immotile (WHO motility class D). Motility was assessed using the sperm progression rating (A)Rapid forward progression motility, (B)Slow or sluggish progression motility, (C) Non-progressive motility and (D)Immotility. Motility was defined as normal when ≥ 50% of sperm were A+B, or ≥ 25% were grade A. The sperm concentration was assessed using a Micro cell using a counting chamber, Six different area were counted at a total microscopic magnification of ×400. Only sperm with tails were counted.

ISSN: 0975-8585

Statistical Analysis

The median and standard deviation for the non normal distribution like sperm concentration, volume and motility were calculated. The pearson correlation test was performed to find the relation of above variables with age. Then linear regression model is used to examine the independent effect of risk factor on semen parameters like fast progressive motility and slow progressive motility with age.

RESULTS

The general characteristics of the eligible 435 subjects after filling their questionnaire, it is noted that more than 80% were 30-40 years old. The mean duration of abstinence was 4-5 days. After collection of the sample, (semen) analysis was done within 30 minutes in the same centre.. However half the study subjects had semen parameters (semen volume, sperm concentration , rapid progressive motility) within normal threshold values of WHO 2010. The mean value of volume was 2.4 ml and their interquartile range were from 1.5ml-3ml. The mean value of concentration was 49.8×10^6 and their inter quartile range were in the range from $20\text{-}70\times10^6$.The mean value of fast and slow progressive motility was 16.03%and 21.43 respectively as shown in table 1. Correlation test showed except volume and sperm concentration, fast and slow progressive motility were negatively correlated with age as shown in table 2. The sperm concentration was positively correlated with sperm motility and negatively correlated with volume as shown in table 3 and 4.

Table 1: Showing Mean, Median and Inter Quartile range of Semen Parameters in infertile men

SEMEN PARAMETERS	MEAN	MEDIAN	INTER QUARTILE RANGE	SD	
VOLUME	2.42	2.0	1.5 – 3.0	±1.3176	435
SPERM CONCENTRATION	49.85	42	42.0 – 70.0	±37.139	
A	16.03	15.00	9.0 – 23.0	±9.222	
B	21.43	20.00	16.0 – 27.0	±9.131	
C	5.69	5.00	5.0 – 7.0	±3.119	
A+B	37.47	38.00	26.0 – 50.0	±16.76	
A+B+C	43.16	43.00	31.0 – 56.0	±17.9	

Table 2: Showing the relation of age with sperm motility

	A	B	A+B
AGE	r=-.268	r=-0.226	r=-0.271
	p=0.000	p=0.000	p=0.000
	n=435	n=435	n=435

Table 3: Showing the relation of semen volume with sperm concentration

	SPERM CONCENTRATION	C
VOLUME	r=-0.171	r=-0.106
	p=0.000	p=0.027
	n=435	n=435

Table 4: Showing the semen concentration with volume and motility

	V	A	B	A+B	A+B+C
SPERM CONCENTRATION	r=-0.171	r=0.351	r=0.193	r=0.298	r=0.283
	p=0.000	p=0.000	p=0.000	p=0.000	p=0.000
	n=435	n=435	n=435	n=435	n=435

DISCUSSION

The quality of semen from 435 infertile males from various life styles of socio economic status from a part of chennai were analyzed. In the present study , the association of age with seminal volume, concentration and sperm motility was analysed, and the current finding observed the decline of seminal volume and concentration with age but not statistically significant. . The table shows that the mean and median value of semen volume in our study was found to be 2.4 and 2 ml respectively. The mean and median

value of semen concentration was found to be 49.85 and 42×10 ^{6} ml respectively. This study also highlights that total motility and fast progressive motility were highly correlated with age and showed a significant decline with age.

