Original Article

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Association of the Serum Anti-chlamydial Antibodies with Tubal Infertility

Microbiology Section

ASHISH SURANA, VIJAYLATA RASTOGI, PREM SINGH NIRWAN

ABSTRACT

Background: Infertility is increasingly becoming a significant health problem in many areas of the world. The infection which is caused by *Chlamydia trachomatis* is a major cause of tubal factor infertility secondary to salpingitis. However, the data which pertains to infertility attributed to the *C. trachomatis* infection is limited in India.

Aims: To evaluate the chlamydial infection in women who suffered from infertility and to investigate the possible role of the chlamydia serology as a screening test for tubal infertility.

Method: This study was aimed at evaluating the chlamydial infection in fifty women with primary infertility and at investigating the possible role of the chlamydial serology as a screening test for tubal infertility, by the detection of the anti-chlamydial IgM antibodies by using E.L.I.S.A.

Setting and Design: The present prospective study was carried out at a tertiary care hospital in north India.

Results: In this study, a high seropositivity (60%) for the anti-chlamydial antibody was observed. 52% females showed bilateral tubal blockage, while the most common site of the blockage was the ampullary portion (36%).

Conclusion: These findings highlighted a strong correlation between the tubal factor infertility and the antichlamydial antibodies. It also stressed on the need of the screening of infertile women for *C. trachomatis* with laboratory investigations, which could provide a rapid and specific diagnosis so that early therapeutic interventions could be instituted.

Key Words: *Chlamydia trachomatis*, Antichlamydial antibodies, Tubal infertility

INTRODUCTION

Tubal factor infertility is one of the main causes of involuntary childlessness in women [1]. Sexually Transmitted Diseases (STDs) are believed to play an important role in the increase of the infertility, particularly when it is caused by tubal factors [2]. Female infertility is attributed to the tubal factors in about 14-38% of the cases [1]. The tubal damage is presumed to be secondary to salpingitis, with a two-third of the subjects being asymptomatic [3] while the remaining third present with symptoms [4].

The *C. trachomotis* infection is the most common sexually transmitted bacterial infection worldwide, especially among young adults [5]. The chlamydial infection produces less severe symptoms than other sexually transmitted diseases [6]. These deceptively mild symptoms allow the infection to go unnoticed, with minimal patient awareness, until the secondary or the tertiary symptoms develop. Serious sequelae like acute salpingitis and pelvic inflammatory disease often occur in association with repeated or persistent infections [7]. The precise mechanism through which the repeated infection elicits an inflammatory response that leads to tubal scarring and damage in the female upper genital tract, is not yet clear [8]. *C. trachomatis* may cause intraluminal adhesions, fibrosis, hydrosalpinx and pelvic adhesions. Due to the serious consequences of these conditions, the *C. trachomatis* infection can lead not only to significant morbidity, but it can also affect a woman's fertility [9]. Due to this asymptomatic nature of *C. trachomatis*, the diagnosis of tubal disease cannot rely solely on the presence or absence of a history of PID and therefore, it is important to screen this group of patients for the chlamydial infection [8]. The infection which is caused by *C. trachomatis* results in the formation of antibodies which are detectable in the serum in infected patients. After the study which was done by Punnonen et al., [10], several studies have demonstrated that tubal factor infertility was significantly associated with the serum antibodies to *C. trachomatis*, which resulted in infertility [11]. Infertile women with tubal diseases are 2 to 4 times more likely to have elevated antibodies to *C trachomatis* than either infertile women with normal tubes or pregnant women [12]. In contrast to laparoscopy or Hysterosalpingography (HSG), which are the accepted methods of diagnosis [7] of the tubal damage, the serological detection of the chlamydial genital infections is a non-invasive, simpler and a faster test to perform.

The infertility which was caused by *C. trachomatis* represented a preventable type of infertility, if it was detected early. Hence, the present study was aimed at evaluating the chlamydial infection in women who suffered from infertility, who attended a tertiary care hospital in north India and at investigating the possible role of the chlamydia serology as a screening test for the tubal infertility.

