

## **Study of blood parameter in women infected with *Trichomonas vaginalis* parasite**

### **دراسة معايير الدم في النساء المصابات بطفيلي المشعرات المهبليّة**

Assist. Prof. Dr. Basima Sh. Al Gazali      Lecturer Maysoon K. A .Al-Hadraawy  
Dep.Of Obstetrics and Gynaecology      medical laboratory Department      Technical institute  
Faculty of Medicine / Kufa University

Assist. Prof.Haqi A .A .Al-fatlway  
medical laboratory Department / Technical institute

#### **Abstract**

The study was conducted on 450 out patients and 30 healthy women, whom have visited the department of infertility at Al-Sadder medical city, Al-Zahra Hospital in Najaf Province during the period from January till August, 2012. The infection with *T.vaginalis* in clinical suspected women determined by using the wet amount microscope, ratio and infected women numbers by wet mount microscope were 49 and 10.88% respectively.

The results showed significant decrease ( $P<0.05$ ) in RBCs count, level of Hb, PCV, MCV, and MCHC in *T.vaginalis* infection patients in comparison to healthy control group.

#### **الخلاصة**

صممت هذه الدراسة لتحديد الإصابة بالمشعرات المهبليّة لدى النساء المشكوك بإصابتها سريريّاً في مدينة النجف الاشرف وذلك باستخدام طريقة الفحص المجهرى المباشر حيث اشتملت الدراسة الحالية على 450 حالة مشكوك بها سريريّاً بالإصابة بطفيلي المشعرات المهبليّة 30 حالة من نساء غير مصابات ارتادوا وحدة العقم في مدينة الصدر الطبيّة ومستشفى الزهراء في محافظة النجف الاشرف للمدة من كانون الثاني حتى آب 2012 أظهرت الدراسة الحالية إن نسبة وعدد المصابات بطفيلي المشعرات المهبليّة كانت 49 و 10.88% على التوالي.

كشفت الدراسة الحالية حصول انخفاض معنوي ( $P<0.05$ ) في كريات الدم الحمر ومستوى وحجم الكريات المرصوصة ودلائل كريات الدم الحمر المتمثلة بمعدل حجم الكرية MCV وتركيز خضاب الدم داخل الكرية MCHC في حين ان معدل كمية الخضاب في الكرية MCH والاقراص الدموية لم يعاني أي تغير معنوي ملحوظ في المصابات بالمشعرات المهبليّة مقارنة بمجموعة السيطرة .

#### **Introduction**

*Trichomonas vaginalis* is a colorless, preform or oral organism four anterior flagella and a recurrent flagellum attached to the body by an undulating membrane. The recurrent flagellum does not extend beyond the posterior end of the body; the Para basal body is single and V shaped and has a filament associated with it; the cytoplasm is granulated; a single round or oral or elongated nucleus is found in the anterior portion of the body that contains karyosome and scattered mass of chromatin(1).

Laboratory diagnosis of *T.vaginalis* infection is based on their covey of the motile organism in the vaginal discharge or mucosal scraping of the vagina in female and urethral discharge in male, and it is able to detect the protozoa at concentration as low as three organism (2). The traditional clinical diagnosis of vaginal infection is based on a history of patient, clinical finding observed during the vaginal specimen. This last one provides the most objective information. A microscope wet amount examination of the specimen permits, detection of the motile protozoa *T.vaginalis* (3). Although *T.vaginalis* is the most common cause of non-viral STD, the exact mechanism of its pathogenesis has not been clearly elucidated. The host-parasite relationship is very complex and the broad range of clinical symptoms cannot likely be attributed to a single pathogenic mechanism. Many mechanisms are thought to be involved and all the pathogenic mechanisms (i.e.,

contact-dependent, contact independent and immune response) are probably important in the virulence of this disease (4).