The semen volume observed in Chennai men was similar to Chinese men and lower than American and European men. Likewise the sperm concentration of Chennai men was lower than Chinese American and European men [14]. It is speculated that the variation may be due to different life style, environmental factors , genetic variations and the methodology used for semen analysis or a combination of these factors. The alarming concentration of nitric oxide in the ambient air of Chennai region and the increasing concentration of heavy metals due to rise of vehicular pollution and food sources may play principle role in the pathophysiology of decreased sperm motility . It is also speculated that persistant organic pollutant and its association with semen quality should also taken into consideration in the decreased motility of infertile men. The free radical generated by oxidative stress, disturbance of redox equilibrium, DNA damage due to oxidative stress can be one of the major causes for the decrease in sperm motility .

This study also supports the earlier reports that increase of age is associated with decrease in overall motility (percent)as well as FPM [9-11]. According to earlier reports, sperm count decreased with age and sperm motility was found to be inversely related to age with a peak motility at age less than 25 yrs and lowest motility at age greater than 55 years [15,16]. The Meta analysis by Kidd et al 2001 and in a recent study by Levitas et al 2007 suggest that increased age is associated with decrease not only in semen volume, but also in the percentage of normal sperm and sperm motility [11,16]. Other studies showed that there is no correlation between sperm concentration and male age [17,18]. Controversies also exist reporting no change of sperm count with age [17].The age dependent changes in epididymal and accessory sex glands may be attributed to declined sperm motility [19,20].

CONCLUSION

Fifty percentage of infertile males do not fulfill the new semen analysis parameters WHO 2010.. A significant Negative correlation was noticed between sperm motility with age. Much attention to be paid in decresing the environmental pollution, oxidative stress and other factors affecting the sperm motility, ultimately resulting in the reduction of risk factor associated with infertility due to male factors.

REFERENCES

[1] Templton. Health Bull 199553:294-298.
[2] Sitzmann B, Urbansk H, Ottinger M. Age (Dordr) 2008;30:157-168.
[3] Harman S, Metter EJ, Tobin JD, Pearson J, Blackman MR. J Clin Endocrinol Metab 2001;86; 744-731.
[4] Moffat S, Zonderman AB, Metter EJ, Blackman Mr, Harman SM et al. J Clin Endocrinol Metab 2002;87:5001-5007.
[5] Auger J. Kunstmann JM. Czyglik F, Jouannel P. New Eng J Med 1995, 332:281-5.
[6] Adamopoulos DA, Pappa A. Nicopoulou S. Andreou E. Karamertznis M. Michopoulos J. Deligianni V. Simou M. Hum Reprod 1996; 11:1936-1941.
[7] Bujan L. Mansat A. Pantonnier F. Mieusset R. BMJ 1996:312-471-472.
[8] Fisch H. Goluboff ET, Olson JH, Feldshuh J. Broder SJ, Barad DH, Fertil Steril 1996; 65:1009-14.
[9] Jung A.Schuppe HC, Schill WB. Andrologia 2002:34:116-22.
[10] Hellstorm WJ. Overstreet JW. Sikka SC, Denne J. Ahuja S. Hoover J Androl 2006:27:421-8.
[11] Levitas E. Lunenfeld E. Weisz N. Friger M. Potashnik G. Andrologia 2007:39:45-50.
[12] Kidd SA, Eskenazi B, Wyrobek AJ. Fertile Steril 2001;75:237-48.
[13] WHO Laboratory manual for semen analysis 2010.
[14] Gao J, Gao ES, Yang Q, Walker M, WU JQ, Zhou WJ,Wen SW, 2007. Hum Reprod 2007;22: 477-484.
[15] Neaves WB, Johnson L.Porter JC. Parker CR Jr. Petty CS. J. Clin Endocrinol Metab 1984; 59:756-63.
[16] Paulson RJ, Milligan RC, Sokol RZ. Am J Obstet Gynecol 2001; 184:818-24.
[17] Kumtepe Y. Yakin K. Kahraman S. Sertyel S. Vanlioglu F, Cengiz S, et al Int. J. Androl 2003:26: 161-5.
[18] Carlsen E. Giwercman A. Keiding N. Skakkebaek N. BMJ 1992; 305-609-613.
[19] Elzanaty S. Arch Androl 2007;53:149-56.
[20] Henkel R. Maass G. Schoppe HC, Jung A. Schubert J. Schill WB. Fertil Steril 2005:84:1430-7.