

**REGULAR ARTICLE**

Prevalence and correlation of *Neisseria gonorrhoeae*, *Mycoplasma hominis* and *Ureaplasma urealyticum* antibodies in unexplained infertile women having positive post coital test

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ABSTRACT

The probability that a vaginal infection can interfere with fertility is often overlooked. The microorganisms, their products may inhibit sperm morphology and motility. Abnormal cervical mucus and sperm interactions clarify infertility in 5% to 10% of couples with a fertility problem. The aim of this research study was to estimate the prevalence of Gonococcal (IgG), *Mycoplasma hominis* (IgG) and *Ureaplasma urealyticum* (T. mycoplasma) (IgG) antibodies in unexplained infertile women having positive post coital test (PCT). Blood samples of 50 positive PCT identified infertile females and 50 healthy pregnant females (age group of 24-36 yrs) were collected and analyzed for Gonococcal (IgG), *M. hominis* (IgG) and *T. mycoplasma* (IgG) antibodies by ELISA technique. In the study group patients, only 12 % cases (6/50) were positive for IgG gonococcal antibodies but no any positive case was found in control group. 28% cases (14/50) were found positive for *M. hominis* IgG antibodies in study group patients and only 10 % cases (5/50) were positive in control group. Results statistically were insignificant. In case of *T. mycoplasma* IgG antibodies, 76% (38/50) infertile women were observed as positive while only 24% (12/50) cases of control group were found positive for the same ($p < 0.001$). The results were not significant for gonococcal and *M. hominis* antibodies but were highly significant for *U. urealyticum* IgG antibodies and it was concluded that it may be a cause of infertility in positive PCT cases as no any other known reason of infertility is noticed in such cases.

1. Introduction

Around the world, infertility indicates a leading health and social problem. For women in numerous developing countries, the incompetence to produce children can result in stigmatization and abandonment by their families. The highest rates of infertility in the world reported in sub-Saharan Africa

ranging from 10-21%. This higher percentage of infertility can slightly be associated with high rates of sexually transmitted infections (STIs) and complications of delivery or unsafe abortions (Shaheen, 2005).

Cervical Factor Infertility can occur when the mucus covering the cervix is too thick, therefore im-

peding the man's sperm from progressing past the cervix. It can also predict when a woman generates antibodies that attack and kill the sperm before it can enter the cervix or when the cervical mucus is inadequate, too thick or thin, or unfavorable to sperm. Some infertile women could have an abnormal cervical condition in which the sperm cannot pass through the cervical canal whether due to abnormal mucus production or a previous cervical surgical practice. It involves inability of the sperm to pass through the cervix due to damage of the cervix. In sexually transmitted diseases (STDs) various cervical infections caused by microbes like gonorrhoea, trichomonas, *M. hominis* or *Ureaplasma urealyticum* (*T mycoplasma*) can be the reasons for cervical factor infertility. In women, the cervix is the most frequent site of gonorrhoea, resulting in endocervicitis and urethritis, which can be convoluted by pelvic inflammatory disease (PID). The microorganisms and their byproducts or the patient's immune response to infection may interfere with sperm viability, motility, or morphology. Gonococcal PID is still a major factor of infertility in women in developing Asian and African countries (Densen, 1989). Although *Neisseria gonorrhoea* conversely influence nonciliated tubal cells, the gonococcal toxin can impair the cilia of adjoining cells. The isolation of *N. gonorrhoeae* depends on the stage and severity of infection. It is recovered from approximately 30% of untreated patients with acute salpingitis. *M. hominis* in the vagina is correlated with bacterial vaginosis. *M. hominis* has also been recovered from the upper genital tract of women diagnosed for either having endometritis or salpingitis (Bolan et al., 1999). Whether this organism, alone or in combination with other microbes like *T mycoplasma* and *Chlamydia trachomatis*, subsidize to fallopian tube occlusion is imprecise. The considerable frequency of antibodies to *M. hominis* and *T mycoplasma* in infertile women with a history of pelvic infection than in other women suggests that this organism may collaborate to tubal pathology (Rosenstein et al., 1996). Hence, the aim of present study was to estimate infectious microbes in infertile females having cervical abnormality and no any other specific reason of infertility was found.

2. Material and Methods

50 infertile women with unexplained infertility were selected for the present study after screening through post coital test and test was found positive (Table 2). 50 normal pregnant women who attended the Outpatient clinic of LLRM Medical College,

Meerut (India), for their routine checkup and were not having any known health problem were selected as control group. Ethical approval was taken from the local ethics committee, together with informed patient consent for this research study.

