Seroprevalence of Chlamydia Trachomatis infection in Kashmiri women of reproductive age with mucopurulent cervicitis, infertility and ectopic pregnancy - a hospital based study

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Abstract:

Objectives: To find the seroprevalence of the Chlamydia Trachomatis (CT) infection in women who suffer from infertility, mucopurulent cervicitis and ectopic pregnancy and to investigate the possible role of the Chlamydial serology as a screening test by detection of the anti-Chlamydia IgG antibodies using ELISA. **Methods**: Over period of two years, total of 160 women who attended the gynecology OPD of Government Lalla Ded hospital, Srinagar, were screened for presence of Chlamydia Trachomatis IgG antibodies. Patients were categorized based on clinical diagnosis into 2 groups. Group I: Comprising of 120 patients [40 patients in each sub group. I (a) - Women with mucopurulent cervicitis (MPC); I (b) - Women with infertility; I (c) - Women with ectopic pregnancy.] Group II: Fertile women with no clinical signs and symptoms of mucopurulent cervicitis and no history of ectopic pregnancy and infertility. Venous blood samples from all these women were collected and screened for IgG antibodies to Chlamydia Trachomatis. **Results**: In our study 32.5% women with mucopurulent cervicitis were positive for CT IgG. In the infertile group, 22.5% of women were positive for Chlamydia IgG antibodies. 30% of ectopic pregnancies were positive for Chlamydia Trachomatis IgG. Out of 40 patients who were taken as controls, 7.5% screened positive for Chlamydia IgG antibodies. 56.7% of women who were positive for CT IgG antibodies were from rural areas. In our study the overall seroprevalence of Chlamydia Trachomatis was 23.12%. **Conclusion**: Chlamydia Trachomatis is the most common cause of sexually transmitted bacterial infection worldwide. Our study has shown that significant proportion of Kashmiri women also harbor this infection. So it becomes imperative that health and screening programs be employed to prevent the spread of this infection and its long term residual sequelae in women of childbearing age.

Keywords: PID, mucopurulent cervicitis (MPC), Chlamydia Trachomatis IgG.

Reproductive tract infections are on rise and have witnessed a growing concern. Asymptomatic reproductive tract infections are often undetected and left untreated and may lead to complications. Genital chlamydia infection is a common sexually transmitted disease and a major cause of infertily and ectopic pregnancies.

Chlamydia Trachomatis (CT) is a gram-negative obligate intracellular parasite and is dependent on host cells for survival. It infects columnar epithellial cell and endocervical glandular infection leads to mucopurulent discharge. Chlamydia is the most common cause of sexually transmitted bacterial infection worldwide[1], with females sharing the major burden of the disease.

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Recent studies from India have revealed the prevalence of Chlamydia Trachomatis in young females to be 43% in the gynecology OPD and 18.9% in patients with sexually transmitted diseases [2, 3]. Asymptomatic and untreated genital infections have serious implications on the reproductive health of women. Because of its asymptomatic nature, pelvic inflammatory disease (PID) due to Chlamydia Trachomatis present with higher rates of consequent tubal infertility and ectopic pregnancy in comparison with PID caused by other infections such as gonorrhea. It is also associated with 3-6 fold increase in transmission of HIV and is considered a risk factor for the development of cervical carcinoma [4]. Clinical manifestations of Chlamydia Trachomatis infection in women include pelvic inflammatory disease, mucopurulent cervicitis, postpartum endometritis, acute urethral syndrome, ectopic pregnancy and tubal infertility [5].

Chlamydia Trachomatis has been isolated from the cervix of 5% to 12% of healthy non-pregnant women and 2% to 20% of pregnant women[6-8]. It has also been isolated from the cervix of up to 36% of women with acute PID and in 86% from fallopian tubes in women with acute PID and positive cervical culture for Chlamydia Trachomatis [9-11]. Serological studies also support the role of Chlamydia in acute PID. Mardh et al[10] reported that 80% of women with acute salpingitis had Chlamydia Trachomatis antibodies and that 37% had a 4-fold change in IgG antibody titer. Women with PID have a 4 to 7-fold increased risk of infertility and each episode of PID approximately doubles the risk [6]. Ectopic pregnancy is commonly reported among women of childbearing age and comprises 1–3% of reported pregnancies.

