ISSN: 1343-4292
Volume 140, Issue 02, May, 2022

Relationship between interleukin 6 and 10 with seminal fluid characteristics in patients with varicocele

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ABSTRACT— Infertile males were tested for the presence of interleukin 6 and 10, as well as for the presence of lipid peroxidation in their sperm. A total of 75 men with varicoceles and 25 fertile men served as controls, with sperm samples collected via masturbation. Malondialdehyde (MDA) production in the sperm membrane was used to assess the degree of lipid peroxidation in the membrane. Statistics were used to examine the association between the quantities of interleukin-6 (IL-6) and interleukin-10 (IL-10) in plasma of seminal and lipid peroxidation levels of sperm membranes. There existed a statistically significant difference in the concentration of IL-6 in the seminal plasma of unfertile males and fertile men ($p < 0.05$) between the two groups. On the other hand, the concentration of interleukin-10 (IL-10) in the seminal plasma of infertile men was considerably greater than that of fertile men ($p < 0.05$), and the degree of lipid peroxidation in the semen of infertile men was significantly higher than that of fertile men ($p < 0.05$). in seminal plasma the levels of IL-6 and membrane lipid peroxidation procces in the spermatozoa were found to be positively related to each other ($p < 0.05$), while IL-10 levels in seminal plasma and lipid peroxidation membrane in sperm were found to be positively correlated with each other ($p < 0.05$). It seems that there is a potential link between plasma interleukin-10 and 6 and ranks of spermatozoa and peroxidation of fat in the sperm membrane based on these findings. It may explain the encouragement species reactive formed by sperm of males and leukocytes, which is stimulated by great ranks of IL-6. Moreover, IL-10 is categorised by chemoattractant action of both T cells and basophils, as well as by the use of a proangiogenic effect on vascular smooth muscle cells. IL-10 is a cytokine that shows a key character in a variety of inflammatory disorders.

KEYWORDS: interleukin 6;10, varicocele

1. INTRODUCTION

The scrotum is one of the most important members of the male reproductive system, as it works to maintain a temperature of between 35-36C°, and it is one of the most important things in the formation of healthy sperm [1], [2]. These sperms are maintained by maintaining a constant temperature in the scrotum, as the countercurrent phenomenon, through which the temperature is lost and maintained through blood flow in the fine blood network [3], [4]. Varicocele is represent one of greatest communal reasons of man sterility in the world, and it is frequently caused by surgical intervention [5], [6]. More than 9-15% of males worldwide have varicocele [7- 9]. Several studies have shown that 9-10% of males suffer from infertility for every 50 infertile men who suffer from varicocele [10]. Infection with varicocele affects the cells of animals. Sperm damage can be direct or indirect [11], [12] and immune infertility is one of the main problems in male infertility and is often associated with varicoceles and this condition is responsible for 10-15% of all infertility cases [13]. During several studies, factors were taken into account Fertility-related

immunity since 2010 [14], [15] Several cells have been studied in terms of cytokine secretion, as cytokines are small peptides that circulate in various immune activities [16], [17]. The transmitted signal caused by cytokines can regulate cell growth, proliferation, differentiation and other functions of the testes [18]. Cytokines produced by immune cells in the testes, interstitial cells, Sertoli cells, and sperm cells all regulate germ cell growth and differentiation, reproductive neuroendocrine, and spermatogenesis [19], [20]. Impaired cytokine secretion can affect reproductive system function and may lead to infertility [21], [22].

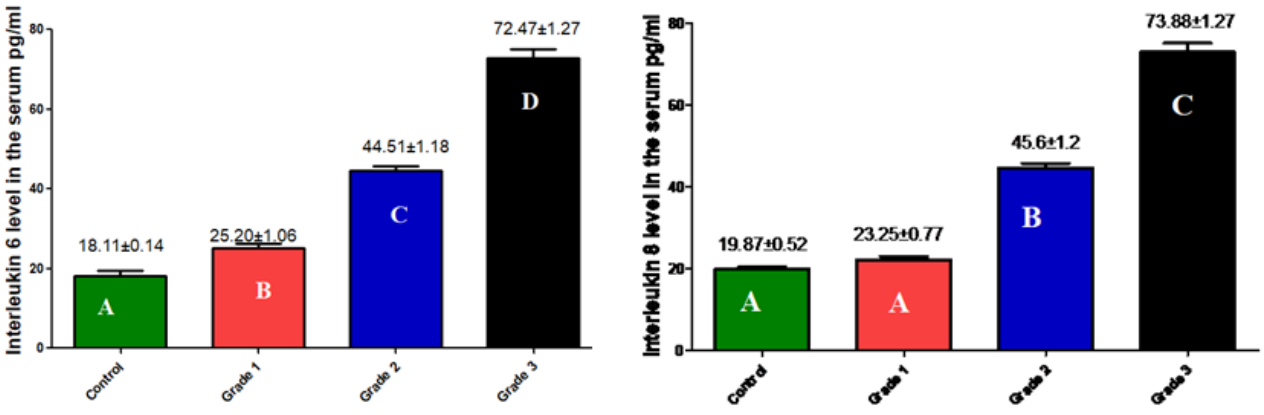
Ethical approval: Ethical approval was obtained from the human and animal ethical committee at the university of kufa 2020. Guidelines of the Ethical Committee for human Research were followed, which conform to the recommendations on Health Guide for human samples and Use of Laboratory Animals.

