The Value of Chlamydia Trachomatis Antibody Testing in Prediction of Tubal Factor Infertility

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Abstract

Objective: This study aimed to assess the value of Chlamydia trachomatis (C.trachomatis) antibody titer test in prediction of tubal damage.

Materials and Methods: In this case-control study we enrolled 50 women with tubal factor infertility (proven by laparoscopy after hysterosalpingography) and 110 women without infertility history. ELISA was performed for all participants, seeking C.trachomatis IgG antibodies. ELISA for IgM was then performed for women with positive test. Statistical package for social science version 11 was used for data entry. Statistical evaluation was performed using student t test, Fisher exact and chi-square tests. Statistical significance was defi ned as P<0.05.

Results: In 8(5%) of all women the C.trachomatis IgG antibody was positive .Five (10%) of the infertile patients and 3 (2.7%) of pregnant women had positive tests ($P < 0.03$). All of them had negative results for IgM antibodies. Twenty five percent of women with normal hysterosalpingography and 5.3% of women with abnormal hysterosalpingography had positive antibody test. There was not any correlation between antibody titer and abnormal HSG. Endometriosis was diagnosed in seven women with negative antibody results.

Conclusion: The result of C.trachomatis antibody titer was significantly different in women with and without infertility Laparoscopic. Tubal assessment is recommended in infertile women with a positive result of the C. trachomatis antibody titer.

Keywords: Chlamydia trachomatis antibody, Hysterosalpingography, Laparoscopy, Tubal damage

Introduction

Tubal factor accounts for the reason of infertility in 14–38% of cases of female infertility (1). Pelvic inflammatory disease (PID) is the most important cause of tubal pathology leading to infertility which is mostly caused by *Neisseria gonorrheae* and *Chlamydia trachomatis* (2). The incidence of Chlamydia trachomatis genital infection is being increased worldwide (3) as it is the leading cause of bacterial STD in developed countries (4). As the late sequels of PID (chronic pelvic pain and tubal damage) have major health implications it is important to screen this group of patients for chlamydial infection. Due to its serious impact on women's fertility and the asympto-matic nature of Chlamydia trachomatis, the diagnosis of tubal disease cannot be relied solely on the history of PID.

The two most commonly used methods of assess-

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ment for tubal disease are still hysterosalpingography (HSG) and laparoscopy (1). HSG has been used routinely in many fertility centers as an initial investigation and is cheaper and less invasive than laparoscopy, but has a low sensitivity (5). Laparoscopy is considered the gold standard and has been shown to be better than HSG in tubal assessment, particularly in detecting peritoneal adhesions and endometriosis (6). Laparoscopy is however an invasive procedure and carries on its specific complications. The use of a non-invasive test in conjunction with, or as an alternative to these diagnostic procedures would therefore be useful in the initial investigation.

Moore et al. showed that 73–79% of infertile women with tubal abnormalities as seen on HSG or direct inspections were positive for Chlamydia trachomatis antibody (7). Subfertile women with persistant C.trachomatis infections have the highest risk of tubal pathology(8,9).

Serology has been shown to be more accurate than HSG in predicting the presence of tubal disease (1) or the same (10), and when used in conjunction with HSG it significantly lowers the false positive rate (11).

The aim of this study was to look at the relationship, if any, between the positive ELISA titer and the presence of tubal damage. The intention was to consider if ELISA could be used to determine which patients require a laparoscopy.

Materials and methods

A prospective case-control study was conducted at Navid infertility clinic between September 2002 and December 2004. Fifty women with confirmed tubal factor infertility and 110 women with normal pregnancy (without infertility history) were enrolled in the study. The institutional board and Shahed university ethical committee approved the study. All patients were seeking diagnostic work up prior to start infertility treatment. Hysterosalpingography (HSG) was done for all women. Enzyme linked immunosorbant assay (ELISA) was performed for all participants seeking for Chlamydia trachomatis IgG antibodies. The cases with positive antibodies underwent another ELISA test for Chlamydia trachomatis IgM antibodies.

Regardless to the patency of tubes in HSG all patientst underwent laparoscopy for better assessment of tubes and peritubal adhesions. Tubal patency was tested by laparoscopy and methylene blue dye test. It was determined by the presence of adhesions involving the tube (tube clubbing or obstruction to the dye). The patients, who had previous laparotomy for any reason (appendicitis, ovarian cyst and etc,) were excluded from the study.

On the other hand, as we did not know the prevalence of positive anti Chlamydia antibody in our normal population we did the test on 110 women without infertility history who had normal pregnancy, during their routine prenatal care in the same period of time.

The case sheets were reviewed for those patients with proved tubal factor infertility with particular reference to age, previous gynecological history, past history of PID, transvaginal ultrasound scan findings, results of HSG and Chlamydia trachomatis antibodies with positive results (i.e. 1 in 32 or greater).

