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Seminal Plasma Zinc Concentration in Infertile Males in Different Classes in Islamabad, Pakistan

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Abstract

Infertility in males is big issues in Pakistan. In the current study we analyzed the level of seminal zinc concentration in various group of infertile males and to link it with sperm concentrations, inactive, active and immotile fractions of seminal constraints, with an objective to begin the role of zinc. The present five years descriptive study was conceded in the Public Health Laboratory, Department of Reproductive Health, National Institute of Health, and Islamabad, Pakistan from 2006 to 2010. Outcomes of our study showed that semen zinc was several folds higher in polyzoospermic as compared to other group while lower in Azoo, oligo and oligoasthenozoospermia group. Concentrations of seminal zinc were 598.48 ± 12.95, 617.54 ± 9.55, 702.92 ± 10.60, 710.36 ± 7.87 and 762.06 ± 8.99 in oligozoospermic, asthenozoospermic, azoospermic, teratozoospermic and proven father group respectively. The level of semen zinc varied and non-significantly ($p>0.05$) in proven father with polyzoospermic. This study concluded that decreased concentration of seminal plasma zinc affect the numbers of sperms count while increased level causes decreased sperm motility.

Keywords: Seminal zinc; Infertile male; Islamabad

Introduction

Infertility of males and females is defined as deficiency to reproduce, while fertility is the capacity to reproduce [1]. Besides other etiological factors, nutritional deficiency of trace elements like, Selenium, zinc and vitamin play an important role in infertility [2]. The Zinc which is second to iron and the content of semen is 87 times in the blood has been reported [3]. Zinc in the body has a vital role in normal spermatogenesis, sperm motility and testicular development [4] and an essential cofactor for >200 metallo-enzymes in different animals species has been reported [5].

Methodology

The current five years descriptive study was conceded in the Public Health Laboratory, Department of Reproductive Health, National Institute of Health, and Islamabad, Pakistan from 2006 to 2010. After taking complete medical history and consent form of the patients, 1,128 subjects were analyzed for complete semen analysis according to standardized method as stated by World Health Organization laboratory manual [6]. The supernatant of the semen samples were processed for evaluation of seminal zinc by using color 5-Br-PAPS method having kit no. ZF 01000050 obtained from Centronics GmbH-Germany along 97 proven fathers as control [7].

Results

Total patients (n=1,128) were divided into different groups on the basis of semen's motility, morphology and concentration. According to the nomenclature of semen recommended by WHO in 1992 [8], semen sample were categorized as: without spermatozoa (Azoospermia), motility less than 50% (Asthenozoospermia), sperm concentration less than 20 million/ml and more than 250 million/ml (Oligozoospermia and polyzoospermia, respectively), sperms having disturbed morphology of more than 30% of normal (Teratozoospermia) while the semen sample having progressive activity more than 25 percent (overall motility >50%) with sperm concentration within the range of 20 million/ml to 250 million/ml were classified as normozoospermia. A group representing 97 proven fathers was taken as a control.

Concentrations of seminal zinc were 598.48 ± 12.95, 617.54 ± 9.55, 702.92 ± 10.60, 710.36 ± 7.87 and 762.06 ± 8.99 in oligozoospermic, asthenozoospermic, azoospermic, teratozoospermic and

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Table 1: Seminal parameters in relation to semen zinc levels.

Means sharing a common letter do not differ significantly, other differ significantly (p<0.05)																
Group	No.	Semen Zinc (ug/dl)			Sperm Concentration (mill/ml)			Activity Motility (%)			Sluggish Motility (%)			Immotile (%)		
Az	203	702.92	10.6	a	0	A	0	0	0	a	0	0	a	0	0	A
O1	353	598.48	13	b	6.99	0.35	B	29.16	0.96	b	15.25	0.51	b	55.59	1.07	b
As	535	617.54	9.55	bc	50.11	2.12	C	17.77	0.49	c	11.67	0.29	c	70.57	0.61	C
T	37	710.36	7.87	ae	5.64	1.15	Bde	17.73	3.22	cde	10.73	1.27	cde	71.54	4.08	cde
F	97	762.06	8.99	g	102.1	1.34	H	60.01	0.58	g	10.94	1.38	cdefg	28.85	0.28	h

proven father group respectively.

Semen zinc was found several folds higher, and highest values were recorded in case of polyzoospermic subjects. The level of semen zinc varied and non-significantly (p>0.05) in proven father with polyzoospermic.

Discussion

Zinc element is considerably influenced the sperm motility. Hardening of the outer dense fibers by development of Disulfide Bridge through epididymis sperm maturation appears to be an important physiologic phase for the generation of sperm motility particularly progressive motility [9]. Male sterility and sub sterility has been associated with zinc deficiency. Mc-Graw reported that sperm counts dropped from a mean of 283 million/ml to 45 million/ml with 2 to 14 months in zinc limited diet in five middle aged men [10]. Male infertility made by zinc limited diet is not yet fully understood because of complexity of its mechanism, however, zinc is believed to be involved in several assimilated processes linked with reproduction and has been stated seminal zinc concentration was lower in patients with idiopathic sub fertility than in normal control [11].

In another study, it has been observed that geometric means of the seminal plasma zinc concentration was found to be significantly lower (p<0.05) in the infertile group compared with those in the fertile group [12]. In contrast, other authors had reported normal and even increased seminal plasma zinc levels in infertile males, but such studies are very low in magnitude. The probable explanation could be that zinc in semen is responsible for motility, therefore, it may not effect in both oligozoospermic and azoospermic groups [13,14]. We also found decrease level of semen zinc in azoospermic, oligozoospermic, asthenozoospermic and oligozoospermic groups.

High zinc content had also been reported in seminal plasma and has been associated with a high degree of sperm cell motility [15], it has also been reported that extra cellular zinc performances as an inhibitor of human sperm motility and acrosome reaction [16]. In other study found that zinc content in seminal plasma was associated negatively with progressive sperm motility [17], while in contrast to this study others reported no significant correlation of seminal plasma zinc with motility of sperms in oligozoospermic males [13,18]. Whereas, we in our study found that seminal plasma zinc in those subjects having more than 50% of motility had significant increased concentration than those having decrease (<50%) of motility.

In the present study, we observed significant decrease in seminal plasma zinc level in asthenozoospermic group. These results are in consistent with earlier studies [19]. Our results deferred from another study, who had reported normal and even increased seminal plasma zinc level in oligozoospermic and azoospermic males respectively [14].

Conclusion

We observed that decreased concentration of seminal plasma zinc do affect the sperm count and sperm motility. So it is important that carefully administration of zinc should be in those patients who have normal sperm motility but having low sperm count. In such cases seminal plasma zinc level should be measured before treatment, since adequate seminal plasma content of zinc is required for normal sperm function.

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