

Title : Study of zinc levels in seminal plasma and its Relationship with semen quality**Author :** * Shinde.C.L **Dr.Mrs.Zingade.U.S

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Address for Correspondence : PDVVPF's Medical college and hospital, Ahmednagar.**ABSTRACT****Objectives** – To study Zinc levels in seminal plasma and its relationship with various semen parameters.

Design - Prospective from a systematic perspective there are three primary foci in the study of male reproduction 1) The pituitary gland and the gonadotropic hormones secretions that signal spermatogenesis. 2) The male reproductive track which creates and supports the maturation of spermatozoa. 3) The quality and quantity spermatozoa several trace elements are secreted by the accessory gland in the reproductive track these can be used as diagnostic tools for the disorders in male reproductive system. To assess the levels of essential trace elements in semen and the relation to semen Parameter. So there has been increasing interest in the evaluation of essential trace elements presents in different levels in human body fluids and the relationship with reproductive health. trace elements play an important role in a number of normal function of body, perspective it in very important to evaluate Zn levels to asses semen quality . The main objective of the Research is to evaluate the Zn levels in seminal plasma and its Relationship with semen parameters such as sperm motility, sperm concentration and normal more physiology. **Method** – The levels of Zn in human seminal plasma were evaluated by Atomic Absorption Spectroscopy. **Result**:-Zinc concentration is significant in oligospermic group in correlation to sperm % motility. **Conclusion**: - it seems that, count, motility are affected by variations of seminal plasma Zinc.

Key words : Atomic absorption spectropotometry, Zinc, seminal plasma correlation, Trace elements, Zinc.**Introduction** : Spermatogenesis is a physiological process in which formation of spermatogonia which transform into spermatozoa which undergoes cell

division mitosis, meiosis and spermatogenesis. So that sperm can fertilize an egg to produce the next progene.it is essential in all species for next generation of the species. So there must be the normal healthy sperm for egg fertilization. Spermatogenesis takes place in the epithelium of the seminiferous tubules as seminiferous epithelium which is divided in two compartments by the blood testis barrier known as sertoli cells. Sperm maturation and development of head and tail in the sertoli cell and they are transported to epididymis for final steps maturation and development and stored for duration and release at the time of ejaculation^[1]. Testis produce about 300 million sperms daily in young adult after puberty. The normal spermatogenesis depends upon many factors like certain compounds, proteins, lipids, carbohydrates, steroids, hormones and trace elements calcium, magnesium, zinc and some other small molecules. In which Zinc is the one of essential trace element for the process of spermatogenesis^[2]. Available literature reveals the adult human body needs 2-3 mg of Zinc daily, about 1/1000 of which is renewed daily.^[3] Many authors has been reported markedly elevated level of zinc in human seminal plasma denote range from 76.06 to 275 mg/L. Prostate gland is the most important supplier of seminal plasma zinc. After the efficient maturation of sperm, the major contribution of zinc ions comes in contact with sperm immediately after ejaculation. Semen or ejaculate is the fluid discharge from male genital organ. Seminal zinc ions get dilute by the cervical and vaginal fluids. Therefore how this high concentration of Zinc in seminal plasma affects sperm function so there has been increasing curiosity in the evaluation of essential trace elements present in different concentration in human body fluids and their relation to semen parameters. In fact zinc play vital role in affecting a variety of semen parameters. Zinc has defensive role against accumulation of heavy metals by decline of available binding site or by competition between them.^[4] Zinc play an important role in the semen ejaculation as well co-factor for the DNA- binding proteins with Zinc fingers. Zinc in the seminal plasma stabilizes the cell membrane and nuclear chromatin of the sperm. It also plays important role in development of sexual organ, and in a few sperm physiological functions. Zinc serves as a growth factor and having anti-inflammatory effects. Decrease in the Zinc levels in seminal plasma causes, decrease in the size of the testes, insufficient development of secondary sexual characteristic, and atrophy in

somniferous tubules as a result, failure in sperm production and leads to hypogonadism^[5]. Although some important effects of zinc on semen have been accepted, controversy continues relating to zinc levels in sub fertile patients as well as the relationship between zinc and semen parameters. Some author reported significantly dissimilar seminal zinc level in fertile and sub fertile subjects mark low seminal zinc concentration in sub fertile population^[6,7]. While some other has shown that there is no difference between these population^[8].

Number of studies has been done over the decades in relating seminal zinc concentration with semen parameters but also so far the result is in conclusive. Some others reported a significant relationship of seminal plasma zinc with sperm density, motility and viability^[9] similar studies have shown the relationships with volume^[10] PH^[11] concentrations^[12] & more physiology^[13] be deficient in of relations is also manifest in some other studies by using different methods^[14]

The aim of the present study is to determine the seminal zinc levels in different groups, and to discover the relationship between zinc levels in seminal plasma and semen parameters

Subjects : - Married Male leading normal life and regular sex without contraception for one year or more are included for the study.

Exclusion criteria: - The subjects with testicular varicoceles, genitals infection, sexually transmitted diseases, chronic illness, serious systemic disease, heavy or regular use of alcohol or smoking or Reproductive endocrine abnormalities were excluded from study.

Sample Collection:- semen samples were collected

from the patient who was attending the infertility clinics and advice to do the semen analysis. All the instructions were given to the patient and verbal consent is obtained from the patient the semen is collected in private room in a single use container by Masturbation after three days of sexual absentia the containers was called with name of the subject identification number date and time of collection. Sample were allowed to liquefy at 37°C for 30 minutes and analyzed for descriptive semen parameters within 1hr of collection. Analysis were performed according to the WHO guidelines of 2010^[15, 16]. Immediately after assessing the volume, a portion of the sample was centrifuged at 5000g for 10 minis and the supernant was stored at -20 c for determining the zinc levels.

