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1- Inflammatory response.
2- Nonspecific cellular immune response.
3- Cooperation and / or inverse cooperation of natural and adaptive Immune responses to foreign antigenic epitopes.

Study of Nonspecific Cellular Immune Function (Leucocytospermia) on Asthenozoospermic, Oligozoospermic & Azoospermic Infertile Patients

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**Introduction**

This study were established according many attempts that had been made to answer the question of whether and to what extent WBCs – in particular polymorphonuclear (PMNs) can affect the quality of semen sample (Comhair et al., 1980; Gonzales et al., 1992; Anderson, 1995).

Therefore, this work were studied three different categories of infertile male factors which are include; asthenozoospermic, oligozoospermic and azoospermic patients as well as to the control subjects.

As the male reproductive system (Figure-I) includes the testis, a series of ducts or channels, accessory sex glands and the pen. The testis also produce the spermatocytes, the sperms in addition to the male sex hormones. The male reproductive mucosal compartment responds as an autoimmune response to sperm antigens (Meshan, 1984; Gilbert, 1988; Comhair, 1999; Wira et al., 2002).

Older paper showed a decrease in number and motility of spermatozoa in infertile patients with leucocytospermia (Talbert et al., 1987; Eggert et al., 1992).

Concerning the morphology of spermatozoa a reduction of normal forms was observed along with the decrease of their number and motility (Wolff et al., 1990; Gonzales et al., 1992).

These older findings have not been confirmed by other studies (Aitken and West, 1990; Tomlinson et al., 1993; Aitken and West, 1994), which involve large numbers of fertile men with leucocytospermia.

On the contrary, most reports seem to agree that leucocytospermia has a negative effect on sperm function tests in a different stages of the sperm – ova interaction processing due to WBCs impartment molecules secretions (Maruyama et al., 1985; Vogelpoel et al., 1991; Garvella and Lipovac, 1993; Chan et al., 1994).

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Many investigations say that, Reactive oxygen species (ROS) are produced by leucocytes and spermatozoa in both fertile and infertile men as a result of lipid peroxidation. (Rao et al., 1989; Aitken et al., 1993). Excessive ROS causes oxidative stress, resulting in decreased sperm motility, viability and increased midpiece defects that impair sperm capacitation and acrosome reaction (Aitken, 1997; De Lamirande et al., 1995).

Patients and methods:

The study consists of seventy nine infertile male patients. Those patients were subgrouped according to infertility type which includes; (48) of asthenozoospermic, (18) of oligozoospermic and (13) of azoospermic infertile patients who were involved in this study during their attendance of Babylon maternity and child care teaching hospital of Babylon university.

All those patients were evaluated by consultant of urologist surgeons assessing for the presence or absence of varicocele, hydrocele, cryptochidism, inguinal hernia operation, present or absent of the congenital abnormalities, complete history regarding sexual habits, venereal diseases, chronic diseases such as diabetes, and febrile disease at least throughly during last one year were undertaken.

In addition to the questioner for: age, alcohol consumption, smoking habits, ABO blood group, exposure for ionizing radiation and the type of infertility.

Seminal fluid analysis were done according to the WHO, (1990). which is regaded that the normal concentration leuocytes value is $< 1 \times 10^6 / \text{ml}$.

Semen collection:

Semen or the samples of seminal fluid was collected (after 3–4 day of abstinence) directly into a clean, dry and sterile disposable Petri-dish by masturbation in room near the laboratory.

The container was labeled with the following information: name, age, abstinence period and time of sample collection.

The specimens were incubated at $37^\circ C$ for 30 minutes to allow liquefaction. The specimen was examined in details by macroscopic and microscopic examinations and the standard form of the WHO, (1999) was used to record the results of seminal fluid analysis.
Normal Subjects (Controls).

Ten healthy fertile subjects were used in this study as control groups. Physical and clinical examinations were showed by urologist clinician specialists.

Results

Semen of infertile men has shown maximum leucocytes concentration among Oligospermic then asthenozoospermic and azoospermic patients.

Leucocytospermia was ranged among infertile groups from $2.384 \times 10^6 + 0.92$ leucocytes /ml to $6.166 \times 10^6 + 1.106$ leucocytes /ml.

