



## Original Research Article

# Chlamydial Antibodies , Pro-Inflammatory Cytokines and Bacterial Significance among Infertile Women

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### Abstract

The current study was done to investigate the relation between the bacteria different kinds and infertility in women, the study include 108 specimen from infertile and fertile women with ages range (20-40 years) these specimens collected from infertility and gynecology center of Maternity and Pediatrics Teaching Hospital in Babylon province. Urine, vaginal swabs and blood samples were used in this study. Bacteriological diagnosis for urine and vaginal swabs accomplished and showed variation in types and number of isolates. The isolates can be distributed as follows: Gram positive bacterial isolates include *Staphylococcus aureus* 48 (30%) 18 isolates urine and 30 vaginal swabs, *Escherichia coli* 24 urine and 19 vaginal swabs 43 (26.8%). Female infertility divided according to their causes into different types and the detection by anti-*Chlamydia trachomatis* antibodies reveals high concentration of IgG (46%) in the women with Polycystic ovary syndrome group, while the second high concentration (36%) in women with primary infertility. Immunological test of Cytokine IL-10 in patient show decreased in their concentration 11.5pg/ml compared with healthy at  $P < 0.05$  especially at polycystic ovary syndrome group.

**Key words:** IL-10, female infertility, bacterial isolates, *Chlamydia trachomatis*.

الأجسام المضادة للكلاميديا، الحركيات الخلوية المولية لالتهابات البكتيرية وأهميتها بين النساء المصابات بالعم

### الخلاصة

تتضمن هذه الدراسة التحقيق في العلاقة بين بعض أنواع البكتيريا ومسببات مختلفة من العم عند النساء. الدراسة شملت 108 عينة من النساء المصابات بالعم والسليمان اللاتي تتراوح أعمارهن (20-40 سنة) حيث تم جمع العينات من مركز العم في مستشفى بابل التعليمي للنسائية و الاطفال في محافظة بابل، شملت هذه العينات البول والمسحات المهبلية والدم. أظهر التشخيص الجرثومي للبول ومسحات المهبل التباين في أنواع وعدد العزلات. يمكن توزيع هذه العزلات على النحو التالي:

شملت العزلات البكتيرية المكورات العنقودية الذهبية 48 (30%) 18 عينة البول و 30 مسحات مهبلية، *أيشيريشيا القولون* 24 البول و 19 مسحات مهبلية 43 (26.8%). العقم عند النساء مقسمة وفقا لأسبابها إلى أنواع مختلفة والكشف عن طريق الأجسام المضادة للكلاميديا يكشف تركيز عال من IgG (46%) في النساء مع مجموعة متلازمة تكيس المبايض، و في الدرجة الثانية (36%) في النساء مع العم الاولي. اظهرت نتائج الاختبار المناعي للحركي الخلوى IL-10 انخفاضاً بالتركيز في المصابات بالعم الى 11.5 pg/ml مقارنة مع الأصحاء تحت معنوية 0.05 خصوصاً في مجموعة متلازمة تكيس المبايض.

### Introduction

Infertility is the inability to conceive after one year of regular unprotected sexual intercourse. The infertility of any given couple is not absolute and it takes a healthy couple, on average, a year

to achieve pregnancy given normal anatomy, physiological and sexual function. It affect about 10-15% of couples [1].

The causes are divided into several etiologies including genetic, physical

abnormalities, tubal factor, ovulatory dysfunction, diminished ovarian reserve, sexual transmitted diseases (STD), polycystic ovary syndrome, endometriosis and uterine factor [2].

In general, *Chlamydia trachomatis* is a main reason of sexual transmitted bacterial infections (STI), over 85 million individuals are affected every year by this bacteria [3] and the figures refer to increasing through the past 10 years in the USA and Europe [4]. Infection can ascend to the upper tract and cause endometritis, salpingitis and pelvic inflammatory disease (PID) that is difficult to define and diagnose [5], potentially leading to tubal pathology and infertility later, [6]. In the long term, *C. trachomatis* reduces fertility in women the presence of Chlamydia IgG antibodies in serum is associated with tubal pathology and lower natural conception rates, even in matter of tubal patency [7].

IL-10 cytokine characterized by its immunosuppressive effect, it has a nature of dual-side in infectious diseases [8]. On one side, the excessive production of IL-10 has a link with the immune response of the host and how far the bacteria or viruses show resistance, the second side, IL-10 has an essential part in the preventing of immunopathology that may sequel from immoderate response of the inflammation [9]. IL-10 has been shown to minimize the harmful and devastating effect of *C. trachomatis* on human Fallopian tube [10]. The current study aimed to detect the

association of bacteria and chlamydial infection in infertile women.