Statistical package for social science version 11 was used for data entry and analysis. Statistical evaluation was performed using student t test, Fisher exact and chi square tests. Statistical significance was defined as $P<0.05$ and the results were expressed as means ±SD and percentages.

Results

The mean age for infertile women was 32.8±3.2 and for pregnants were 25.2±2.8 years. Forty-two (84%) of cases had primary infertility. All infertiles had HSG before laparoscopy, and in 38 of them the results was in accordance but in 12 patients a discrepancy between these two procedures was noted. Nobody had the history of acute pelvic inflammatory disease.

Forty-one pregnants had history of abnormal vaginal discharge before pregnancy and so was seventeen (34%) of infertile patients. Statistically, there was not any correlation between the history of discharge and presence of antichlamydial antibodies.

In 8 (5%) of the patients, Chlamydia trachomatis antibody titer was positive (IgG titer 1 in 32 or higher), so another ELISA for Chlamydia trachomatis was performed seeking IgM antibodies. All of them had negative results for IgM antibodies. Five (10%) of the infertile patients and 3 (2.7%) 0f pregnant women had positive tests. The difference between the two groups was statistically significant ($p<0.03$). Three out of 12 (25%) of the infertile group with normal HSG and 2 out of 38 (5.3%) with abnormal HSG had positive antibody tests. There was not any correlation between antibody titer and abnormal HSG. Endometriosis was diagnosed in seven women with negative antibody results.

Discussion

Various methods for detecting tubal factor infertility are available. Laparoscopy with dye instillation is considered the gold standard for the evaluation of tubal function but is an invasive and expensive procedure, making it unsuitable for screening purposes. HSG is a less invasive test but is of limited usage for detecting tubal patency because of its low sensitivity, although its high specificity makes it a useful test in confirming the presence of tubal obstruction (6). When HSG is combined with Chlamydia trachomatis titer testing, the false-positive rate is significantly lowered (11). The problem with HSG is that Chlamydia causes adnexal adhesions as well as tubal obstruction and these are best picked up by laparoscopy (6) .Adnexal adhesions are much more common in women with positive Chlamydia titers and those women with high titers should therefore have a laparoscopy (12). High titers of chlamydial IgG antibody are associated with inflammatory tubal damage, pelvic adhesions and increased risk of tubal pregnancy (13, 14). The presence of peritubal adhesions may also limit tubal motility and interfere with ovum capture (12). These findings are in concordance with the results of another study by Thomas et al which showed the usefulness of Chlamydia trachomatis antibody testing as a routine baseline investigation in the infertility clinics (15).

Chlamydia antibody titer is a simple blood test and causes little inconvenience for patients. Patients may have another cause for adhesions (e.g. endometriosis or salpingitis due to another micro-organism) so it cannot be used as the sole test for evaluation of tubal patency. Also some patients who have had previous Chlamydia trachomatis infection have no detectable antibody (16). These authors also showed that the sensitivity of the antibody test is critical as IgG titers can decrease over time. On the other hand Gijsen et al showed that in subfertile patients, decline in IgG antibody titers over time is not a significant cause for false negative Chlamydia antibody test results, because, in spite of this decline, all patients continued to be test positive for IgG antibodies (17).

Veenemans et al focused on the predictive value of serum anti-Chlamydia trachomatis IgG screening in women presenting with infertility. The predictive value of Chlamydia trachomatis antibody testing (CAT) was equal to the predictive value of HSG in screening tuboperitoneal pathology. They proposed because of minimal inconvenience to the patient in contrast to HSG, CAT should be maintained in infertility work-up (10).

In summary, despite low prevalence of Chlamydia trachomatis in our group (which is reflected by low incidence of STD in our population) the study showed significant increased Chlamydia trachomatis positive antibody titers in women with tubal damage. Although there will be a proportion of patients with negative titers who have tubal damage due to other causes (e.g. endometriosis). It has already been men-tioned that seropositive patients do not seem to become seronegative (16), making chlamydial damage very unlikely in this group.

Previous work has shown that combination of HSG and Chlamydia trachomatis antibody titers will give a false negative rate of approximately 5% (10), and therefore are best used in those patients with a low titer (<1 in 128). In patients with a higher titer, laparoscopy would be the better procedure as there is a significantly higher incidence of tubal disease. In our setting this mean that patients would initially have a laparoscopy based on their initial titer. Although some patients undergo laparoscopy for other reasons (e.g. assessment of endometriosis), laparoscopic assessment of fallopian tubes is recommended if the result of the Chlamydia trachomatis antibody titer is positive. This manner avoids an annoying HSG and also has beneficial costs.

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