

Prevalence of anti-*Chlamydia* Immunoglobulins in pregnant women in Al-Kadhimiya Teaching Hospital

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Abstract

Background: The sexually transmitted microorganism *Chlamydia trachomatis* causes a medical problem world wide, especially for pregnant women as this infection may lead to different complications in pregnancy.

Patient and Methods: In this study, 90 pregnant women with suspected Chlamydial infection were included from consultant clinic Al-Kadhimiya teaching hospital in Baghdad, with 100 pregnant women as control group. ELISA tests were done to detect the level of anti-chlamydial antibodies, IgM, IgG and IgA.

Results: In our study we found IgM seropositivity to *C.trachomatis* in 80,96% of patients and 14,03% of controls and similar results were found regarding IgG seropositivity in patients and control groups. IgA seropositivity to *C.trachomatis* was positive in 89,64% of patients and 40,30% of controls. In our study we also found higher rates for seropositivity regarding antichlamydial antibodies of IgG, IgM and IgA types in patients with a history of more than one abortion compared to those who have negative history of abortion

Conclusion: Antichlamydial antibodies of IgA, IgG and IgM types were found to be elevated in the study group and this may reflect the incidence of infection of *Chlamydia trachomatis* in our patients. Moreover it may reflect the relation of infection to repeated abortion as there was a high level of antichlamydial antibody in patients with history of more than one abortion.

Key Word: *Chlamydia trachomatis*, IgG, IgM, IgA, ELISA

الخلاصة

المقدمة: الكائن المجهري كلاميديا التراخومية والمنقول بالاتصال الجنسي يسبب مشاكل طبية عديدة في معظم انحاء العالم، لاسيما عند النساء الحوامل حيث ان هذه الاصابة قد تسبب مضاعفات عديدة ومختلفة للحوامل.

المرضى وطريقة العمل: شملت هذه الدراسة ٥٧ امرأة حامل يشتبه بإصابتها بالكلاميدية مع ١٧ امرأة حامل خالية من الاصابة. تم الفحص والتشخيص في العيادة الاستشارية للنساء الحوامل في المستشفى الكاظمية التعليمي في بغداد، حيث اجري فحص الاليزا (ELISA) لمعرفة مستوى مستضدات الكلاميديا من الانواع (A, G, M) في مصل الدم.

النتائج: بينت النتائج بأن هناك ٨٥,٩٦% ارتفاع في مستوى مستضد (IgM) في المرضى مقارنة مع ١٤% لمجموعة السيطرة وكذلك نتائج مشابهة لمستضد (IgG). بينما نتائج مستضد (IgA) كانت ٥٩,٦٤% مرتفعة لدى المرضى و ٤٠,٣٥% لمجموعة السيطرة. كما وأظهرت النتائج بأن هناك ارتفاع في نسب المستضدات الثلاثة للمرضى الذين لديهم تاريخ إجهاض متكرر بالمقارنة مع المرضى الذين ليس لديهم إجهاض سابق.

الاستنتاجات: إن مستضدات الكلاميديا التراخومية مرتفعة في مجموعة البحث وهذا ممكن ان يعكس ارتفاع مستوى الإصابة بهذه الجرثومة. كما ويمكن أن نستنتج بأن قد يكون هناك ارتباط غير مباشرة بين نسبة الإصابة وعدد تكرار الإجهاض للمرضى المصابين.

Introduction

Chlamydia is a curable sexually transmitted disease (STD) that is caused by an obligate intracellular parasite called *Chlamydia trachomatis*.

Sexually transmitted diseases are among the main causes for seeking medical help in the world (1). Some of these diseases significantly affect sexual and reproductive health of women (2). *Chlamydia trachomatis* causes infection in the upper female genital tract such as endometritis, salpingitis and tubo-ovarian abscess; subsequently it may lead to ectopic pregnancy and infertility (3).

In pregnant women, *Chlamydia trachomatis* infections can lead to preterm premature rupture of membrane (PPROM), and premature delivery where the infection interfere with collagen maintenance and degradation of the fetal membranes (4,5). It is classically believed that in pregnant patients, cervical mucus and pregnancy itself prevent spread of infection from lower genital tract to the uterus and fallopian tubes. Nevertheless some case reports and serologic work suggest that *Chlamydia trachomatis* can possibly infect the placenta and thus can harm the fetus. This however remains controversial. Where as some studies found no correlation between *Chlamydia trachomatis* and spontaneous abortion, others have found an increased risk of spontaneous first trimester abortion in patients infected with *Chlamydia trachomatis*.

Although the mechanism of pregnancy loss secondary to *Chlamydia trachomatis* infection is unclear, there are two modules are proposed for pathogenesis of *Chlamydia trachomatis* related early abortions: (1) direct zygote infection, and (2) immune response to heat shock proteins expressed by zygote and triggered by previous *Chlamydia trachomatis* infections (6). There is no direct evidence that *Chlamydia trachomatis* causes direct harm to the development of the fetus. Infants who are born to infected mothers are at risk for Chlamydia conjunctivitis and pneumonia (7).