Tubal factors are one of the most common causes (14- 38%) of infertility in women[11]. Sexually transmitted diseases (STDs) play an important role in increase in infertility, especially when it is caused by tubal factors[12]. The tubal damage occurs secondary to salpingitis, with two-thirds of the subjects being asymptomatic while the remaining one-third present with symptoms. Chlamydial infection produces less severe symptoms than other sexually transmitted infections [13]. The deceptively mild symptoms of Chlamydia Trachomatis allows the infection to go unnoticed, with minimal patient awareness until more severe secondary or tertiary symptoms develop. Serious sequelae include acute salpingitis and pelvic inflammatory disease. They often occur in association with persistent or repeated infection. Chlamydia Trachomatis may cause intraluminal adhesions, pelvic adhesions, fibrosis and hydrosalpinx. Due to the serious consequences of these conditions, the Chlamydia Trachomatis infection results in significant morbidity and can also affect a woman's fertility.

Studies have demonstrated that tubal factor infertility was significantly associated with the serum antibodies to Chlamydia Trachomatis, which resulted in infertility[14]. Role of persistent Chlamydia Trachomatis infection in tubal factor subfertility needs to be studied. Screening tests for persistent Chlamydia Trachomatis infection could be incorporated in fertility workup, aiming to accurately estimate the risk of persistence and identify those women who are at the highest risk of tubal pathology.

Due to asymptomatic course of infection and the high prevalence rates of Chlamydia Trachomatis, screening programs have been established in some countries to reduce the rate of PID and prevent development of post-infectious sequelae. Serological testing of uncomplicated Chlamydia infection of the lower genital tract is not recommended, but antibody titers have been seen to be high especially in women with PID. Infertility caused by Chlamydia Trachomatis represents a preventable type of infertility if it is detected early. The present study aims to find the seroprevalence of the Chlamydia Trachomatis infection in women who suffer from infertility, mucopurulent cervicitis and ectopic pregnancy and to investigate the possible role of the Chlamydial serology as a screening test by detection of the anti-Chlamydia IgG antibodies using enzyme linked immunosorbent assay (ELISA).

Materials and methods

It was a prospective observational study carried out over a period of two years from April 2018 to March 2020.

Inclusion criteria:
All Kashmiri women of reproductive age-group attending the gynecology OPD with mucopurulent cervicitis, infertility and ectopic pregnancy who were willing to participate in the study.
Exclusion criteria:
Post-menopausal women.
Pre-pubertal girls.

Women of other ethnic groups.
Pregnant females with normal intrauterine pregnancies.

After obtaining the ethical clearance from the institutional ethical committee, this study was conducted to find the seroprevalence of Chlamydia Trachomatis infection in women with mucopurulent cervicitis, infertility and ectopic pregnancy versus the seroprevalence of Chlamydia Trachomatis infection in females with no apparent signs and symptoms of mucopurulent cervicitis (MPC) and no history of infertility and ectopic pregnancy in the Postgraduate Department of Obstetrics and Gynecology, Government Lalla Ded Hospital, an associated hospital of Government Medical College, Srinagar.

Sample size: A total of 160 women who attended the gynecology OPD, over a period of two years were screened for the presence of Chlamydia Trachomatis IgG antibodies to detect a difference of 30% in prevalence of Chlamydia infection at a 95% confidence and 80% power. (Expected prevalence in asymptomatic group = 10%).

