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### Role of vitamin E and zinc sulfate in infertile men

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#### **Abstract:**

Infertility affects 15-30% of couples that are trying to conceive, about half of these cases, male partner is the sole contributing factor. Infertility remains a controversial problem worldwide, male infertility caused by different anatomical defect like obstruction of seminal tube and neurological abnormalities, resulting in abnormal spermatogenesis which weakens the function of sperm.

Follow-up study done for 60 infertile men with age range between 30-45 years. Data collected was carried out during the period from April 2019 to August 2019 in Bajji city which include seminal fluid analysis, determination of testosterone, prolactin, and T3 and T4 before and after treatment with vitamin E(800 I.U/daily) and zinc sulfate(50mg/daily) which last for three months , all data were presented as mean and standard deviation. In this study we exclude any disease or abnormal condition that related to this group.

There are 60 infertile men participated in this study, age range between 30-45 years. In these cases we measured the seminal fluid analysis, determination of testosterone, prolactin, and T3 and T4 before and after treatment with vitamin E(800 I.U/daily) and zinc sulfate(50mg/daily) which last for three months

About the seminal fluid analysis, there is a significant increase in number of sperm in infertile men after the treatment, and also there is a significant increase in activity of sperm after treatment. Regarding the seminal fluid analysis, there is a significant increase in number of sperm in infertile men after the treatment compared with this before treatment and also there is a significant increase in activity of sperm after treatment compared with this before treatment. About the percentage of non-motile sperm, there is a significant decrease in this percentage after treatment compared with this before treatment, also there is decrease in percentage of

abnormal sperm shape after treatment compared with this before treatment, while there is a significant increase in percentage of normal sperm shape after treatment compared with this before treatment

About the concentration of prolactin, there is none significant difference between its level after treatment and before treatment. Regarding the concentration of testosterone, there is a significant elevation in its concentration after the treatment compared with its concentration before treatment and

About the concentration of T3 and T4, there is none significant difference in its concentration after treatment and before treatment respectively.

## دور فيتامين E وكبريتات الزنك لدى الرجال المصابين بالعقم

جواد علي صالح

### الخلاصة

العقم يصيب تقريبا 15-20 بالمائة من المتزوجين وهو مشكلة منتشرة على مستوى العالم. الاسباب المؤدية الى العقم عند الذكور تشمل عوامل تشريحية مختلفة مثل انسداد او ضيق الانابيب المنوية او عوامل عصبية غير طبيعية تؤدي الى انتاج حيامن مشوهة تؤدي الى ضعف قوة الحيمن. شملت هذه الدراسة اخذ 60 شخص من الذكور المصابين بالعقم للاعمار من 30-45 سنة وتم جمع المعلومات للفترة من شهر نيسان لعام 2019 الى شهر آب من نفس العام في مدينة بيجي وقد شملت هذه المعلومات كل من تحليل السائل المنوي، قياس نسبة هورمون التستستيرون، البرولاكتين، هورمون التايروكسين T3 و T4 قبل وبعد العلاج بفيتامين E والزنك ولمدة ثلاثة اشهر فترة علاجية. بالنسبة لفحوصات السائل المنوي هنالك زيادة معنوية في زيادة عدد ونشاط الحيامن بعد العلاج ونقص معنوي في عدد الحيامن الضعيفة وشكلها بعد العلاج. اما بالنسبة لفحوصات الهورمونات فأن هنالك زيادة معنوية في نسبة التستستيرون بعد العلاج. اما بقية الهورمونات فليس هنالك اختلافات معنوية في القياسات قبل وبعد العلاج.

### Introduction

Infertility affects 15-30% of couples that are trying to conceive, about half of these cases, male partner is the sole contributing factor (1, 2). Infertility remains a controversial problem worldwide, male infertility caused by different anatomical defect like obstruction of seminal tube and neurological abnormalities, resulting in abnormal spermatogenesis which weakens the function of sperm (3, 4). There are different environmental factors can cause infertility like nutritional deficiency and oxidative stress which caused by pesticides and industrial chemicals, smoking, alcohol

consumption and heat exposure to testes which can lead to damage of semen quality (5-7). Other factors such as urinary tract infection and radiation contribute significantly to fertility (8). Regarding the Vitamin E consider as a fat soluble organic compound mainly localized in cell membranes and protect sperm cell membrane from oxidative stress induced damage, preventing lipid peroxidation and capturing free hydroxyl radicals and superoxide(9). Placebo controlled double blind study reported improvement of sperm motility in men with oligoasthenoteratozoospermia after vitamin E oral supplement, and

the enhancement of sperm motility was associated with a decreased sperm production of MDA, the end product of the lipid peroxidation(10). Dietary habits seem also to play a role in semen quality, since a positive correlation has been found between vitamin E dietary intake and progressive and total motility(11). This evidence suggests that vitamin E may have a positive effect on semen quality, enhancing the pregnancy rate, altogether these findings suggest that vitamin E could be a therapeutic choice for the treatment of male infertility (12).

