

***Chlamydia trachomatis* urogenital infection in women with infertility**

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ABSTRACT

Purpose: The study objective was to evaluate the prevalence of urogenital *Chlamydia trachomatis* (*C.tr.*) infection in women with diagnosed infertility.

Material and methods: The study involved patients from the Department of Gynecological Endocrinology and from the Center for Reproductive Medicine „Kriobank” in Białystok. Female patients (n=71), aged 23 – 41, were divided into two groups according to the main diagnosis: A – tubal infertility (23) and B - infertility of another origin (48). For direct testing, PCR method was used to detect *C.tr.* infection in cervical samples (Roche, Molecular Systems, N.J., USA). Specific IgA and IgG anti-chlamydial antibodies in the serum were determined by immunoenzymatic assay (medac, Hamburg, Germany). Diagnostic procedures were performed at the Centre for STD Research and Diagnostics in Białystok.

Results: In group A, *C.tr.* infection was detected in: 8.7% patients, in group B – 8.3%. Specific anti - *C.tr.* antibodies IgA were detected in: 13.0% in group A and 6.3% in group B, IgG respectively in 39.1% and in 10.4%.

Conclusions: 1. *C.tr.* infection is very important etiological factor of female infertility. 2. The detection of specific anti-chlamydial antibodies is a valuable, noninvasive diagnostic procedure. 3. Infertile women should be routinely tested for *C.tr.* infection.

Key words: *Chlamydia trachomatis*, female infertility, tubal occlusion, specific anti-chlamydial antibodies

INTRODUCTION

Tubal infertility, according to literature data, concerns about 15-40% of married couples [1]. Acute and chronic inflammatory processes within pelvis are responsible for the occurrence of number of complications, including pelvic inflammatory disease (PID), which can lead to tubal occlusion. Early undertaken sexual intercourse, having multiple sex partners, engaging in unprotected intercourse, and choosing high-risk partners are behavioral risk factors leading to acquiring sexually transmitted infections. Among bacterial sexually transmitted factors, the most frequent is *Chlamydia trachomatis* (*C. trachomatis*), as Centers for Disease Control and Prevention (CDC) announced [2].

Epidemiological data indicate that every year approximately one million cases of salpingitis are diagnosed in Europe, including 600,000 of chlamydial etiology, of which 120,000 cases result in mechanical infertility. In the United States of America *C.trachomatis* infection is the main cause of tubal infertility (according to CDC – 296.5 cases on 100,000 in 2002) [2].

The asymptomatic course of salpingitis caused by *C. trachomatis* (in about 80% of patients) can delay diagnosis and effective treatment, which in many cases is the chance to fertility restoration and may prevent further complications [3].

C. trachomatis infection of fallopian tubes can cause functional and anatomical changes by causing damages within

Table 1. Study results by PCR method and serological method in group A and B.

TOTAL GROUP n=71	PCR method	Specific anti-chlamydial antibodies IgA	Specific anti-chlamydial antibodies IgG
GR. A n=23	2/23 (8.7%)	3/23 (13.0%)	9/23 (39.1%)
GR. B n=48	4/48 (8.3%)	3/48 (6.3%)	5/48 (10.4%)

ciliated epithelium of fimbriae of the oviduct or forming fibrous changes contracting or occluding oviduct light. The consequence of tubal obliteration might be tubal infertility or ectopic pregnancy [4]. Weström states that the risk of tubal infertility increase directly proportional to number of pelvic infections in the past – after one PID episode it is 12% and 75% after three infections [5].

The role of *C. trachomatis* infection in salpingitis and in tubal infertility was confirmed in studies on animal model [6].

In study conducted by Paavonen et al. *C. trachomatis* infection was detected more frequently in endometrial biopsy specimens in women with histopathologically diagnosed endometriosis comparing to women in control group [7]. Moller et al. isolated *C. trachomatis* from the Fallopian tubes in women with salpingitis [8], which in direct way confirms the impact of chlamydial infection on tubal infertility.

The study objective was to evaluate the prevalence of urogenital *C. trachomatis* infection in women with diagnosed infertility.

MATERIALS AND METHODS

Patients from the Department of Gynecological Endocrinology, Medical University of Bialystok and from the Center for Reproductive Medicine „Kriobank” in Bialystok, with diagnosed infertility were enrolled in this study. All the women have had diagnostic laparoscopy performed, preceding the laboratory procedures. In 23 out of 71 patients, tubal occlusion was confirmed in laparoscopy (group A). In 48 women infertility was caused by factors other than of tubal origin. These patients served as comparative group (group B). In group B, ovulation dysfunction and idiopathic infertility were the main obstacles in becoming pregnant. Mean age of women enrolled into the study was 31.25 (23 – 41 years old).

At the first visit patients eligible for the study were asked to sign an informed consent form and to complete a questionnaire. Questions focused on medical history, past history of sexually transmitted infections, infertility duration and urogenital symptoms. Infertility duration in our patients was 2 – 10 years. All the women stated not to have had any antibiotic treatment during the last 3 months.