MATERIALS AND METHODS

The study population consisted of 50 consecutive women of the reproductive ages, who had primary infertility, who attended the Obstetrics and Gynaecology Outpatients Department of Jawaharlal Nehru Medical College, Ajmer,Rajasthan, India. for the evaluation of their fertility problem. Fifty healthy women of a similar age group who attended the antenatal clinic during the study period, constituted the control group.

A general medical history was taken and information was obtained from the subjects on the age, marital status, history of the treatment for vaginal discharge,history of intra-abdominal infections, and of previously diagnosed STDs. Infertile women who had a normal Mantoux test, a normal X-ray of the chest and no specific findings in the endometrial biopsy and husbands who had a normal semenogram were enrolled in the study. The patients with a history of antibiotic treatment in the previous 2 months were excluded from the study. 'Infertility' was defined as inability to conceive for more than a year despite having regular, unprotected intercourse. 'Primary infertility' was defined as a condition in which conception had never occurred, whereas the term, 'secondary infertility' was used to define those cases where there was an inability to conceive after a previous successful conception. Hysterosalpingography was done in all the cases. Tubal infertility was said to be present if the hydrosalpinx was seen on HSG.

5 ml of venous blood was drawn from both the females with primary infertility and the control group for the laboratory measurement of the serum IgM specific antibodies against *C .trachomatis* by ELISA (Novum Diagnostics, Assar – Gabrielsson – Str. 1A, Germany). The kits manual was strictly followed while the tests were conducted. The initial screening of all the sera was done for Syphilis by the Venereal Disease Research Laboratory Test (VDRL—Immutrep, Rapid Plasma Reagin Card Test) and for the Human Immunodeficiency Virus (HIV) antibody by the Dot Immunoassay (Combaids-RS). The whole study group was found to be non-reactive for Syphilis and HIV, thereby ruling out the simultaneous presence of these infections with the chlamydial genital infection. Similarly, the results were also non-reactive for Syphilis and HIV in the entire control group.

RESULTS

In our study, 60% seropositivity for the anti-chlamydial IgM antibody was observed among the females with primary infertility. The mean age of the 50 women with primary infertility who were enrolled in this study was 24.62 + 6.51 years, while the mean age of the control group was 24.1 + 5.90. Among the females with infertility, 18 (36%) were in the 21-25 years age group, followed by 14 (28%) in the 15-20 years age group; of the remaining 18 women, 10 were in the 26-30 years age bracket and 4 each were in the 31-35 years and 36-40 years age groups respectively [Table/Fig-1]. The healthy term, pregnant, control women were free of all the signs and symptoms and their age distribution was similar to that of the study group.

In the present study, the blockage at various sites within the fallopian tube [Table/Fig-2] among all the females with primary infertility was also studied. The most common site was the ampullary portion (36%), followed by the cornual portion (24%), while none of the subjects had blockage within the isthmus portion. Among

Age Groups (in years)	Primary Infertility Group(n=50)	
	Number (50)	IgM Positive (30)
15-20	14	8
21-25	18	12
26-30	10	6
31-35	4	2
36-40	4	2
41-45	--	--

[Table/Fig-1]: Infertile cases in various age-groups and their correlation with chlamydial seropositivity

	Number of females with primary infertility (n=50)		Chlamydial seropositivity(30) among females with primary infertility	
Site of Block	**Number**	**(%)**	**Number**	**(%)**
Ampullary	18	36	12	40
Fimbrial	10	20	08	26.67
Cornual	12	24	04	13.34
Hydrosalpinx	10	20	06	19.99
Isthmic	0	0	0	--

[Table/Fig-2]: Correlation between the sites of block in the fallopian tube of females with primary infertility and chlamydial seropositivity