About the Zinc sulfate is a component of over 200 enzymes involved in the biosynthesis of nuclear acids, proteins and the process of cell division (9), it has been reported to normalize oxido-sensitive indices and catalase-like activity in the seminal fluid of asthenozoospermic patients, zinc is given (oral), the dose is 50 mg once or twice daily for three to four months (13).

### **Patients and methods**

A case follow-up study done for 60 infertile men with age range between 30-45 years. Data collected was carried out during the period from April 2019 to August 2019 in private clinics and laboratories in Bajji city which include seminal fluid analysis, serum testosterone serum prolactin, and serum T3 and T4 before and after treatment with vitamin E(800 I.U/daily) and zinc sulfate(50mg/daily) which last for three months, all data were presented as mean and standard deviation. In this study we exclude any disease or determine conditions that related to this group. Laboratory investigations include the following:

**1-Semen fluid analysis:** semen specimens were collected from all patients before and after treatment at

least three days of sexual intercourse in sterile containers and obtained by masturbation in the room beside the laboratory, container were closed and labeled and the ejaculates were allowed to liquefy for 30 minutes and within half-one hour semen parameters were analyzed.

**2-Serum testosterone:** Blood samples were obtained from the patient, sterile disposable syringes and plain plastic tubes and the blood samples obtained from each man was transferred into a plain tube for separation of serum. Then the blood was allowed to clot for one hour, after that centrifugation was done to separate the serum and then the serum was transferred by micropipette for hormonal assay. The Eliza kit that used for testosterone was manufactured by Bio Check, Inc. company (USA). We adopted the test procedure and protocol recommended by the kit manufactured.

**3- Serum prolactin:** VIDAS Prolactin is an automated quantitative test for use on the VIDAS family instruments (made in Italy) for the enzyme immunoassay determination of human prolactin in human serum or plasma using the ELFA technique (Enzyme Linked Fluorescent Assay).

**4-Serum T3 and T4:** The essential reagents required for a solid phase enzyme immunoassay including an immobilized antibody, enzyme-antigen conjugated and native antigen. Upon mixing immobilized antibody, enzyme antigen conjugate and a serum containing the native antigen, a competition reaction results between the native antigen and the enzyme antigen conjugate for a limited of insolubilized binding sites.

### **Results**

There are 60 infertile men participated in this study, age range between 30-45 years. In these cases we measured the

seminal fluid analysis, serum testosterone, serum prolactin, and serum T3 and T4 before and after treatment with vitamin E (800 I.U/daily) and zinc sulfate (50mg/daily) which last for three month. Regarding the seminal fluid analysis, there is a significant increase in number of sperm in infertile men after the treatment ( $72 \pm 5.4$ ) compared with this before treatment ( $43 \pm 4.3$ ), and also there is a significant increase in activity of sperm after treatment ( $86 \pm 4.9$ ) compared with this before treatment ( $53 \pm 3.5$ ) (Table 1) and Figure (1). About the percentage of non-motile sperm, there is a significant decrease in this percentage after treatment ( $9 \pm 1.3$ ) compared with this before treatment ( $29 \pm 1.8$ ), also there is decrease in percentage of abnormal sperm shape after treatment ( $12 \pm 1.2$ ) compared with this before treatment

( $47 \pm 1.5$ ), while there is a significant increase in percentage of normal sperm shape after treatment ( $81 \pm 4.8$ ) compared with this before treatment ( $47 \pm 3.2$ ) Table 1) and Figure (1). About the concentration of prolactin, there is none significant difference between its level after treatment ( $2.8 \pm 1.5$ ) and before treatment ( $3.2 \pm 1.9$ ) (Table 2) and Figure (2). Regarding the concentration of testosterone, there is a significant elevation in its concentration after the treatment ( $56 \pm 5.7$ ) compared with its concentration before treatment ( $46 \pm 3.1$ ) (Table 3) and Figure (3). About the concentration of T3 and T4, there is none significant difference in its concentration after treatment ( $1.8 \pm 0.7$ ), ( $5.9 \pm 0.3$ ) and before treatment ( $2.2 \pm 1$ ), ( $6.20 \pm 1.12$ ) respectively (Table 4) and Figure (4).