Patients were categorized based on clinical diagnosis into 2 groups -
Group I: Comprising of 120 patients (40 patients in each subgroup)
I (a):- Women with mucopurulent cervicitis
I (b):- Women with infertility.
I(c):- Women with ectopic pregnancy.
Group II: Fertile women with no clinical signs and symptoms of mucopurulent cervicitis and no history of ectopic pregnancy and infertility.

Written informed consent was taken from all the participants of the study and venous blood samples from all these women were collected and screened for IgG antibodies to Chlamydia Trachomatis, using the Calbiotech Chlamydia IgG kit based on ELISA[15-17].

Results

In our study, out of 40 patients with mucopurulent cervicitis, 13 patients were found positive for Chlamydia Trachomatis IgG antibodies i.e. 32.5 %. 9 out of 40 patients with infertility were positive for Chlamydia Trachomatis IgG antibodies i.e.22.5%. Out of 40 patients with ectopic pregnancy, 12 screened positive for Chlamydia IgG i.e.30%. Out of 40 women taken as controls, 3 women were also found to be positive for Chlamydia Trachomatis IgG antibodies i.e. 7.5 percent controls were also positive. 56.7% of women who were positive for CT IgG antibodies were from rural areas. Majority of patients who screened positive belonged to lower to upper middle socioeconomic status (figure 1).

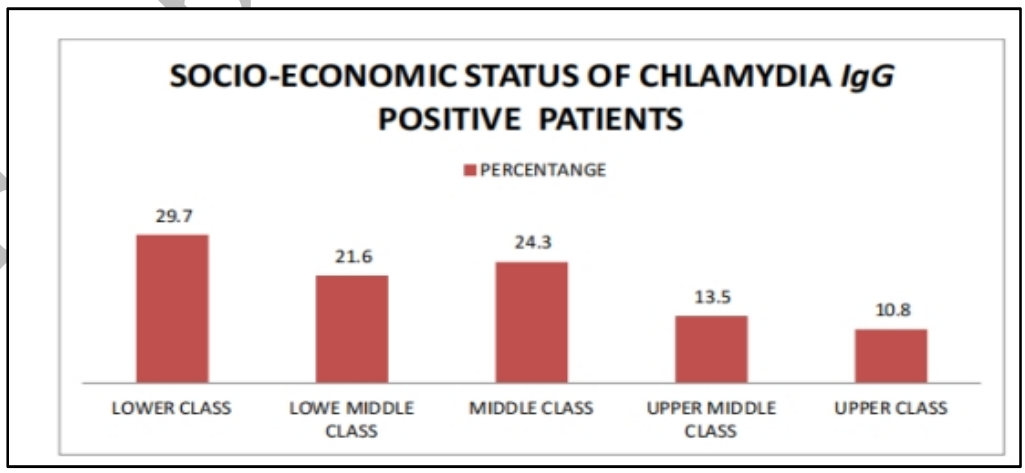

Figure 1: socioeconomic status of Chlamydia IgG positive women

Table 1: Seroprevalence of Chalymdia IgG in mucopurulent cervicitis			
Categories	**N**	**Percentage (%)**	**P Value**
Ig G +ve	13	32.5	< 0.001*
Ig G -ve	27	67.5	
Total	40	100	
*P value <0.05 significant.			

Out of 40 patients with mucopurulent cervicitis, 13 patients were found positive for Chlamydia Trachomatis IgG antibodies i.e. 32.5 % (table 1). 9 out of 40 patients with infertility were positive for Chlamydia Trachomatis IgG.i.e.22.5% (table 2). Out of 40 patients with ectopic pregnancy, 12 screened positive for Chlamydia IgG i.e.30% (table 3).

Table 2: Seroprevalence of Chalymdia IgG in infertile women			
Categories	**N**	**Percentage (%)**	**P Value**
Ig G +ve	9	22.5	< 0.001*
IgG -ive	31	77.5	
Total	40	100	
*P value <0.05 significant.			