The World Health Organization (WHO) estimates that each year around 92 million new cases of Chlamydia are recorded, of which the majority occur in developing countries (8). Center for Disease Control (CDC) of the United States estimates that each year, half of the new STD occur between 10 and 24 years of age, which represents more than 1 million young people infected, of which it is estimated that 2.8 million cases genital Chlamydia (9,10). Diagnosis of *Chlamydia trachomatis* infection is hampered by inadequate laboratory work (9) and lack of specific symptoms, particularly in women, of which approximately 50% may be asymptomatic (11).

For sexually active women who are not pregnant, screening is recommended in those under 20 and others at risk of infection. (12) Risk factors include a history of chlamydial or other sexually transmitted infection, new or multiple sexual partners, and inconsistent condom use (13) For pregnant women, guidelines vary: screening women with age or other risk factors is recommended by the U.S. Preventive Services Task Force (USPSTF) (which recommends screening women under 20) and the American Academy of Family

Physicians (which recommends screening women aged 20 or younger). The American College of Obstetricians and Gynecologists recommends screening all at risk, while the Centers for Disease Control and Prevention recommend universal screening of pregnant women. (13) The USPSTF acknowledges that in some communities there may be other risk factors for infection, such as ethnicity (14). Evidence-based recommendations for screening initiation, intervals and termination are currently not possible. (15)

Patients and Methods

This is study, 84 pregnant women with suspected chlamydial infection were included, with 14 pregnant women with no signs and symptoms of infection as control group. Patients group age from 16 -38 years. Through examination and full medical and obstetric history were taken for each patient by specialist gynecologist, including numbers of pregnancies, abortions and deliveries.

Blood samples were taken, 3 ml in plain tube, sera were stored in freezer to be used in testing for anti-chlamydial antibodies, IgM, IgG and IgA by ELISA (Enzyme linked Immuno Sorbant Assay).

ELISA was done according to manufacturer leaflet instruction (EUROIMMUN, Denmark). Briefly, 100ul of standards and diluted patients` sera were added to ELISA plate, left for 30 min at room temperature. After that 3 times washing done, then applying peroxidase-labelled anti-human Ig for 30 min at room temperature. Washing as mentioned previously and then a freshly prepared substrate-chromogen were added to each well, left for 10 min at room temperature, then a stopping solution was added and results were obtained by reading the plate by ELISA reader at 490 nm wave length.

Results

Our patients group range in age from 16 -38 years with a mean age of 24 years. The number of previous pregnancies for each of the patients group and the control group, shown in table 1.

Table ١ showing the number of previous pregnancies in patients and control groups

	Gravidity								Total
	١	٢	٣	٤	٥	٦	٧	٨	
control	٤	٢	١	١					٨
patient	٢٢	١٢	١٠	٥	٤	٢	١	١	٥٧
Total	٢٦	١٤	١١	٦	٤	٢	١	١	٦٥

Number of previous deliveries for the both groups shown in table ٢

Table ٢ showing number of deliveries for both patients and control groups

	Parity						Total
	٠	١	٢	٣	٤	٥	
Control	٥	٢		١			٨
Patient	٢٤	١٦	٨	٥	٢	٢	٥٧
Total	٢٩	١٨	٨	٦	٢	٢	٦٥

While the number of previous abortion for each of the patients and control group shown in table ٣.

Table ٣ showing the number of abortions in patients and control groups

	Abortions					Total
	٠	١	٢	٣	٤	
control	٧	١				٨
patient	٤٧	٣	٥	١	١	٥٧
Total	٥٤	٤	٥	١	١	٦٥

The number of positive and negative for anti-chlamydial antibodies, IgA, IgM and IgG in patients and control groups shown in table ٤

Table 4 showing the number of positive and negative cases with anti-chlamydial antibodies, IgA, IgM and IgG in patients and control groups

	IgA		
	Negative	Positive	Total
Control	0	12	12
Patient	23	34	57
Total	23	46	69
	IgM		
	Negative	Positive	Total
Control	0	12	12
Patient	8	49	57
Total	8	61	69
	IgG		
	Negative	Positive	Total
Control	0	12	12
Patient	8	49	57
Total	8	61	69

The results of ELISA anti-chlamydial immunoglobulins are shown in the following tables. The number of positive cases in each immunoglobulin in relation to gravidity is shown in table 5.

Gravidity	IgA			IgM			IgG		
	Negative	Positive	Total	Negative	Positive	Total	Negative	Positive	Total
1	10	16	26	5	22	27	0	21	21
2	6	8	14	2	12	14	2	12	14
3	2	9	11	1	10	11		11	11
4	3	3	6		6	6		6	6
5	1	3	4	1	3	4	1	3	4
6		2	2		2	2		2	2
7		1	1		1	1		1	1
8	1		1	1		1		1	1
Total	23	42	65	9	56	65	8	57	65

Table ٦ shows the number of positive cases in relation to Parity.