Blood sample of all patient and control group subjects were collected, centrifuged and serum were stored at -20°C after adding preservative. Demographic data of all study group patients were also documented (Table 1). All serum samples were analyzed for IgG antibodies of *M. hominis* and *T mycoplasma* and *N. gonorrhoea* by using ELISA technique. All data were analyzed by using chi square method of statistical analysis.

2.1. Post Coital Test

The post coital test after intercourse is used to determine the ability of sperm to survive in the cervical mucus. A mucus sample of patient is obtained after intercourse and examined under a microscope. If plentiful dead or immovable sperm are detected it represents a possible antigen/antibody reaction. This happens when the female's immune system treat sperms as pathogens (invading bacteria, allergic factor, virus, etc.) and investigate to destroy them.

3. Results

In the present study, only 12% (6/50) cases of infertile patients were positive for IgG gonococcal antibodies but no any positive result were observed in control group. The results were not found significant statistically as compared with control group. Limited information is available on the importance of gonococcal IgG antibodies in cervical factor infertility and in our study also results were not significant. For *M. hominis* IgG antibodies, 28% cases (14/50) were found positive in this study. In control group only 10% (5/50) cases were positive for the same, results were not significant as compared with control group. 76 % cases (38/50) were positive for *T mycoplasma* IgG antibodies while in control group, 24% cases (12/50) were positive for the same parameter. Results were found statistically highly significant ($p < 0.001$) as compared to control group (Table 3). Only two cases of study group patients were positive for both gonococcal and *M. hominis* IgG antibodies while three cases were positive for gonococcal IgG and *T mycoplasma* IgG antibodies. In 11 cases of study group patient's *M. hominis* and *T mycoplasma* IgG antibodies both were identified simultaneously. Two cases were

N = 50		Mean ± SD
1	Age (yrs) mean yrs ±SD	26.9± 5.3
2	Residency (n & %) Rural Urban	30 (60%) 20 (40%)
3	Weight (kg) mean ± SD	62.5 ±5.3
4	Height (cm) mean ± SD	165 ±5.9
5	Body Mass Index (BMI), kg/m ² (mean ± SD)	27 ± 3.5
6	Hb% gram (mean ± SD)	12.4 ± 1.05

Table 1: Clinical characteristics' of the studied group (50 cases of infertility with positive PCT).

N = 50		Percentage	
1	SPERM COUNT, <10HPF	28	56%
2	PRE OVULATORY FEATURES PERSISTING UPTO 22 ND DAY OF CYCLE	22	44%
A	SCANTY MUCUS	10	20%
B	SPERM IMMOBILIZATION	7	14%
C	SPERM AGGLUTINATION	5	10%
	TOTAL	50	100%

Table 2: Post coital test abnormalities detected.

	Groups		Significance level (p value)
	Control group (%)	Study group (%)	
Total no. Of Cases	50	50	
Gonococcal (IgG) Antibodies	NIL	6 (12)	P = 0.0114*
Mycoplasma hominis (IgG) Anti-bodies	5 (10)	14 (28)	P= 0.022*
T Mycoplasma (IgG) Antibodies	12 (24)	38 (76)	P= zero**

Table 3: Gonococcal (IgG), *Mycoplasma hominis* (IgG) and *T mycoplasma* (IgG) antibodies in study group females with positive post coital test and control cases.

* Results are not significant at p< 0.01

** Result is significant at p< 0.01

	Studied group patients (50)	No. (%)
1	Cases positive for gonococcal IgG antibodies + Mycoplasma hominis IgG antibodies	2 (4)
2	Cases positive for gonococcal IgG antibodies + T Mycoplasma IgG antibodies	3 (6)
3	Cases positive for Mycoplasma hominis IgG antibodies + T Mycoplasma IgG antibodies	11 (22)
4	Positive for all	2 (4)

Table 4: Association between different antibodies detected among studied group infertile patients with positive post coital test.

observed as positive for all three microbes (Table 4).