### **Sample collection**

From January till August, 2012, 450 vaginal swabs were collected from patients and 30 healthy women who attended the Antenatal and gynaecological outpatient's clinics in AL-Sadder Teaching Hospital and AL-Zahra Hospital in AL-Najaf province informative questionnaire was organized to each patient. From suspected women vaginal discharge was carefully collected from the posterior vaginal fornix after putting the patient at a lithotomic position and taking swab after opening the vagina by a sterile speculum, the swab are immersed in a tube with ml of a sterile normal saline (5).

The swab was examined in wet mount preparation and five ml was the total blood collected from each clinical suspected woman with *T.vaginalis* infection and non-suspected women( as control group) by disposable syringe .Four ml from each of blood samples were drawn in sterile plain tubes and remains for 30 minutes at room temperature. After that the samples were centrifugation at 3000 rpm for 5 minutes Backman/counter, Germany to separate the serum and collected in other sterile tubes, each sample of serum was divided into three parts; each of them was kept in deep freeze at -20C°. The remaining one ml of blood was drawn in tube with anti-coagulated EDTA (Abott /Jordan) which was used for determination the haematological parameters.

### **Wet mount examination**

Immediately, 1 drop from one of the tubes was applied to a glass slide, covered with a cover slip, and examined under the microscope by using the high power objective (X40) for the presence of *T.vaginalis*. The wet mounts were examined for at least 10 minutes (6). Positive results were defined as the presence of one or more Trichomonads with characteristic motility jerky movement and morphology (7). The Trichomonads may be inactive and non-motile as in chronic or asymptomatic condition (8). The wet amount is also used to demonstrate the presence of clue cells in vaginal secretions, these cells were epithelial cells covered by masses of bacteria of varying morphology (9).

### **Procedure**

- 1- 10 µl of EDTA blood sample was placed in the aspirator of the instrument.
- 2- The start key on the instrument was pressed and the blood sample was aspirated.
- 3- Result were provided within 1 minute on the LCD display, printed out on the printer and stored in the resident memory.

### **Results**

#### **Hematological criteria**

The statistical analysis of the results has shown a significant decrease ( $P < 0.05$ ) in a count of red blood corpuscular, hemoglobin concentration, packed cell volume, mean corpuscular volume, mean corpuscular hemoglobin concentration .While the mean corpuscular hemoglobin, platelets count were non- significant ( $P > 0.05$ ) in patients with *T. vaginalis* infection compared to the healthy control group, as seen in table (1).

Table (1): Blood parameters in healthy control group and patients suffering from *T.vaginalis*infection.

Blood parameters	Healthy control (n=30)	<i>T.vaginalis</i> patients (n=60)
RBCs $\times 10^6/\text{mm}^3$	$4.964 \pm 0.061$	$*3.679 \pm 0.053$
Hb g/dL of blood	$12.018 \pm 0.970$	$*7.912 \pm 0.162$
PCV (%)	$37.647 \pm 0.318$	$*30.806 \pm 0.937$
MCV ( $\text{mm}^3$ )	$84.647 \pm 0.731$	$*71.097 \pm 0.731$
MCH( pg) /cell	$23.313 \pm 0.388$	$23.258 \pm 0.203$
MCHC (g/dLof RBCs)	$29.848 \pm 6.130$	$*22.083 \pm 0.414$
PLT $\times 10^3 /\text{mm}^3$	$321.840 \pm 8.340$	$324.120 \pm 6.130$

\* Significant difference  $P < 0.05$  between control group and patients.

## Leukocyte count

### Total Leukocyte Count ( $\times 10^3 / \text{mm}^3$ )

TLC in the patients group suffering from *T. vaginalis* infection exhibited a significant increase ( $P < 0.05$ ) as compared to the healthy control group, as seen in Table(2).

### Differential Leucocyte Percentage %

The result of differential type of lymphocyte, monocyte, neutrophil and basophil shown that the significant increase ( $P < 0.05$ ) in patients suffering from *T.vaginalis* compared to healthy control group .but the eosinophil showing non-significant( $P > 0.05$ ) change in patient group as compared to healthy control group.(2).