**Table (1): The mean and SD of seminal fluid analysis before and after treatment**

Parameters	Before treatment	After treatment	P value
Sperm count	$43 \pm 4.3$	$72 \pm 5.4$	<b>0.01</b>
Active	$53 \pm 3.5$	$86 \pm 4.9$	<b>0.01</b>
Non motile	$29 \pm 1.8$	$9 \pm 1.3$	<b>0.05</b>
Abnormal shape	$47 \pm 1.5$	$12 \pm 1.2$	<b>0.05</b>
Normal sperm	$47 \pm 3.2$	$81 \pm 4.8$	<b>0.01</b>

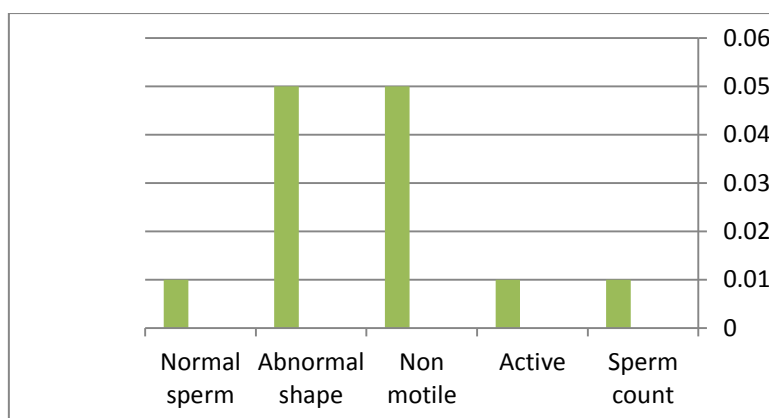


Figure (1):- Shows the P value of seminal fluid analysis

Table (2): The mean and SD of prolactin before and after treatment

Parameters	Before treatment	After treatment	P value
Prolactin level	3.2 ± 1.9	2.8 ± 1.5	0.07

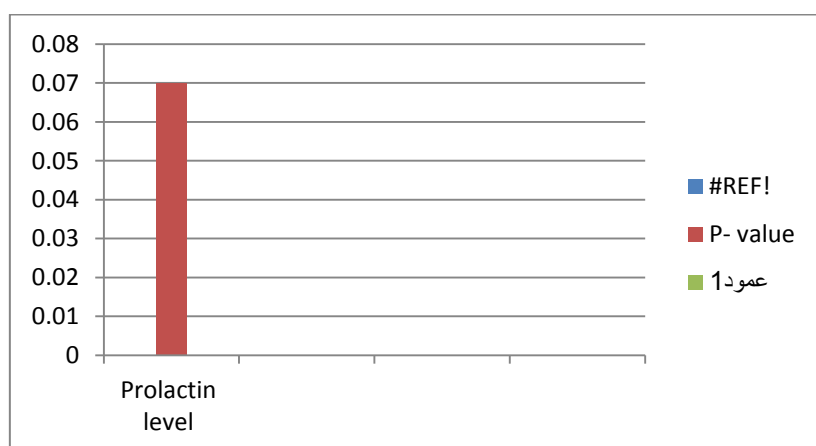
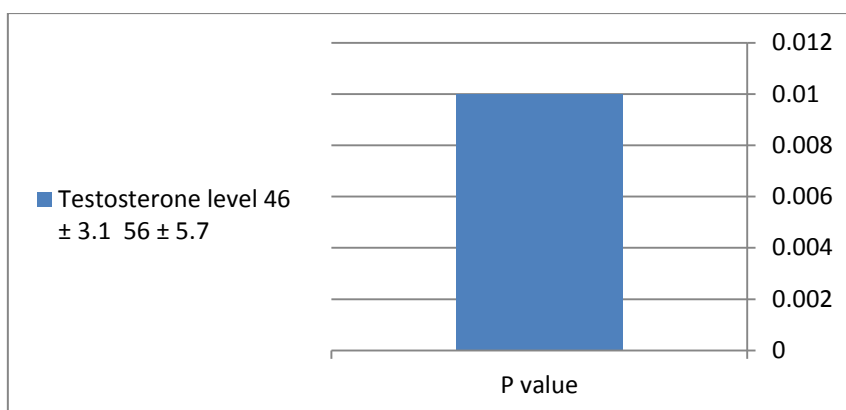