The results:

Table 1. semen and sperm parameters in patient with varicocele compare with control group

Parameters	Control	Grade 1	Grade 2	Grade 3	L.S.D. 0.05
Sperm concentration (million/ml)	66.16± 1.17 A	44.32± 3.2 B	33.02± 1.18 C	11.15± 1.07 D	4.521
Sperm Percentage of the progressive motile (%)	70.1.5± 2.15A	58.14± 2.11 B	27.16± 2.13 C	17.19± 1.11 D	5.892
Sperm Percentage of the Normal morphology (%)	68.21± 3.15 A	55.13± 2.55 B	34.1 ± 1.2 C	20.08± 4.16 D	5.195
Sperm Vitality Percentage (%)	90.33± 1.55 A	65.24± 2.85 B	52.42± 5.2 C	32.44± 3.85 D	6.942
Malone Didehyde Concentrate	4.13± 0.44 A	6.32± 0.72 B	11.07± 1.24 C	14.41± 1.45 D	1.147

The results in the table represent mean ± standard error S.E.
Number of fertile men's = 25
Number of men's with varicocele Grade1 = 25
Number of men's with varicocele Grade2 = 25
Number of men's with varicocele Grade 3 = 25
The dissimilar letters show significance differences (P<0.05)



ISSN: 1343-4292
Volume 140, Issue 02, May, 2022

Figure 1. The comparison of Interleukin 6 level in the serum between Grade 1 ,Grade 2 and Grade 3 compared with control group

Figure 2. The comparison of Interleukin 10 level in the serum between Grade 1 ,Grade 2 and Grade 3 compared with control group

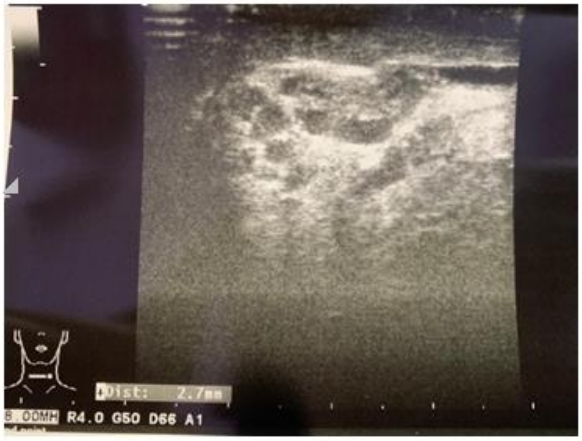


Figure 3. Show the expansion of the vein and show the varicocele grad 2

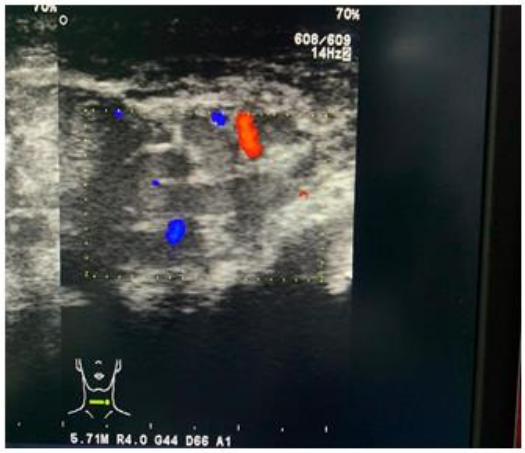


Figure 4. Show the expansion of the vein and show the varicocele grad 1

Figure 5. Show the expansion of the vein and show the varicocele grad 3

Table 2. Correlation between Interleukin 10 & 6 and the semen and sperm parameters

Interleukin 10 with Sperm concentration	R= - 0.651
Interleukin 10 with Sperm progressive motile	R = - 0.623
Interleukin 10 with Sperm Normal morphology	R = -0.691
Interleukin 10 with Sperm Vitality	R = - 0.543
Interleukin 10 with Malone Didehyde Concentrate	R = 0.826
Interleukin 6 with Sperm concentration	R= - 0.534
Interleukin 6 with Sperm progressive motile	R = - 0.605
Interleukin 6 with Sperm Normal morphology	R = - 0.634
Interleukin 6 with Sperm Vitality	R = - 0.637
Interleukin 6 with Malone Didehyde Concentrate	R = 0.866

2. Methods

75 patients (23-43 years old) are suffering from varicocele and their main complaint is infertility. Samples were taken from the Infertility Center in Al-Sadr Teaching City, Najaf, Iraq. Analyses were performed and the amunts of IL-6 and 10 in plasma of seminal were checked, A paired Student's t-test be present to use for locate the statisticaly significance differences in values.