Table (2):total leukocyte count and differential leukocyte Percentage in healthy control group and patients suffering from *T.vaginalis* infection

Parameters	Healthy control (n = 30)	<i>T. vaginalis</i> patients (n = 60)
TLC ( $\times 10^3 / \text{mm}^3$ ):	$5.252 \pm 0.198$	$*7.940 \pm 0.272$
NEU. %	$51.368 \pm 0.221$	$*54.840 \pm 0.147$
Lym. %	$23.026 \pm 0.07$	$*24.993 \pm 0.104$
Mono. %	$5.438 \pm 0.023$	$*8.0155 \pm 0.035$
Eos. %	$2.268 \pm 0.149$	$2.575 \pm 0.022$
Baso. %	$1.061 \pm 0.0028$	$*2.168 \pm 0.011$

\* Significant difference  $P < 0.05$  between control group and patients

## Discussion

### Hematological criteria

The present results has revealed a significant decrease in RBCs count, concentration of Hb and PCV in patients with *T. vaginalis* infection compared to healthy control group. This result may be due to hemolysis of RBCs and phagocytosis by *T.vaginalis* parasite and the increased bleeding through menstrual cycle and this leads to decrease in the number of RBCs and the hemolysis of RBCs may lead to decrease in the Hb concentration (10;11). One of the most frequent causes of anemia in *T. vaginalis* infection is the increase of the bleeding in the menstrual and increase of the hemolysis of red blood cell these lead to iron deficiency anemia (IDA).

The results have shown a decrease in MCV and MCHC in women infection with *T.vaginalis* parasite compared to healthy control group. A decrease in MCV may be due to a decrease in Hb

inside RBCs caused by *T.vaginalis* infection; decrease in MCHC is caused by iron deficiency anemia that lead to decrease in formation of Hb in RBCs.

The results also provided a decrease in level of PCV in patient women compared to control group; this result maybe due to a decrease in RBCs counts or due to decrease in MCV caused by decreased level of Hb in RBCs. The data on the correlation between *Trichomonas* SPP, infection, and anemia is limited. However, there is a report describing that phagocytosis of erythrocyte can also be seen in the cytoplasm of *T.vaginalis*. Anon-intestinal protozoa, suggesting the need for the patient to be tested for anemia (12).

About 50% of infected women with *T.vaginalis* punctuate hemorrhages can be observed (2). The data of this study indicated a significant increase in WBCs; these due to an increase in the number of monocyte, lymphocyte, neutrophils, and Basophils because the infection with this parasite causes stimulation immune system of host humeral and cellular.

The results also revealed Basophilia associated with patients who suffering from *T.vaginalis* infection; these phenomenon are not fully understood. The reason for this observation may be attributed to allergy disorder which is one of symptoms of *T.vaginalis* infection these allergy causes increase IgE antibody in blood stream and these may lead to increase in the basophil because the receptor of IgE found on the surface of basophil and mast cell in human (13).

The present study indicated a significant increase in lymphocyte in all groups of *T. vaginalis* infection patients compared to control group. This result corresponds to the result of (14) that provided a significant increase in the percentage of B-lymphocyte in peripheral blood in women infected with *T.vaginalis* compared to the control group. It also agrees with (15) who recorded that the B-lymphocyte is significantly higher in women with *T.vaginalis* infection ( $57.24 \pm 0.64\%$ ) compared to the control group ( $16.05 \pm 0.55\%$ ).

The results of this study revealed neutrophilia associated with patients suffering from *T.vaginalis* infections; only a few studies have been carried out on the response of neutrophils to *T. vaginalis* infection and these results agrees with (16) who provided an increase in the neutrophil cell in the women infected with *T.vaginalis* patients compared to control healthy group. The increase of neutrophil count maybe due to immune response of neutrophil against *T.vaginalis* infection to produce IL-8 which acts against this parasite protozoan. (17).

The current study indicated significant increase in monocyte in women infected with *T. vaginalis* compared to healthy control group, and this result corresponds to that of (18) who recorded that the monocyte count increase in women infection with *T.vaginalis* to produce IL-8 which production is regulated through mitogen-activated protein (MAP) Kinase signaling pathway (19 ).

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