Table 3: Seroprevalence of Chalymdia *IgG* in ectopic pregnancies			
Categories	**N**	**Percentage (%)**	**P Value**
Ig G +ve	12	30	< 0.001*
Ig G -ve	28	70	
Total	40	100	
*P value <0.05 significant.			

Out of 40 women taken as controls, 3 women were also found to be positive for Chlamydia Trachomatis IgG antibodies i.e. 7.5 percent controls were also positive (table 4). In our study the overall seroprevalence of Chlamydia Trachomatis was 23.12% (table 5).

Table 4: Seroprevalence of Chalymdia IgG in controls		
Categories	**N**	**Percentage (%)**
Ig G +ve	3	7.5
Ig G -ve	37	92.5
Total	40	100

Table 5: Overall prevalence of Chlamydia Trachomatis infection in present study				
Study group	**Total no. of cases in each group**	**CT IgG +ve cases**	**CT IgG -ve cases**	**Percentage of +ve cases**
Ectopic pregnancies	40	12	28	30
Infertility	40	9	31	22.5
Mucopurulent cervicitis	40	13	27	32.5
Controls	40	3	37	7.5
Total	160	37	123	23.12

Discussion

Chlamydia Trachomatis is one of the most prevalent sexually transmitted infection worldwide [18]. Long term sequelae of Chlamydia Trachomatis infection include pelvic inflammatory disease, tubal factor infertility and increased risk of ectopic pregnancy. Chlamydia Trachomatis is a mucosal pathogen that establishes infection within epithelial cells in both the lower and upper genital tract of women[19]. Up to 70% of women with Chlamydia

Trachomatis infection have silent infection and in the majority of cases with such an infection the disease is self-limited.

Out of the 40 patients in the mucopurulent cervicitis group, 32.5% women were positive for Chlamydia Trachomatis IgG. Venkatesh BMS et al [20] also conducted a study to found 17.2% of women with mucopurulent cervicitis positive for Chlamydia Trachomatis IgG antibodies. Similar results were present in the study done by SD Hill et al [21]. Among the 40 patients with infertility, 22.5% of infertile women were positive for Chlamydia Trachomatis IgG. Rabei N et al [22] also conducted a study to found that 32.5 % of women positive for Chlamydia Trachomatis IgG antibodies in the infertile group. Richard Lindgren et al [23] did a similar study to find 40% of women positive for Chlamydia Trachomatis IgG, which is higher as compared to our study. Similar results were found by Venkatesh BMS [20] et al in their study where they found 17.2% women positive for Chlamydia Trachomatis IgG antibodies in the infertile group.

30% of patients with ectopic pregnancies were positive for Chalymdia IgG. Erik K Khilstorm et al[23] also conducted a study to find 33% of women with ectopic pregnancies had positive Chlamydia IgG antibodies. Similar results were found by Rabei N et al[22].

In our study, out of 40 controls, three tested positive for CT IgG antibodies i.e 7.25% of controls also tested positive. Similar results were also present in the studies done by Rabei N et al [22] and Emad H et al [19].

Rural predominance was found in our study. 56.7% of women who were positive for CT IgG antibodies were from rural areas and 43.2% women were from urban areas. Majority of patients who screened positive for Chlamydia Trachomatis IgG antibodies belonged to lower to upper middle socioeconomic status. Our study has shown that significant proportion of Kashmiri women also harbor this infection, with overall seroprevalence of 23.12%.

Conclusion

Chlamydia Trachomatis is the most common cause of sexually transmitted bacterial infection worldwide; with long term sequelae in the form of ectopic pregnancy and infertility in women of childbearing age. The infertility caused by Chlamydia Trachomatis represents a preventable type of infertility, if detected early. Our study has shown that significant proportion of Kashmiri women also harbor this infection. Also significant numbers of asymptomatic women carry this infection and hence do not seek medical attention, further complicating the outcome. So it becomes imperative that health and screening programs be employed to prevent the spread of this infection and its long term residual sequelae in women of childbearing age.

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