Figure (2):- Shows the P value of Prolactin level

Table (3):- The mean and SD of Testosterone before and after treatment

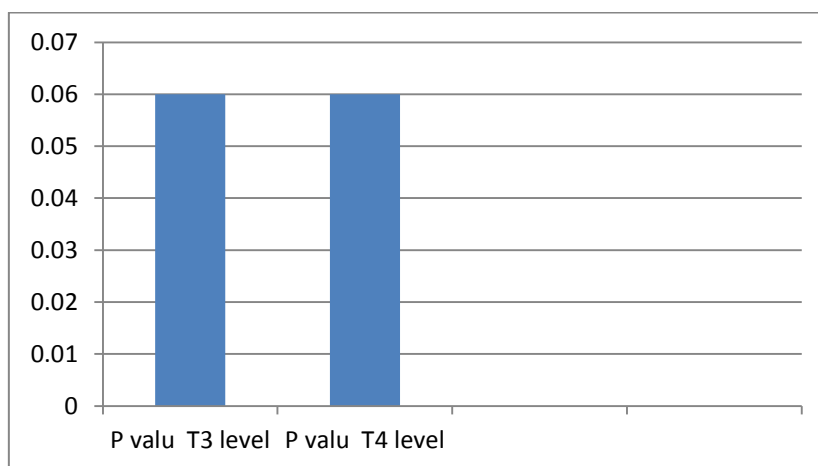
Parameters	Before treatment	After treatment	P value
Testosterone level	46 ± 3.1	56 ± 5.7	0.01



**Figure (3):- Shows the P value of testosterone level**

**Table (4):- The mean and SD of T3 and T4 before and after treatment**

Parameters	Before treatment	After treatment	P value
T3 level	2.2 ± 1	1.8 ± 0.7	0.06
T4 level	6.20 ± 1.12	5.9 ± 0.3	0.06



**Figure (4):- Shows the P value of T3 and T4 level**

## **Discussion**

According to the data obtained in this study and about the measurement of seminal fluid analysis, determination of testosterone, prolactin, and T3 and T4, it was found that in case of treatment with vitamin E there is a significant increase in number of sperm, and this result agree with study of Atig et al(14) and Agarwal(15). Also our study will agree with Ahmed et al(16) and Lenze et al(17) who found that the administration of vitamin E results in an improvement in increasing the sperm activity and motility. Regarding the sperm morphology, the our study will agree with Al-tayar (18) who find that there is improvement in shape of sperm after treatment with vitamin E.

Regarding the prolactin, in our study there is no significant difference in its concentration after and before treatment, Bala, et al(19), Dabbous and Stephen(20) found that there is a significant difference in prolactin concentration after and before treatment by vitamin E, this finding is does not agree with our study. Regarding the testosterone, in our study there is a significant differences in its concentration after and before treatment by vit.E, and this result agree with study done by Hadri (21) and Geidam et al (22). About the concentration of T3 and T4, in our study there is no significant differences after and before treatment with vit. E. There are some studies suggest that dysfunction of thyroid gland can impair quality of seminal fluid, and the potential relation between thyroid hormones and semen quality still not completely understood Poppe (23) and Krassas (24). Regarding the Zinc sulfate treatment, in our study there is a significant differences after and before treatment with Zinc sulfate, this study agree with study done by Salman, AH. (25) who found that the oral zinc sulfate effective in

improvement of progressive sperm motility, other study done by Colagar AH et al. (26) who found that the Zinc treatment play a role in substantial increase in sperm count from 8 million to 20 million/ml. Other study, Ahmed, et al (16) found that Zinc administration results in an improvement in quality and motility of sperm. About the testosterone level, in our study there is a significant difference in its level after and before treatment with Zinc, this study agree with study done by Saeed, HSM, et al(27) who say that administration of Zinc induce significant increase in testosterone level. Omu, AE et al (28) found that the Zinc deficiency has been liked to decrease the testosterone level. Other studies like Abed AA, Jarad A., Ali H and Baig, AM, et al (29, 30) found that there is a positive relation between plasma zinc concentration with sperm count, motility, and serum testosterone levels. About the prolactin and T3, T4, TSH study there is no significant differences after and before treatment with Zinc sulfate.

## **Conclusion**

- 1- Treatment with Vit E play a role in improvement of infertility.
- 2- Treatment with Zinc sulfate play a role in improvement of infertility.

## **Recommendation**

- 1-More study about the relation between thyroid hormones with infertility in men.
- 2- More study about the relation between prolactin with infertility in men.

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