Endocervical swabs and serum samples were obtained. For direct testing, polymerase chain reaction method was used to detect *C. trachomatis* infection in cervical samples (PCR, Roche, Molecular Systems, N.J., USA). Specific IgA and IgG anti-chlamydial antibodies in the serum were determined

by immunoenzymatic assay (p-ELISA, medac, Hamburg, Germany). All diagnostic procedures were performed following the manufacturer instructions. Diagnostic tests were performed at the Chlamydial Laboratory of the Centre for STD Research and Diagnostics in Bialystok.

The study was performed with the acceptance of Bioethics Committee of the Medical University of Bialystok.

RESULTS

In group A (n = 23) *C. trachomatis* infection by direct method was detected in 2 patients (8.7%) and in group B (n = 48) in 4 women (8.3%). Specific anti-chlamydial antibodies IgA were detected in: 3/23 women in group A (13.0%) and in 3/48 of patients in group B (6.3%), and in class IgG respectively in: 9/23 (39.1%) and 5/48 (10.4%) of patients. Study results are shown in the *Tab. 1*.

DISCUSSION

Our findings were similar to that obtained in Mouton's et al. study, who detected IgG specific anti-*C. trachomatis* antibodies in 41% of cases in study group and in 10% in control group of women with tubal infertility [9]. Similar results were established by Eilard et al., who confirmed the presence of specific anti-chlamydial antibodies in about 27% of patients with salpingitis [10]. Gjønnaess et al. confirmed the relationship between PID and *C. trachomatis* infection in 2/3 of examined patients [11]. Jones et al. detected specific anti-chlamydial antibodies in 35% of women and among them they found tubal infertility in 75% of cases [12].

Patton et al. studied the presence *C. trachomatis* in tissue specimens from the Fallopian tubes collected during laparoscopy in women with the history of post infectious tubal occlusion. Positive study results were obtained in 19/24 of patients by direct method and by serological method – IgG antibodies in 15 of patients and IgM antibodies in 1 patient [13]. Shepard and Jones showed chlamydial infection in 15% of women in similarly collected study material [14]. Severity of tubal disease, according to Minassian and Wu, correlates with increased antibody titers [15]. Dabekausen et al. investigations supported these findings [16].

Bevan et al. confirmed *C. trachomatis* infection by means of direct method in 38.5 % women with salpingitis and in 21.7% of patients from the comparative group [17], and their findings considerably outnumber our results.

Multicenter case-control study conducted in the 90s, within the World Health Organization Task Force on the Prevention and Management of Infertility in Thailand, Hungary and Slovenia is an interesting source of information. The study compared women with bilateral tubal occlusion and other infertile women and age-matched pregnant control subjects. IgG anti-chlamydial antibodies to *C. trachomatis* were detected with similar frequency in both groups [18]. Quinn et al. obtained positive test results for IgG anti-chlamydial antibodies in 44.2% of infertile women. The result was twice higher comparing to result in patients with tubal occlusion [19].

Another report showed IgG anti-chlamydial antibodies in 13.8% of women, where in 91.2% tubal occlusion was confirmed in laparoscopy [20]. Veenemans and Linden in group of 36% women with serological evidence of *C. trachomatis* infection confirmed pathological changes in oviducts [21].

The association of *C. trachomatis* infection and infertility was studied in Wrocław, Poland. All the women enrolled into the study had undergone diagnostic laparoscopy. Study material was collected from 33 of patients from endocervix and from pouch of Douglas. By means of ligase chain reaction, *C. trachomatis* infection was detected in 6.1% of patients and this results were similar to that obtained in control group [22]. Sobociński et al. detected cervical chlamydial infection in 9.33% of infertile women by immunoenzymatic assay and their results correspond to our findings. Additionally, in 4 cases there was observed correlation between the infection and tubal occlusion [23].

Our findings show that specific anti-chlamydial antibodies are more frequently detected as compared to chlamydial infection by direct methods, presumably because the infection ascended from lower part of genital tract and this observation is similar to earlier findings [24, 25]. That is mainly connected with the fact that specific anti-chlamydial antibodies, especially IgG, are usually detected in cases of chronic process and IgA or IgM occur in early infection and confirm active stage of infection. IgG specific antibodies, especially when the titers are elevated are very important indicators of chronic infection.

In one of the latest reports authors suggest that *C. trachomatis* IgG is a highly predictive screening test for tubal infertility with similar diagnostic value to hysterosalpingography, and furthermore serology is a noninvasive test [26].

Infertile couple should be offered, among all the diagnostic procedures, also those detecting sexually transmitted infections, including first of all *C. trachomatis*. Nevertheless, negative *C. trachomatis* study result does not exclude the possibility of tubal occlusion and many authors indicate that diagnostic laparoscopy should be performed in this cases if needed.

CONCLUSIONS

Our results indicate that *C. trachomatis* infection is very important etiological factor of female infertility. Detection of specific anti-chlamydial antibodies is a valuable, noninvasive diagnostic procedure, which should be offered to infertile couples routinely.

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