	Number of females with primary infertility (n=50)		Chlamydial seropositivity(30) among females with primary infertility	
Type of Block	**Number**	**(%)**	**Number**	**(%)**
Unilateral	08	16%	04	13.32
Bilateral	26	52%	18	59.94
Hydrosalpinx				
Unilateral	06	12%	02	6.66
Bilateral	10	20%	06	19.98

[Table/Fig-3]: Correlation between the types of block in the fallopian tube of females with primary infertility and chlamydial seropositivity

the 50 females with primary infertility, the seropositivity for the anti-chlamydial IgM antibody was the highest among the subjects with a fimbrial blockage (80%), followed by those with an ampullary blockage (66.6%).

In our study, a correlation between the type of blockage and the chlamydial seropositivity was also observed [Table/Fig-3]. A bilateral tubal blockage was seen in 52% females with primary infertility, followed by those with a bilateral hydrosalpinx (20%). Similarly, the maximum number of subjects who had a positive chlamydial serology had a bilateral tubal blockage (59.94%), followed by those with a bilateral hydrosalpinx (19.98%).

DISCUSSION

Infertility is becoming an emerging health problem in many countries of the world, including India. This increase appears to coincide with the growing role which is played by *C. trachomatis* as a sexually transmitted agent. The anti-chlamydial IgM seropositivity of 60% among the primary infertility group, highlighted a significant correlation between the prevalence of the antichlamydial antibodies and the tubal factor infertility which was secondary to acute salpingitis. These findings were consistent with other reports which were made by Treharne (73%) [13], Bhujwala (60%) [14] and Ghinsberg (43%) [15].

In the present study,the highest incidence of the primary infertility was observed in the third decade, with a slight preponderance in its first half i.e., a peak seropositivity was noticed in the 21-25 years age group. The seropositivity decreased in the later decades of life, thus indicating that chlamydial genital infections were most prevalent in the sexually active age group. Results which supported this were also obtained by Nagasawa et al.,[16] and Ohwada, et al.,[17], with the highest incidence of the chlamydial infections in the twenties. Thus, the present study further affirmed the previous observations, that there was a higher IgM seropositivity in the earlier decades of the sexual life.

In our study, the pattern of the blockage at various sites within the

fallopian tube and its correlation with the anti-chlamydial IgM antibody suggested that the chlamydial infections were more likely to be associated with peripheral endosalpingitis. These findings were in conformity with those of Kane et al., [18] and Jain M et al., [19].

Finally in our study, the results which correlated the type of blockage and the chlamydial seropositivity were similar to those which were obtained in the studies which were conducted by Jain M et al., [19] and Punnoenen et al., [10] with bilateral tubal blockages of 39% and 64.7% respectively, thereby suggesting that the high prevalence of the chlamydial seropositivity could be associated with a bilateral tubal damage.

SUMMARY AND CONCLUSION

In the present study, the high seropositivity rate for the anti-chlamydial antibodies among the females with infertility signified *C. trachomatis* as a major cause of the tubal factor infertility. It also highlighted the promising role of the screening laboratory tests for the *C. trachomatis* infection as the cause of primary infertility, thereby enabling a prompt diagnosis and the appropriate management of this treatable morbidity.

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AUTHOR(S):

1. Dr. Ashish Surana
2. Dr. Vijaylata Rastogi
3. Dr. Prem Singh Nirwan

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Microbiology, Surat Municipal Institute of Medical Education & Research (SMIMER), Surat, Gujarat, India.
2. Assistant Professor, Department of Microbiology, JLN Medical College, Ajmer, Rajasthan, India.
3. Professor- Department of Microbiology & Principal-Controller- JLN Medical College & Group of Hospitals, JLN Medical College, Ajmer, Rajasthan, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Ashish Surana,
Assistant Professor, Department of Microbiology
SMIMER, Near Bombay Market, Umarwada, Surat,
Gujarat, India.
Phone: 09426854701
E-mail: suranaan@yahoo.com

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