Determination of zinc : All the glass ware and plastic ware rinsed with nitric acid and thoroughly washed with deionised distilled water. The liquated semen samples were kept at room temp. Seminal plasma was diluted 1:24 in deionized water to make the volume of 25ml. Standards were also prepared in deionised water they were run in the range of 0.05 to 0.2 ppm for zinc and assayed with an atomic Absorption spectrophotometer

Statistical Analysis : Most of the data were expressed in mean standard deviation and analyzed by one-way analyses of variance (ANOVA) For multiple comparison and parsons' regression coefficient of correlation (r) and students test for paired results with significance fixed at p= 0.05

Table. 1: comparison of semen parameter in three groups.

Semen parameters	Normozoospermic	Oligospermia	Azoospermia
Volume	2.54 ± 0.097	2.50 ± 0.097	2.60 ± 0.067
Sperm count (millions/ml)	67.75 ± 4.368	3.80 ± 0.830	0.00
Total sperm count	162.82 ± 11.493	7.73 ± 1.657	0.00
Motile sperm count (millions/ml)	67.75 ± 4.368	3.80 ± 0.830	0.00
Total motile sperm count	161.00 ± 13.456	7.57 ± 1.650	0.00
Total motility (%)	63.75 ± 3.972	21.13 ± 5.061	0.00
Grade of motility	3.55 ± 0.135	1.80 ± 0.296	0.00
Morphology	14.80 ± 4.015	14.40 ± 0.773	0.00

Scores represented as Mean ± standard error of mean

Table.2. Zinc concentration in seminal plasma in three groups. The values are expressed as mean \pm SEM

Parameters	Normospermic n=20	Oligospermic n=15	Azoospermic n=10
Zinc concentration	73.60 \pm 7.202	65.82 \pm 7.622	92.56 \pm 14.86

Table.3. Correlation coefficient (r) of seminal Zinc with semen parameters

parameters	Control N=20	Oligospermic N=15	Azoospermic N=10
Semen volume (ml)	0.007	.263	- 0.261
Sperm counts ($\times 10^6$)	.614	-.318	.00
Total sperm count	.362	-.288	.00
Motile sperm count	.120	-.318	.00
Total motile sperm count	.166	-.318	.00
% motility	.166	-.603*	.00
Grade of motility	.115	-.303	.00
morphology	-.327	.202	.00

[*The concentration of zinc found significant positive correlation with % motility in Oligospermic group. Correlation is significant at the 0.05 level (2-tailed)]

Results :- Results are expressed as mean \pm SEM for each parameter statistically difference among Normoazoospermic, Oligozoospermic and Azoospermic group are indicated along with their significant values. Parameters are including volume, sperm concentration, total motility, % motility, grade motility, morphology. In all three groups are represented in .Table.1.

In our research we found Zn concentration is positively correlates with only % motility in oligospermic group. The Zn concentration was compared with semen parameters in Azoospermic group, Oligospermic group. And only volume is compared in Azoospermic group. As denotes Azoospermia there is no sperm count. In our study we found the highest concentration of Zinc in Azoospermic group than oligospermic and Normoazoospermic. No significant correlations of seminal Zinc level in Normoazoospermic group are

shown in table .2.

DISCUSSION: - In this study there was a significant low level of seminal plasma zinc in Oligospermic subjects. This differs from other studies. The seminal plasma plays an important role in the transportation of the spermatozoa through the epididymis, the vas deference, and urethra and into the female reproductive tract.Zinc is one of the trace elements which influence the function of the seminal plasma, sperm metabolism, acrosome, reaction and fertilization .Zinc is the critical trace element for male sexual function .Zn involved in virtually every aspect of male reproduction . Most of the reports contradict each other in relating human seminal plasma Zn and semen parameters. Some of them including our study have found no significant correlation between Zn concentration in seminal plasma and semen parameters. Except sperm count and % motility in oligospermic group. Other report suggested that high seminal Zn-C has only suppressing effect on progressive motility of spermatozoa4 quality of movement but not on percentage motile of spermatozoa quantity of movement however we have observed zinc concentration is significant positive correlated with % motility in oligospermic subjects.

Available data on the correlation of Zn with semen parameter is also inconclusive. Positive correlation between Zn concentration in seminal plasma with sperm density, motility and viability^[8] with sperm count of male with normal count. But not in oligospermic males. Some other reports have shown that there is negative correlation between the total Zn in oligospermic and Azoospermic and Normoazoospermic males. According to findings the androlgical variables are sensitive to seminal plasma zinc variation sperm concentration, grade motility, % motility, morphology. Volume and pH in oligospermic and Normoazoospermic group.

Conclusion : On the basis of finding of this study seminal zinc may contribute to fertility through its effect on semen parameter. It seems that estimation of Zinc in human seminal plasma may help in investigation and treatment of infertile male. Further research is required to gain clearer understanding of data on essential trace elements in seminal plasma and correlation with parameters and semen quality in the same subjects, as well as the influence of age, smoking habits alcohol consumption which are associated with reduced

semen quality. A recent study shown the exposure to toxics metals like lead, mercury, cadmium affects the semen parameters. Cd decreases sperm motility and increase abnormal sperm morphology and competition between Cd and Zinc for same binding sites in enzymes and proteins and transporters can change the enzymatic activity. Cd has reported to induce optosis.from different scientific studies reports semen parameters can also alter by some physiological factors. Especially essentials trace elements, heavy metals, nutrition, condition of work place, socio - economic status and history. These results also highlight the area that deserves careful investigation in the year to come.

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