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ORIGINAL ARTICLE

Prevalence of Urogenital *Chlamydia Tracomatis* Infection in Patients of Ectopic Pregnancy

Anzuman-Ara-Begum[1], Sanzida Nahid[2]

ABSTRACT

Background & objective: Ectopic pregnancy is not a rare complication of pregnancy, it is a significant obstetric concern, for it often leads to acute emergencies due to potential rupture and hemorrhage. The incidence of ectopic pregnancy has notably increased four-fold in recent decades, prompting investigations into emerging risk factors, particularly Urogenital *Chlamydia trachomatis* infection. About one or two in every one hundred pregnancies are ectopic, often no reason is found. This study aims to evaluate the prevalence of *Chlamydia trachomatis* among patients diagnosed with ectopic pregnancy.

Methods: This cross-sectional study was conducted from January to December 2004, involving 38 cases of confirmed ectopic pregnancy, identified through clinical diagnosis and pelvic ultrasonography. Ethical approval was obtained from the Institutional Review Board of the medical college, and informed consent was secured from all participants. Endocervical swabs were collected and analyzed for *Chlamydia trachomatis* DNA using polymerase chain reaction (PCR) techniques. Data on demographic and clinical variables were gathered using a semi-structured questionnaire and analyzed using descriptive statistics through the Statistical Package for the Social Sciences (SPSS).

Result: The results showed that the mean age of participants was 24.3 years, with over half (55.3%) aged between 15 and 25 years. A significant portion of the population had a history of pelvic infections (60%) and previous abortions (26.3%). The majority (92.1%) of the patients was confirmed to have an ectopic pregnancy. Despite the known association between Chlamydia and ectopic pregnancy, only 5.3% of the patients tested positive for Chlamydia trachomatis. A high incidence of anemia (over 60% with Hb < 50%) was noted among the participating patients. Most patients underwent surgical interventions, primarily salpingectomy

Conclusion: This study highlights a concerning gap in the correlation between *Chlamydia trachomatis* infection and ectopic pregnancy prevalence. Although the low detection rate of *Chlamydia* in this cohort suggests that it may not be a primary risk factor in the local context, the significant history of pelvic infections indicates underlying etiological complexities. Future research is necessary to explore other potential risk factors contributing to the rise in ectopic pregnancies, which may include social, behavioral, and environmental influences. Improved awareness and early diagnosis of pelvic infections could play an essential role in decreasing the incidence of ectopic pregnancies in Bangladesh.

Keywords: Prevalence, *Chlamydia tracomatis* infection, risk of ectopic pregnancy, etc.

INTRODUCTION:

Maternal mortality remains unacceptably high in Bangladesh, with one of the primary causes being hemorrhage.[1] Ectopic pregnancy, though relatively rare (occurring in approximately 1 in 100 pregnancies), often results in rupture and significant hemorrhage, leading to acute obstetric emergencies. Alarmingly, the incidence of ectopic pregnancy has increased four-fold over the past few decades, indicating that novel factors may be contributing to this rise. Recently, *Chlamydia trachomatis* infection of the female genital tract has increased many-fold and seems to be an emerging risk factor for ectopic pregnancy. This study aims to investigate these

Authors' information:

[1] ***Dr. Anzuman-Ara-Begum,*** *Assistant Professor, Obstetric & Gynae Department, Sir Salimullah Medical College, Dhaka, Bangladesh.*

[2] ***Dr. Sanzida Nahid,*** *Assistant Professor, Obstetric & Gynae Department, Sir Salimullah Medical College, Dhaka, Bangladesh.*

Correspondence: ***Dr. Anzuman-Ara-Begum,*** *Phone: +8801911354605 E-mail: dranzumanara1969@gmail.com*

potential factors, specifically focusing on the prevalence of Urogenital *Chlamydia trachomatis* infection among patients with ectopic pregnancy.