The Inter-groups ranges of leucocyte concentrations were; $2 \times 10^6 - 25 \times 10^6$, $4 \times 10^6 - 20 \times 10^6$ and $2 \times 10^6 - 14 \times 10^6$ leucocytes /ml; for asthenozoospermic, Oligozoospermic and azoospermic patients, respectively (table-1)
**Table (1)**

Leukocytes Concentration Among Infertile Groups

<table>
<thead>
<tr>
<th>Infertility Patient Group</th>
<th>Leukocytes Mean ± SE</th>
<th>Rate of Leukocytes positive: total patient</th>
<th>Leukocytes Positive range</th>
</tr>
</thead>
<tbody>
<tr>
<td>(48) Asthenozoospermic Patient</td>
<td>5.6383×10⁶ ± 0.5628</td>
<td>45:48 (93.75%)</td>
<td>2×10⁶ – 25×10⁶</td>
</tr>
<tr>
<td>(18) Oligozoospermic Patient</td>
<td>6.1667×10⁶ ± 1.1063</td>
<td>18:18 (100%)</td>
<td>4×10⁶ – 20×10⁶</td>
</tr>
<tr>
<td>(13) Azoospermic Patient</td>
<td>2.3846×10⁶ ± 0.9236</td>
<td>8:13 (61.53%)</td>
<td>2×10⁶ – 14×10⁶</td>
</tr>
</tbody>
</table>

**Discussion**

The ejaculation invariably contains other than spermatozoa. These include polygonal epithelial cells from the urethral tract, spermatogenic cells and leucocytes, which have been collectively referred to as (round cells). Leukocytes are present in most human ejaculations (Wolff and Anderson, 1988; Aitken and West, 1990; Aitken and West, 1994). The predominant cell type being the neutrophils.

Accurate assessment of the number of leucocytes is important because the excessive presence of these cells may indicate the existence of reproductive tract infection. A threshold concentration of leucocytes beyond which fertility will be impaired is difficult to define. The impact of these cells depends upon the site at which the leucocyte enters the semen. Furthermore, leucocytospermia may be associated with defects in the semen profile including reductions in volume of ejaculate, sperm concentration, and sperm motility, as well as the loss of sperm function as a result of oxidation stress (Aitken and west, 1990) and for the secretion of cytokines (Hill et al., 1987). as shown in (table - 2). ROS generated by the WBCs especially polymorphonuclear leucocytes (PMNS) or granulocytes, can exert a deleterious effect on human spermatozoa as indicated by marked loss of sperm motility and a reduced capacity for oocyte penetration, that contaminate PMNs is a major source of reactive oxygen species activity recorded in human sperm is in controvertible (Baker et al., 1996).

As a general guide, a normal ejaculate should not contain more than 1×10⁶ leucocyte /ml (WHO, 1999). Such concentration (1×10⁶/ml) was closely different from those results of leucocytospermia of asthenozoospermic,
oligozoospermic and azoospermic patients, which are apparently with high concentration of leucocytes; 5.638 × 10^6 ± 0.562 (93.75%), 6.166 × 10^6 ± 1.106 (100%), and 2.384 × 10^6 ± 0.923 (61.53%) respectively as shown in table (1). Infections may include the testicular tissue, vas deference or the sexual accessory gland (e.g. prostate, seminal vesicles and bulbo-urethral gland). Besides, the relationship between the presence of genital tract infection is controversial (Comhair et al., 1980; WHO, 1992). Our results of the leucocytospermic patients agreed with those of Talbert et al., (1987); Eggert et al., (1992) which had been referred to decrease in number and motility of spermatozoa, Leucocytospermia of the asthenozoospermic, oligozoospermic and azoospermic patients study also agreed with those study of Wolff et al., 1990; Gonzales et al., 1992; Potitch et al., 1993; Yanushpolsky et al., 1996). Whom concerning the morphology of spermatozoa and the reduction of normal forms, as well as the decrease of concentration motility spermatozoa which are relatively evident. In view of susceptibility of human spermatozoa to oxidative stress, the presence of neutrophils is likely to be damaged, particularly if the infiltration occurs at the level of the rete testis or epididymis conversely, the entry of leucocytes, at the moment of ejaculation, via the prostate or seminal vesicles is probably less harmful because of the powerful antioxidant effects of seminal plasma (Jones et al., 1979). Hence this may be attributed to the fluctuating effect of leucocytospermia. Thus, such leucocytospermia may be beared in mind as:

I. Indication of genital infection Indication of urogenital infection.

II. Influxes of tissue harbouring leucocytes.

III. Cellular adjunct to infertility.

A part of normal nonspecific cellular immune surveillance expressed by human immune system.

References:


