

Leukocytospermia and sperm quality ,in seminal fluid samples of infertile men

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Abstract:

Background

White blood cell are present in most human ejaculates, but leukocytospermia may reflect an underlying pathological condition. This study evaluated the relationship between leukocytospermia and standard semen parameters.

Objectives

To investigate the presence of correlation between the leukocytospermia , sperm motility and sperm concentration in infertile Iraqi men.

Methods

A total of 154 semen analyses of infertile men were included in this study. All semen analysis were performed within 1 hour, Data were collected for sperm motility type A and B, concentration of both leukocyte and spermatozoa. The mean numbers of motile sperms and the leukocytes were obtained for each specimen. 10 micro liter of seminal fluid were transferred on a slid and covered by a cover slip, then the mean number of motile sperm, leukocyte and concentration were obtained by reading 25 Microscopic fields

Results

The results indicated a significant relationship between the reduction in the number of leukocytes and the increase in the number of motile spermatozoa and sperm concentration $r = -0.731$ and $r = -0.77$ respectively. But the mean number of motile sperms was weakly correlated with the sperm concentration $r = 0.58$. Conclusion : Both the mean number of motile sperms and sperm concentration were significantly correlated with the increasing number of leukocytes. That refers to improvement in motile sperm and sperm concentration with the reduction of leukocytes. Keyword: Seminal fluid, Leukocytospermia, Sperm motility.

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Introduction

Leukocytes are commonly found in semen samples, and a level above $1 \times 10^6/\text{mL}$ is considered pathologic according to WHO criteria. Whether a correlation exists between leukocytospermia and bacteriospermia remains controversial, particularly in asymptomatic men (1).

The percentages of sperm with normal morphology and progressive motility were higher in semen samples with a leukocyte concentration between 0 and $1 \times 10^6/\text{mL}$ than in samples with a leukocyte concentration $>1 \times 10^6/\text{mL}$ (2).

As leukocytospermia is so prevalent in infertile men, it can be questioned as to whether the

presence of seminal leukocytes correlates with semen quality. Early studies found leukocytes to have a positive effect on semen quality. Tomlinson et al. reported that leukocytes phagocytosed abnormal spermatozoa (3).

Lackner et al. have shown that leukocytospermia may not necessarily have a negative impact on outcomes following assisted reproductive techniques. They reported similar fertilization rates for non-leukocytospermic samples and leukocytospermic samples (63.4% vs. 64.3%, $P =$ not significant). Corresponding pregnancy rates also did not differ significantly between the two groups (4).

Table(1): The relations between sperm parameters according to leukocytes concentration category in 154 seminal fluids of infertile men

Variables	Leukocytes category					Correlation Coefficient (r) between variables
	A	B	C	D	E	
Mean Nr. of Leukocytes	0.82	1.4	2.5	3.2	4.2	r = -0.731 significant
Mean Nr. of motile sperms	41.39	22.7	13.16	18.6	17.14	
Mean Nr. of Leukocytes	0.41	0.72	1.27	1.54	2.14	r= -0.77 significant
concentration	42.8	42.7	34.5	42.07	30.14	
Mean Nr. of Motile sperms	41.39	22.7	13.16	18.6	17.14	r=0.58 not significant
concentration	42.8	42.7	34.5	42.07	30.14	

The percentage of sperm motility was significantly and negatively correlated with leukocytic concentration in semen (5).

In semen, granulocytes are major producers of reactive oxygen species (ROS), which can damage sperm. The diagnosis of leukocytospermia is usually based on the world Health organization (WHO) definition of 1×10^6 white blood cells per milliliter, but controversy remains over the minimum leukocyte level that impairs fertility (6). The white blood cell (W.B.C) count in semen is one of the classical measures of semen quality and the clinical relevance on fertility has been questioned repeatedly (7, 8, 9). The main aim of this study was to investigate the presence of correlation between the leukocytospermia, sperm motility and sperm concentration in infertile Iraqi men.

Materials and method:

A total of 154 semen analysis of infertile men were included in this study.

All semen analysis were performed within 1 hour, and analyzed according to the WHO laboratory manual (7).

Data were collected for sperm motility type A and B, concentration of both leukocyte and spermatozoa.

The mean numbers of motile sperms and the leukocytes were obtained for each specimen. 10 micro liter of seminal fluid were transferred on a slid and covered by a cover slip, then the mean number of motile sperm, leukocyte and concentration were obtained by reading 25 Microscopic fields.

To study the relation between semen parameters, leukocytes concentration were categorized as follow:

- Category A: > 0 to 1.0×10^6 /ml.
- Category B: > 1.0 to 2×10^6 /ml.
- Category C: > 2 to 3×10^6 /ml
- Category D: > 3 to 4×10^6 /ml.
- Category E: > 4 to 5×10^6 /ml.

Statistical Analysis:

The relationships between leukocytes concentration and semen parameters were measured by using the spearman Rho test (10).

Result :

From the total of 154 samples, 57 samples were assigned to leukocyte concentration category A ($< 1 \times 10^6$ /ml), Leukocytospermia ($> 1 \times 10^6$ /ml) was present in 97 (62.98%) of total samples and distributed as following 39 (25.32%) samples to category B, 32 (20.77%) samples to category C, 16 (10.38 %) samples to category D and 10 (6.49%) samples to category E.

(Table- 1) shows the relation between the number of leukocytes, the numbers of motile sperm and the sperm concentration in each semen sample.

Both the mean number of motile sperms and sperm concentration were significantly correlated with the increasing number of leukocytes $r = -0.731$ and $r = -0.77$ respectively. That refers to improvement in motile sperm and sperm concentration with the reduction of leukocytes.

But the mean number of motile sperms was weakly correlated with the sperm concentration.

discussion:

These results are different from results cited by, Tomlinson MJ et al (3), and Lackner et al (4) but agrees with conclusion of Jacob et al (2), Nabil Aziz et al (5) and Sharma et al (6). The presence of leukocytes in the semen is a paradox, from one side it is negative due to generation of free radicals, which are harmful to sperm and reduced its motility (1, 6). From the other aspect is good because the leukocytes engulf the abnormal sperm, and they can respond to infectious stimuli and become activated to kill the invading micro-organisms.

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