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ORIGINAL ARTICLE

Association of Zinc Concentration in Seminal Plasma and Blood with Several Parameters of Semen in Infertile Males

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ABSTRACT

Objective: To evaluate the concentration of zinc inthe blood and seminal plasma with semen parameters between fertile and infertile males

Methodology: This prospective study was carried out in the Department of Biochemistry, Hayatabad medical complex, Peshawar. Fifty (50)infertile males, not receiving any treatment and had regularintercourse for 1 yearaged 25-45 years were selected from HMC. They were divided into 35oligospermia and 15 azoospermic. 35 fertile males were nominatedamongthe overallresidents and were taken as the control group after their semen analysis was taken as normozoospermic. According to WHO criteria semen is analyzed. With the help of 5br Serum and seminal plasma zinc were estimated.

Result: There was a significant difference found in serum and seminal levels of zinc in normozoospermic, oligospermia (p less than 0.05), and azoospermic (p-value less than **0.05**) individuals. The correlation of seminal plasma zinc with sperm counts showed a positive association with the count of sperm and a negative association with motility of sperm in normozoospermic/oligospermia and a negative association of concentration with pH, and volume, WBC in all groups. No association was found with the morphology of sperm.

Conclusion: It has been concluded that zinc interfered with fertility by having a considerable impact on many semen parameters. It suggests that measuring seminal plasma zinc could be useful for diagnosing and treating male infertility.

INTRODUCTION

The impact of infertility has many causes and concerns which rely on age, gender, lifestyle, and sexual history. Word wide it has affectedalmost (8% to 12%) and mostly in men half of the cases arethe only causeor contribute to infertility couples(1,2). Semen various parameters, trace elements magnesium, calcium, selenium, zinc,and copper had an important role(3).Among these elements, zinc was available in the seminal parameter. The function of zinc inseminal plasma controls the “cell membrane and nuclear chromatin of spermatozoa”, and antibacterial function andprotectsdegenerative changes in the testis(4-6). with an additional role in regulatory of capacitation and acrosome reaction process(7). It is questionable how zinc relates to the parameters of semen quality that are usually determined. The study aimedto evaluate the concentration of zinc in the blood and seminal plasma with semen parameters between fertile males and infertile.

METHODOLOGY

The study was carried out in the Hayatabad medical complex, Peshawar, and the Department of Biochemistry. 50 infertile males, not receiving any treatment, and had regular intercourse for 1 year. The aged 25-45 years, were selected from HMC. According to WHO criteria semen is analyzed(8).

To make sure the history was taken from wives who had no tubal blockage or ovulation disorders. a detailed history and physical examination were done on both couples. The sperm count was used to group the infertile subjects oligospermia (35), and azoospermic (15). The subjects hada sperm count of less than 20 million/ml tooksperm while azoospermichad0 sperm count. The fertile male n=35 whose partners had conceived within a year and had a sperm count of more than 20 million/ml with motility of more than50%, were selected from the overall population and taken as a control group normospermic.

Semen and serum sampling: After a 3 to 5-day period of abstinence, semen samples were collected by masturbating into 50 ml polystyrene jars. Following liquefaction, samples underwent standard examination to evaluate the volume, pH, sperm motility, sperm count, and morphology of sperm as per WHO standards.After 15-20 minutes of centrifugation at 2000 rpm, the seminal plasma was obtained. When ready to be utilized for the zinc assay, the supernatant was transferred into new tubes and kept at -20°C.After receiving informed consent, 5 ml of blood were collected from each patient in the morning after an 8-hour period fast. Following centrifugation, serum was stored frozen at 20°C until the zinc content was determined. Zinc levels in serum and seminal plasma were determined using the 5-Br PAPS colorimetric method using a kit provided by Spinreact SA Spain. Based This element is estimated based on the theory that zinc reacts with a particular complexant, 5-Br PAPS, to create a persistent color complexamount of zinc in the sample has a direct relationship with the color intensity. Statistics were used to examine the results using SPSS version 20

RESULTS

The mean and standard deviation of each parameter is shown ±,and the significant values are shown between each group i-e azoospermic,oligospermia, and control groups normospermic.

