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Some immunological parameters in patients with Mycoplasmal urogenital infection

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Abstract

Background: Mostly isolated from genitourinary tracts, mycoplasmas are slow-growing, picky creatures without a cell wall. While many mycoplasma species are considered typical flora, other species can cause significant genital diseases. The purpose of the current investigation was to ascertain the connections between certain immunological characteristics for urinary genital tract infections (UGTIs) and fastidious bacterial infections (Mycoplasma species and Ureaplasma species).

Married women only (pregnant). For purpose, and to obtain reliable results, the following technique was used: RADIAL IMMUNODIFFUSION (concentration IgG, IgM, IgA, C3, C4). The study includes (30) patients were distributed into three age groups (20-29) year 10 patients, (30 – 39) year 10 patients, (40 – 49) year 10 patients and (15) samples as control samples which were apparently (Health women) pregnant (married).

Results: The result show Concentration of IgA mg/dl in Patients and Control significant difference at p value (0.018*) and it was found that Mean ± SD in patient (370.28 ± 136.82) less than control (456.28 ± 60.88) . Concentration of IgG mg/dl in Patients and Control significant difference at p value (0.000**) and it was found that Mean ± SD in patient (2595.49 ± 708.37) higher than control (2000.67 ± 266.82).

Concentration of IgM mg/dl in Patients and Control significant difference at p value (0.024*) and it was found that Mean ± SD in patient (285.0 ± 80.72) less than control (327.0 ± 38.53). C3 mg/dl Concentration in Patients and Control not significant difference at p value (0.441) and it was found that Mean ± SD in patient (220.95 ± 38.77) higher than control (186.62 ± 38.96).

Concentration of C4 mg/dl in Patients and Control significant difference at p value ((0.001**) and it was found that Mean ± SD in patient (59.63 ± 23.74) higher than control (44.36 ± 6.76). In this study, it was found positive correlation in IgG (0.385*) with IgA and negative correlation in IgM (- 0.441) with IgA. And show positive correlation in IgM with IgG (0.191). Correlation C3 with IgA and IgG is negative correlation (- 0.233, - 0.286) and positive correlation with IgM (0.262). Correlation C4 with IgA and IgG is negative correlation (- 0.260, - 0.156) and positive correlation with IgM (0.348). Correlation C4with C3 show positive correlation (0.370*).

Keywords: Mycoplasmal infection; Immune response; Cytokines; Urogenital infection

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1. Introduction

Mycoplasmas are slow-growing, picky organisms without a cell wall that are typically isolated from the genitourinary tract and are not found on commonly used media [1]. Only three organelles make up their structure: prokaryotic chromosomes, ribosomes, and plasma membranes [2]. Only a small number of Mycoplasmas species make up the vast group of bacteria known as Mycoplasmas.and Ureaplasma spp. are harmful to people. They are mostly found in the genitourinary system and respiratory tract mucous membranes. [3] Mycoplasma adhesions can attach to the host cell's receptors or extracellular matrix through the use of accessory proteins. Mycoplasmas possess a range of virulence factors that allow them to get past many obstacles to entry into the host. Successfully surviving Mycoplasmas produce a variety of metabolites during proliferation, such as hydrogen peroxide, ammonia, and hydrogen sulfide; secrete a variety of exotoxins, such as hemolysins and community-acquired respiratory distress syndrome toxin; and express a range of pathogenic enzymes, all of which have strong toxic effects on host cells. Additionally, certain naturally occurring elements of Mycoplasmas, like lipids, membrane lipoproteins, and even super antigens produced by Mycoplasma, might have a major harmful effect on the immune system or host cells. [4]. Most sexually active people may have mycoplasmas, which may also be a part of the commensal flora of the genitourinary tract mucosa. Ectopic pregnancy, premature birth, chorioamnionitis, postpartum endometritis, salpingitis, low birth weight, and late miscarriage are among the negative consequences of genital mycoplasmas on pregnancy outcomes [5]. Three species—Mycoplasma hominis (M. hominis), Ureaplasma urealyticum (U. urealyticum), and the recently identified Mycoplasma genitalium (M genitalium)—have been isolated from the mucosal surfaces of the genitourinary tract. Since the infection is contracted through sexual contact, they are frequently referred to as "genital mycoplasmas." [6]. There are several methods for detecting mycoplasmal infections, and each has pros and cons in terms of time, money, specificity, sensitivity, and dependability. Based on the infrastructure of the laboratory, the most popular techniques include : (İ-culture-based test for isolation, detection, identification, antimicrobial susceptibility profile ; İİ-antigen detection, Mycoplasmal-specificserologic reactions as well as β—Polymerase Chain Reaction [7].Cytokines have a variety of roles in the reproductive physiology of both men and women, modulate inflammatory responses, and are crucial for intercellular communication. Inflammatory cells release these powerful polypeptides in response to a number of signals, often brought on by injury or infection They typically have systemic effects in addition to acting locally in an autocrine or paracrine manner within a network of other cytokines. Pathologic outcomes may result from excessive cytokine production or activity [8]. In addition to being able to identify pathogen-related molecular patterns (PAMPs) of Mycoplasma through toll-like receptors, innate immune cells, including neutrophils, macrophages, and natural killer cells, are also capable of eliminating these microbes [9].

2. Methodology

2.1. Sample collection

A total of 45 specimens (serum)(30)patients (15)control were collected from patients laboratory diagnosed with UGTIs , who attended the Teaching Hospital of Maternity and children Hospital and Private Clinics in Babylon province**.** According to previous study[10]. The ages of those patients ranged from 20 –49 year. The blood samples (serum) saved at – 20 Cº until systemic and innate immunological study.