3. Results

The result indicated a significant reduction ($p<0.05$) in the sperm concentration in infertile patients Grade 1, Grade 2 and Grade 3 comparison with control group. In addition, there was a significant drop ($p<0.05$) in motility of the sperm, sperm activity and normal sperm morphology in patients in Grade 1, Grade 2 and Grade 3 compared with the control group in the table (1)

The outcomes exhibited a significant decrease ($p<0.05$) of Interleukin 6 level in both patients Grade 1, Grade 2 and Grade 3 compared with control group shown in figure (1).

The outcomes explain a significant reduction ($p<0.05$) in Interleukin 10 level in both patients Grade 1, Grade 2 and Grade 3 compared with group of control shown in figure (2).

There was a significant positive relationship among IL-6 levels in plasma of seminal and the lipid peroxidation found in membrane in spermatozoa (p), and a significant positive relationship between IL-10 levels in plasma of seminal and the lipid peroxidation membrane in sperm ($p < 0.05$).

4. Discussions

In this study, the results showed a significant difference between the groups. It can be speculated that the varicocele leads to an effect on the production and freedom of sperm, as well as their normal morphology. These outcomes are regular by the findings of two other studies that concluded that varicocele could have a undesirable effect on semen feature [23], [24].

Varicocele management possibly will practically recover potential of fertility in men expressively. Hence, it appears that varicocelectomy has confident result on factors such as level of sxual hormones like FSH levels and testosterone in serum as long count and motility of sperm. So, it might be decided that varicocelectomy is an actual approach to recover fertility of male and sexual illnesses [25].

It was found that there is a relationship between varicocele and immune markers, where the marks displayed a important rise in the level of cytokines 6 and 10 between varicose vein groups when compared with control groups [26], [27].

The rise in interleukin 6 and 10 and the formation of varicose veins leads to pressure on the varicose veins on the areas of male hormone production, and thus leads to a decrease in the efficiency of the formation of spermatozoa, according to a study conducted on Leydig cells, Leydig cells assume urgent parts in evoking male qualities by creating testosterone and any harm to these cells can bargain male fruitfulness *Toxoplasma gondii* (*T. gondii*) is an intracellular parasite skilled to attack any nucleated cell, including cells from male regenerative framework. Thus, we assessed the limit of RH strain of T. gondii to contaminate TM3 Leydig cells and the effect of this disease on testosterone and provocative go betweens creation. We first, by performing adherence, contamination, and intracellular expansion tests, we tracked down a huge expansion in the quantity of tainted Leydig cells, topping 48 h after the disease with T. gondii. Supernatants of TM3 tainted cells displayed, in a period subordinate way, expanded degrees of testosterone just as monocyte chemoattractant protein-1 (MCP-1) and interferon-γ (IFN-γ), which is corresponded with the powerful *T. gondii* contamination [28].

The study also discovered a significant increase in cytokines 10, 6, which is consistent with the findings of other researchers. The results also revealed a link between cytokines 6 and 10 because the test's effect caused them to increase together. An increase in varicose veins and a rise in interleukin six and eight leads to a high oxidative stress and a decrease in oxygen delivery to the areas of spermatogenesis This is according to a study conducted, which says: Oxidative pressure is an aftereffect of the awkwardness between receptive oxygen species and cancer prevention agents in the body that can cause tissue harm. Oxidative pressure has a critical contribution in the pathogenesis of ongoing prostatitis/constant pelvic torment condition and male fruitlessness. chronic pelvic pain and prostatitis is a significant danger factor for male barrenness because of age of unreasonable root species that harm sperm, proteins DNA,lipids, and bringing about undermined essentialness and diminished sperm motility. Here we present a thorough survey of oxidative pressure significance in prostatitis/constant pelvic torment and male barrenness, and exemplify the defensive impacts of cancer prevention agents against root species [29].

5. Conclusion

The effect of varicocele can depressingly affect the feature of sperm, then the presence of researchers in the sperm has an opposite correlation among the quality of semen and spermatozoa and the level of cytokines 6 and 10 with each other because the effect of the testicles has led to their elevation, including on the two types of sperm.

Conflict of interest:
All authors declare that, there is no conflict of interest

6. References

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