An ectopic pregnancy occurs when the fertilized ovum implants outside the normal uterine cavity, most commonly in the fallopian tube (over 95% of cases). However, implantation can also occur in the uterus (angular, cervical, or in a rudimentary horn), the ovary, the broad ligament, or elsewhere in the peritoneal cavity. The reported incidence of ectopic pregnancy varies significantly, ranging from 3-4 per 1000 pregnancies to as much as 16 per 1000 pregnancies in certain populations.[2] The diverse etiologies of ectopic pregnancy include pelvic inflammatory diseases (PIDs), developmental anomalies, distortion of fallopian tubes due to adjacent tumors, surgical obstruction, intrauterine contraceptive devices, smoking, and assisted reproductive techniques. Among these, PIDs are thought to be the most significant contributing factor.

Most cases of ectopic pregnancy necessitate emergency surgical intervention, which carries inherent risks, including further ectopic pregnancies and reduced future fertility. Even after surgical management, if the underlying cause of the ectopic pregnancy remains unidentified and untreated, patients may experience recurrent ectopic pregnancies. Pelvic infections, particularly those caused by *Chlamydia trachomatis*, are critical determinants of ectopic pregnancy risk. In the United States, *Chlamydia trachomatis* is the leading cause of pelvic infections and a major contributor to serious reproductive morbidity. Recently the prevalence of chlamydial infections has been noted to correlate with the incidence of ectopic pregnancies, as evidenced by findings in Sweden, where 5.4% of women tested positive for *Chlamydia*.[3] Nonetheless, no study has yet been done to investigate the link between *Chlamydia* infection and ectopic pregnancy in the context of our country, demanding an immediate look into the issue.

Despite advancements in the management of ectopic pregnancy through early diagnosis and improved clinical and investigative procedures, the actual causes often remain unidentified in many cases. Notably, there is a lack of research specifically examining the association between chlamydial infections and the risk of ectopic pregnancy. This gap highlights the need for targeted studies to explore the prevalence of Urogenital *Chlamydia trachomatis* infection in patients diagnosed with ectopic pregnancy. The study was designed to investigate the proportion of patients with ectopic pregnancy who concurrently harbor Urogenital *Chlamydia trachomatis* infection. By identifying the prevalence of this infection among affected women, the study aims to contribute valuable insights into the etiological factors of ectopic pregnancy and potentially inform future prevention & management strategies.

METHODS:

This cross-sectional study was conducted in the Department of Obstetrics and Gynaecology at Sir Salimullah Medical College and Mitford Hospital, Dhaka, Bangladesh, over the period from January to December 2004. Ethical approval for this study was obtained from the Institutional Review Board (IRB) of Sir Salimullah Medical College and Mitford Hospital. A total of 38 cases of confirmed ectopic pregnancy, diagnosed both clinically and via pelvic ultrasonography, were consecutively included in the analysis. Patients with a known diagnosis of tuberculosis associated with ectopic pregnancy were excluded from the study.

Following the acquisition of informed consent, endocervical swabs were collected from all participants & sent to the Microbiology Department of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B), Mohakhali, Dhaka, for the detection of Chlamydial DNA through polymerase chain reaction (PCR) techniques. Data pertaining to relevant variables were gathered using a semi-structured questionnaire, which served as the research instrument. The data were subsequently processed and analyzed utilizing the Statistical Package for the Social Sciences (SPSS), version 25 for Windows. Descriptive statistics, including frequency

and corresponding percentages for qualitative data, as well as means and standard deviations for quantitative data, were employed to analyze the findings.

RESULTS:

The study revealed that over half (55.3%) of the participants were aged between 15 and 25 years, with 25-35 years making up the next largest group, and the remaining 21.1% were aged 15-45 years. The mean age of the patients was 24.3 ± 4.2 years (Table I). Among the participants, about 40% were primipara, 31.8% were multipara, and 13.1% were grand multipara. Notably, over one-quarter (26.3%) had a previous history of abortion, with 60% of these cases involving induced abortions (Table II).

More than 60% of the patients reported a history of previous pelvic infections. Additionally, 23.8% experienced lower abdominal pain, 15.7% had valvovaginitis, 13.1% reported dyspareunia, and 8% experienced dysuria. A significant majority (over 75%) had no history of surgical interventions, while 10.5% had a history of lower segment ceasarean section (LSCS), 5.3% had undergone appendectomy, and another 5.3% had dilation and curettage (D&C). The occurrence of previous ectopic pregnancy was rare, noted in only 2.6% of cases (Table III). Approximately 58% of the patients reported using contraceptive methods before the occurrence of ectopic pregnancy. The types of contraceptives used are detailed in Table IV.