4. Discussion and Conclusion

Cervicitis encircled a diversity of gynecologic conditions. Among the most common causes of cervicitis are *C. trachomatis* and *N. gonorrhoea*. Female genital tract microbial infections of which the cervix is the passing way not only the main reason of tubal infertility but also there is risk of ectopic pregnancy (Rosenstein et al., 1996). It had been reported by various researchers that susceptibility to chronic complications associated with *N. gonorrhoeae* disease is a specific problem in women because of the asymptomatic description commonly comparable with gonococcal cervicitis and the subsequent spread to the upper genital tract (Omoniyi-Esan et al., 2006, Densen et al., 1982, Murray et al., 1995). It has also been reported that ascending gonococcal infection occurs in up to 45% of infected women and can result in pelvic inflammatory disease (PID), which can cause permanent fallopian tube adhesions and blockage, with consequent infertility and ectopic pregnancies (Sparling., 1999; Hook, 1999). Some research workers have also concluded that one in 10 women getting experience of PID, of which *N. gonorrhoeae* is the chief agent in 40% of all reported cases (Sweet et al., 1986, Aral et al., 1991). In Swedish populations, the *N. gonorrhoeae* was cultured in 10% to 30% of patients, whereas at an American city hospital, *N. gonorrhoeae* was recovered from most of the female patients routinely examined (Brian Wong., 2014). In our study incidence of gonococcal antibodies in infertile females having abnormal cervical findings were insignificant statistically.

M. hominis is frequently found in the genital tract of sexually experienced females and a role in PID and post-abort fever has been advised (Taylor-Robinson, 2007). Research on the incidence of *M. hominis* in women suffering from cervicitis varies extensively between 2.3% in a Turkish study and 26% in a small Wisconsin college community (Schlicht et al., 2004). In our research study also, we estimated 28% of infertile cases having cervical abnormality were positive for *M. hominis* IgG antibodies. It's a challenge to establish the pathogenic role of *M. hominis* given its frequent association with bacterial vaginosis (Taylor-Robinson, 2007). Like *M. hominis*, *U. urealyticum* is infrequently isolated from the fallopian tubes of women having pelvic infections, but its action on disease remains

uncertain because it also commonly found in the lower genital tract of healthy fertile women. In vitro studies with fallopian tube explants systems have advised that mycoplasmal infection may be commensals comparatively than other pathogens in acute PID. However, it has been shown by scanning under electron microscopy that *M. hominis* persuade pathologic swelling in fallopian tube ciliated cells in tissue culture (Mardh et al., 1986). In vitro systems preclude study of a potential host immune response that it may contribute to the pathogenesis of salpingitis. Researchers also reported that Cultures from the lower genital tract of healthy women recovered, *M. hominis* and *U. urealyticum* in 16% to 20% and 43% to 57% of infertile subjects with abnormal cervical findings respectively (McCormac et al., 1986, Gump et al., 1984). These percentages may be miscalculated because culture techniques are poor sensitive. In a study of culture negative women when gone through IVF, ensuing lower genital tract samples investigated by PCR for *M. hominis* and *U. urealyticum*. The sample was determined as positive in 2% and 17% of patients, respectively (Witkin et al., 1995). Controlled studies have not demonstrated a convincing difference in isolation rates between fertile couples and couples with long-standing infertility (Gump et al., 1984). In 1983, Cassell et al. (1983), recovered *M. hominis* from 6% and *U. urealyticum* from only 1% of the endometria of infertile women.

U. urealyticum (*T mycoplasma*) is suggested as a pathogen associated with cervicitis adverse pregnancy outcome and postpartum sepsis (Paavonen et al., 1986, Mitunari et al., 2005). The colonization of mycoplasmas was higher in the age group 26-30 years and low socio economic group. The investigators concluded that *U. urealyticum* can be considered as an etiological agent in unexplained infertility. In our study also, *T mycoplasma* antibodies were found significant statistically in infertile patients as we used ELISA which is very sensitive method of detection of these microbes. It may also be impossible to detect *ureaplasmas* by culturing method when some other rapidly growing bacteria are present in the specimen. Some Scientists reported *T mycoplasma*, 33.9% and *M. hominis*, 11% in infertile women with vaginal discharge (Biernat-Sudolska et al., 2006, Yavuzdemir et al., 1992). These results are not similar to our study, but in some research studies researchers reported considerably higher percentages of both these microorganisms, 61.4%, *U. urealyticum* and 16.5%, *M. hominis* in patients with genital discharge, which

support the findings of our research study. In such studies comparable incidence rates of *U. urealyticum* was prominent cause of infertility with abnormal post coital test as no any other known reason of infertility is noticed in such cases (Di – Bartolomeo et al., 2002). The number of infertile patients who found positive for *U. urealyticum* in this research study was high. The higher than expected incidence of these microorganisms and the impact they have in female reproduction suggests a role for routine screening and treatment before undergoing infertility treatment.

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