2.2. Estimation of Immunoglobulin (IgG, IgM, IgA) and Complement (C3,C4) Levels

The study employed ESAY RID (Radial Immune Diffusion) plates with wells for quantitative measurement of human blood radial immunodiffusion to quantify antibodies IgG, IgM, lgA, and complement C3, C4.

2.3. Principle of method

Antigen is initially present in a relatively high concentration and forms soluble complexes when it diffuses from a well into agar containing appropriately diluted antiserum; when the antigen diffuses further, the concentration steadily decreases until the point is reached at which the reactants are nearer optimal proportions and a ring of precipitate is formed. The higher the concentration of antigen, the greater the diameter of this ring.

2.4. Test procedure

- To allow any condenser water in the well to evaporate, ESAY RID was taken out of the envelope, the plate was opened, and it was left to stand at room temperature for roughly five minutes.
- Five microliters of an undiluted patient sample were added to the well.

- After the sample had diffused into the gel for roughly 20 minutes, the plate was sealed with a lid, left to stand, and then overturned into the envelope at room temperature for 96 hours.

3. Interpretation of result

After the necessary amount of time, measure the precipitating ring to the closest 0.1 mm in accordance with the protocol and the protein type. Fig(1) Show interpretation of result Radial immune diffusion.

Figure 1 Interpretation of result Radial immune diffusion

3.1. Ethical Statements

All participants provided written informed consent prior to enrollment. This study was approved for scientific research by the Research Ethics Committee, University of Babylon, under ethical approval number (MHS-S-1264), in accordance with the regulations of the Ministry of Health (MOH) and the Ministry of Higher Education and Scientific Research (MOHESR).

3.2. Statistical Analysis

SPSS version 23, a statistical tool for social science, was used to process and analyze the data using one-way ANOVA. The results were reported as Mean ± S.D. Differences between means and P-values less than 0.05 were regarded as statistically significant.

4. Results and Discussion

4.1. Study Population

A total number of(45) 30 specimens were collected from all (serum) pregnant married women and checked up for colonization with *(M.hominis*, *M.genitalium* and *U.urealyticum*) were selected from patients diagnosed by laboratory with urinary genital tract infections (UGTIs), who attended the Teaching Hospital of Maternity and children Hospital and Private Clinics in Babylon province, during 3 months from January to march , 2023 . (15) control samples which were apparently (Health women) pregnant(married).The specimens percentage compared with control. A total number of (30) patients were distributed into three age groups (20-29) year10 patients, (30 – 39) year10 patients , (40 – 49) year10 patients.

4.2. Concentration immunological parameters

4.2.1. Concentration of IgA mg/dl in patients and control

The table (1) show concentration of IgA mg/dl in patients and control significant difference at p value (0.018*) .In this study ,it was found that Mean ± SD in patient (370.28 ± 136.82)less than control (456.28 ± 60.88) .

Table 1 Concentration of IgA mg/dl in patients and control

IgA mg/dl	N	Mean ± SD.	P. Value of T - Patient
Patient	30	370.28 ± 136.82	(0.018*)
Control	15	456.28 ± 60.88	

(*) denotes a significant difference at the 0.05 level when compared to the control.

4.2.2. Concentration of IgG mg/dl in patients and control

The table (2) show concentration of IgG mg/dl in patients and control significant difference at p value (0.000**). In this study, it was found that Mean ± SD in patient (2595.49 ± 708.37)higher than control(2000.67 ± 266.82).

Table 2 Concentration of IgGmg/dl in patients and control

IgG mg/dl	N	Mean ± SD.	P. Value of T - Patient
Patient	30	2595.49 ± 708.37	(0.000**)
Control	15	2000.67 ± 266.82	

(**) denotes a significant change at the 0.01 level when compared to the control.

4.2.3. Concentration of IgM mg/dl in patients and control

The table (3) show concentration of IgM mg/dl in patients and control significant difference at p value (0.024*).In this study, it was found that Mean ± SD in patient (285.0 ± 80.72)less than control (327.0 ± 38.53).

Table 3 Concentration of IgM mg/dl in patients and control

IgM mg/dl	N	Mean ± SD.	P. Value of T - Patient
Patient	30	285.0 ± 80.72	(0.024*)
Control	15	327.0 ± 38.53	

(*) mean significant difference in comparison with control at the 0.05 level.

This result is comparable with result of previous studies done show not resemble with result study the There was no discernible link between M. genitalium antibodies and EP, according to a 2007 Swedish study that examined serum *M. genitalium* antibodies of pregnant female patients with EP and discovered an antibody positive rate of 18% in EP patients compared with 15% in controls [11]. Remarkably, a different Swedish study from 2015 employed *M. genitalium* serological patient to assess differences in *M. genitalium* antibodies between infertile and pregnant women the results showing that the rate of Serum IgG levels positive for *M. genitalium* were 5.4% in infertile women and 1.6% in the control group. [12]**.**

4.2.4. Concentration of C3 mg/dl in patients and control

The table (4) show concentration of C3 mg/dl in patients and control not significant difference at p value (0.441). In this study, it was found that Mean ± SD in patients (220.95 ± 38.77) higher than control (186.62 ± 38.96).

Table 4 Concentration of C3 mg/dl in patients and control

IgG mg/dl	N	Mean ± SD.	P. Value of T – Patient
Patient	30	2595.49 ± 708.37	(0.000**)
Control	15	2000.67 ± 266.82	

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that they have no conflict of interest.

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