### **Materials and Methods**

Five ml of blood were withdrawn from each patient and control placed in plain tube, left in room temperature for 30 minutes for coagulation, centrifuged at 3000 rpm for serum separation. The collected sera were stored at -20 °C until used in immunological investigations including Elisa assay for detection of IL-10 concentration in patients sera according to company (Elabscience) instructions. Searching for *Chlamydia trachomatis* were carried out depending on serological detection of anti-*Chlamydia* IgG in sera of infertile women according to company (Novalisa) instructions. Transport sterile cotton swabs and different cultural media were used for cultivation and isolation of bacteria [11]. The bacterial isolation and identification was performed according to the recommended diagnostic procedures and the final identification was achieved biochemically by using different biochemical reagents [12].

### **Results**

Bacteriological investigations for urine and vaginal swabs obtained from infertile patients show variation in number of bacterial isolates with different causes of infertility, *Staphylococcus aureus* reveals high percentage of isolates, followed by *Escherichia coli* of the total isolates, as shown in (Table 1).

**Table 1:** Types of bacteria isolated from infertile patient with different causes

Bacterial Isolates	NO. of bacteria from urine	No. of bacteria from vagina	Total No.	%
<i>Escherichia coli</i>	24	19	43	26.8%
<i>Staphylococcus epidermidis</i>	9	6	15	9.7%
<i>Staphylococcus aureus</i>	18	30	48	30%
<i>Klebsiella pneumoniae</i>	5	4	9	6.2%
<i>Streptococcus spp.</i>	9	8	17	10.6%
<i>Proteus mirabilis</i>	5	2	7	4.8%
<i>Serratia marcescens</i>	2	3	5	3.4%
Total			144	100%

Serological test reveals positive cases for anti-*Chlamydia* IgG in different groups; the most one appeared with those infected

with polycystic ovary syndrome at  $P < 0.05$  as mention in (Table 2).

**Table 2:** Anti- *Chlamydia trachomatis* IgG in serum of different groups of infertility and controls

Types of Infertility	No.	Positive IgG	%
Primary infertility	33	12*	36%
Secondary infertility	11	0	0%
Tubal factor	4	0	0%
Poly cystic ovary syndrome	13	6*	46%
Control	6	0	0%

\* $P < 0.05$

Immunological investigations for infertile women pointed out inducing of immune response through elevation of interleukin

10 concentrations in their sera compared with healthy persons at \* $P < 0.05$  (Table 3).

**Table 3:** Levels of IL-10 in patient infected with female infertility

Category	IL-10 level P g/ml M $\pm$ SD
Control	16.16* $\pm$ 5.45
Primary Infertility	10.52 $\pm$ 4.24
Secondary infertility	9.78 $\pm$ 3.76
Tubal factor infertility	8.33 $\pm$ 3.21
Polycystic ovary syndrome	11.5 $\pm$ 6.50

\* $P < 0.05$

## **Discussion**

The present investigation was highlight the accompanying bacterial infections for infertile women, which included a total number of 108 clinical samples (urine and vaginal swap) that subjected to bacteriological, morphological, and biochemical characterization indicated the high percentage of culture belong to Gram positive bacteria with eighty bacterial type compared with gram negative bacteria and this might be according to the fact that grams positive bacteria are commensals of mucosal surfaces of genital tract and that

were resembled to those results being reported by previous research [13]. Besides this, *Staphylococcus aureus* occupied the most percentage within the total isolates from infertile women this may related with infertility by their role with post-inflammatory alteration after infection in individuals and in case of non- treatment or resistant bacteria develop and the infection impact on the female reproductive organs which may leading to consequences linked with female infertility, this was in line with reports from other studies that shown *S. aureus*

the dominant organism implicated in primary infertility [14].

The present study also agreed with the result mentioned by a researcher and his mate [15], and was close to the finding by researchers [16].

According to existing study the data revealed that infected women with previous *Chlamydia trachomatis* infection were just sited in the two fields' primary infertility and polycystic ovary syndrome with percentage (36%, 46%) respectively. Many previous studies showed that *Chlamydia trachomatis* infections correlated with female infertility as the most causes of sexual transmitted diseases (STD) and *Chlamydia* IgG antibodies can persist at stable levels for years after infection [17], while many studies have shown that IgG antibodies of past *C. trachomatis* infection are correlated with infertility [18], [19].

The consequences were derived to damage the reproductive organs and may lead to hormonal disorder which derived to diseases such as polycystic ovary syndrome (PCOS), tubal factor infertility (TFI) and pelvic inflammatory disease (PID) such as [8].

The present study also showed decreasing in the serum levels of IL-10 in all patient groups who sustaining from female infertility compared with healthy group, the existent data was in line with the report from previous study by content that the decrease in Th2 cytokine IL-10 production compared with the increase Th1 cytokines production such as TNF- $\alpha$  is connected to infertility [20]. Other study agreement with the sitting data their finding showed a decrease in the levels of IL10 may alter the tolerance to sperm cells in the female genital tract and reduce the favorable state for conception [21].

### **Conclusion**

According to current study the most common bacteria accompany with infertile women *Staphylococcus aureus*, patients with female infertility appeared decreasing in the levels of IL-10 production and the serological test revealed presence of anti-

*chlamydia trachomatis* IgG in certain patients from different causes of infertility and the high percentage in patients with polycystic ovary syndrome (PCOS).

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