As shown in table 1: (Serum and seminal Zn) the levels were statistically significant in infertile subject oligospermia and azoospermicthan fertile males normozoospermic, fertile males(less than 0.05, less than 0.01 respectively). In table 2, sperm count in oligospermia shows a positive association between seminal plasma zinc concentration and volume, pH, sperm motility & WBC concentration in oligospermia& azoospermic groups showa negative association. In table 3 there was no statistically significant association of Zndetected with seminal plasma Zn concentration and various semen variables.

TableI 1: Three categories of seminal plasma and blood zinc concentrations. The data are shown as mean SEM.

Parameters	Normospermia	Oligospermic	Azoospermia
Total no.	(15)	(35)	(15)
Serum zinc Concentration	90.70±4.10	80 .20±5.30"	66.45±2.93""
Seminal plasma ZINC concentration	7.50±1.50	6.50±1.60"	4.65±0.33""

(" P<0.05oligospermia are comparable to normosperms.)
(""P<0.001 azoospermic group comparable with normospermic.)

Table 2: Seminal plasma zinc concentration and semen parameters' correlation coefficient (r)

Various Parameters	Control subject	Oligospermic	Azoospermia
Total no.	(35)	(35)	(15)
Volume.	1.40	1.50[rr]	1.50 [r]
Ph.	1.30	1.60[rr]	1.50
Sperm count.	1.4	1.50[rr]	1
Sperm morphology.	1.10	1.10	1
Motility.	1.30	-1.50[rr]	1
WBC(HPF).	1.20	-1.50[rr]	-1.60[rr]

"[r]pless than 0.05"
"[rr]p less than 0.01"

Table 3: Seminal plasma zinc concentration and semen parameters' correlation coefficient (r)

Various parameters	Control subject	Oligospermic	Azoospermia
Total subjects	(35)	(35)	(15)
Volume.	1.10	1.20	1.30
pH.	1.220	1.10	1.20
Sperm count.	1.010	1.20	1
Sperm morphology.	1.70	1.20	1
Motility.	1.20	1.10	1
WBC per HPF.	1.21	1.10	1.37
Seminal Plasma Zn.	1.40	1.40	1.11

DISCUSSIONS

In this research, oligospermia and azoospermic men had very low zinc levels in their serum and seminal plasma. Other research have reported similar outcomes(9, 10). Additionally, our findings conflict with those of several studies(11, 12)

In the current investigation, it was discovered that the seminal plasma zinc in infertile males had a negative correlation with the volume and pH of the semen. These findings conflict with some studies(13) while correlating with others(14). During ejaculation, sperm cells are released along with acidic prostatic fluid, which contains zinc, citric, and acid phosphatase to produce the acidic pH in the initial fraction. The subsequent fraction contains fewer sperm and is primarily made up of an alkaline vesicular fluid that is high in fructose and high molecular weight ligands that originate from seminal vesicles(14).

The pH would be either elevated or lowered, depending on whether the prostate gland or seminal vesicle is aberrant. The seminal plasma zinc content and the sperm count showed a strong positive connection. These findings both go against many research findings (15-18) and support a few of them(19).

Adult males who were experimentally denied zinc displayed impaired testosterone synthesis in Leydig cells, according to a clinical investigation(20). Since zinc is essential for the 5á reductase enzyme, which transforms testosterone into the physiologically active form of "5á dihydrotestosterone"(20).

There was no relationship between seminal plasma zinc content and sperm morphology. Comparable results from previous investigations support this one(21).

In oligospermic patients, it was discovered that sperm motility was inversely connected with seminal plasma zinc levels, which contrasts with the findings of various studies(22, 23) and is consistent with other research that has produced comparable findings.(24).

In this research, a strong inverse relationship between WBC and seminal plasma zn concentration was discovered. Because Trichomonas vaginalis is easily destroyed by zinc concentrations found in healthy men's prostatic fluid, the prostatic zinc may have antibacterial properties. 6 Serum zinc levels did not significantly correlate with seminal plasma zinc levels or other semen characteristics. A few additional studies also produced similar results(25).

CONCLUSION

Based on the findings of this and previous investigations, seminal zinc may influence numerous semen properties, hence influencing fertility. It appears that measuring seminal plasma zinc could be useful for diagnosing and treating male infertility.

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