Parity	IgA			IgM			IgG		
	Negative	Positive	Total	Negative	Positive	Total	Negative	Positive	Total
٠	١٠	١٩	٢٩	٤	٢٠	٢٩	٥	٢٤	٢٩
١	٨	١٠	١٨	٢	١٦	١٨	٣	١٥	١٨
٢	٢	٦	٨	٢	٦	٨	٠	٨	٨
٣	٢	٤	٦	٠	٦	٦	٠	٦	٦
٤		٢	٢	٠	٢	٢	٠	٢	٢
٥	١	١	٢	١	١	٢	٠	٢	٢
Total	٢٣	٤٢	٦٥	٩	٥٦	٦٥	٨	٥٧	٦٥

While table ٧ shows the number of positive cases in relation to number of abortions

Abortion	IgA			IgM			IgG		
	Negative	Positive	Total	Negative	Positive	Total	Negative	Positive	Total
٠	١٨	٣٦	٥٤	٧	٤٧	٥٤	٦	٤٨	٥٤
١	٣	١	٤		٤	٤	١	٣	٤
٢	١	٤	٥	٢	٣	٥		٥	٥
٣	١		١		١	١	١		١
٤		١	١		١	١		١	١
Total	٢٣	٤٢	٦٥	٩	٥٦	٦٥	٨	٥٧	٦٥

Discussion and conclusion:

Infection with *C. trachomatis* is one of the major health problem, particularly in developing countries. A wide range of antibodies has been reported to be produced following *C trachomatis* infection because the organism has a unique biphasic life cycle, alternating between infectious elementary bodies and a replicating, reticulate body. (١٥)

Screening for Chlamydia infection is crucial in order to prevent adverse pregnancy outcome, as many pregnant women are asymptomatic (١٦) and the infection may persist for extended periods of time in diagnosed and untreated cases. (١٧)

With the availability of a non-invasive *C. trachomatis*-specific screening test, a large population can be screened. Although nonculture tests like the serological methods used in our study are available that do not require strict handling of specimens, are easier to perform and less expensive than culture tests, they do have limitations.

The significance of IgM antichlamydial antibodies in pregnancy is not clearly understood. Berman et al, considered them to indicate a recent or invasive infection. (18) Specific IgG antibodies may indicate ongoing or past Chlamydia infection in sites other than the genitourinary tract. (20)

In our study we found IgM seropositivity to *C. trachomatis* in 80.96% of patients and 14.03% of controls and similar results were found regarding IgG seropositivity in patients and control groups, these findings were higher than those obtained by other studies. Genancy et al found IgM seropositivity to *C. trachomatis* in 13.64% of the cases and 0.47% of the controls by ELISA technique, Rastogi et al, found an overall prevalence of *C. trachomatis* IgM antibodies of 07.4% in a cohort of 144 of asymptomatic pregnant women. (21) In a study from Lucknow, India, Jain et al, reported a 30.9% prevalence of antichlamydial IgM antibodies in asymptomatic women in the third trimester of pregnancy. (22) Sawhney et al, has shown positive results to IgM of an overall positivity of 33.10% of cases and an overall IgG antibody positivity of 40.83%. While none of the controls show positivity to IgG or IgM. (21)

The higher rates of positivity for anti-chlamydial antibodies found by our study may be attributed to the lower rates of treatments for this infection in our society due to the lack of a screening program for *C. trachomatis* infection in our community.

The difference in seropositivity rates between the cases and the controls is due to increased susceptibility of antenatal cases to *C. trachomatis* infection during sexual activity and increased proliferation of the organism in those with ante partum infection, due to the lowered immunity in pregnancy. (23)

Anti- *C. trachomatis* IgA antibodies indicate the active status in acute, chronic and recurrent Chlamydia infections. They confirm positive anti-*C. trachomatis* IgG results and may aid in the follow-up evaluation of antibiotic treatment. In addition, clinical studies suggest a high degree of correlation between antichlamydial IgA and the actual presence of Chlamydia antigen. (24) In our study we found IgA seropositivity to *C. trachomatis* in 09.64% of patients and 4.30% of controls compared to Sawhney MP where only 1.0% of the controls were positive for IgA

antibodies(٢١), and this high rate of IgA positive cases in our study may again confirm the lack of proper screening and accordingly proper treatment for this infection.

In our study we also found higher rates for seropositivity regarding antichlamydial antibodies of IgG, IgM and IgA types in patients with a history of more than one abortion compared to those who have negative history of abortion and this in concordance with other studies like Quinn et al. who found IgG antibodies to *C. trachomatis* in ٥٧,٦% of women with more than one spontaneous abortion

In the past compared to patients with uncomplicated pregnancy (٣٣,٧%) [٢٧]. Witkin et al. also confirmed the relationship between the presence of antichlamydial antibodies in serum and recurrent abortions [٢٨]. However in our study there was no obvious correlation with either the total number of pregnancies or the total number of deliveries and antichlamydial antibody seropositivity.

Conclusion

١. Antichlamydial antibodies of IgA, IgG and IgM types were found to be elevated in the study group and this may reflect the incidence of infection in our patients. Moreover it may reflect the relation of infection to repeated abortion as there was a high level of antichlamydial antibody in patients with history of more than one abortion.

٢. There was no clear relationship between number of pregnancies and the total number of deliveries.

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