The predominant symptom reported was abdominal pain, followed by per vaginal bleeding (71.1%) and shock (31.8%). A substantial proportion of patients (63.1%) reported amenorrhea lasting 4-8 weeks at the time of admission (Table V). During abdominal examination, the most common finding was abdominal tenderness (86.8%), followed by rebound tenderness (36.8%). Muscle guarding and abdominal masses were noted in 63.1% and 26.3% of cases, respectively. Abdominal distension was observed in 21% of patients. Among pelvic signs, nearly 90% exhibited pelvic tenderness, and two-thirds (65.8%) had an enlarged uterus. The cervical excitation test was positive in over 70% of cases, and adnexal masses were palpated in 60% of cases (Table VI).

Over 60% of the patients were severely anemic (Hb < 50%), and 13% tested positive for pregnancy. A majority (92.1%) were confirmed to have ectopic pregnancy. The PCR test for Chlamydia DNA revealed only 2 patients (5.3%) positive (Table VII). More than 70% of the patients underwent salpingectomy, while 10.5% had salpingo-oophorectomy, 13.1% had salpingotomy, and 5.3% underwent cul-de-sac salpingotomy. Of the 38 cases, 35 (92.1%) required blood transfusion (Table VIII).

Table I. Age distribution of women with ectopic pregnancy (n = 38)

Age (years)	Frequency	Percentage
15 – 25	21	55.3
26 – 35	9	23.7
36 – 45	8	21.0

Table II. Distribution of the participants by their obstetric history (n = 38)

Obstetric history	Frequency	Percentage
Parity (n = 38)		
Nullipara	6	15.7
Primipara (single child)	15	39.4
Multipara (2-3 children)	12	31.8
Grand multipara (≥ 4 children)	5	13.1
History of past abortion (n = 38)	10	26.3
Types of abortion (n = 10)		
Spontaneous abortion	4	40.0
Induced abortion (including MR)	6	60.0

Table III. Distribution of patients by their past history of medical significance (n = 38)

Past history of medical significance	Frequency	Percentage
PIDS		
No history	15	39.4
Valvo-vaginitis	6	15.7
Lower abdominal pain	9	23.8
Dysuria	3	8.0
Dysparonia	5	13.1
History of surgery		
No history	29	76.3
LSCS (Lower Segment Ceasarean Section)	4	10.5
Appendisectomy	2	5.3
D & C	2	5.3
Previous ectopic pregnancy	1	2.6

Table-IV. Contraceptive measures taken before the incidence

Contraceptive methods used	Frequency	Percentage
IUCD	1	2.6
Oral pill	11	29.0
Injectable	5	13.1
Norplant	1	2.6
Condom	4	10.5
No methods used	16	42.2

Table-V. Distribution of patients by symptoms they reported (n = 38*)

Symptoms	Frequency	Percentage
Abdominal Pain	34	89.5
P/V Bleeding	27	71.1
Shock	12	31.8
Ammenorrhoea	24	63.1

Total will not correspond to 100%, for multiple responses.

Table-VI. Distribution of patients by the clinical signs they exhibited (n = 38*)

Signs	Frequency	Percentage
Abdominal signs		
Abdominal tenderness	33	86.8
Muscle guard	24	63.1
Abdominal mass	10	26.3
Rebound tenderness	14	36.8
Abdominal distension	8	21.1
Pelvic signs		
Pelvic tenderness	34	89.5
Enlarged uterus	25	65.8
Cervical excitation test (positive)	27	71.1
Adenexal mass	23	60.5

Total will not correspond to 100%, for multiple responses.

Table-VII. Investigations performed in study cases and their findings (n = 38*)

Investigations	Frequency	Percentage
Severe anaemia (Hb < 50%)	23	60.5
Pregnancy test (positive)	5	13.1
USG confirmed ectopic pregnancy	35	92.1
PCR Test for Chlamydial DNA positive	2	5.3

Total will not correspond to 100%, for multiple responses.

Table-VIII. Patients stratified by types of treatment they received

Treatment	Frequency	Percentage
Definitive treatment (types of operation)		
Salpingectomy	27	71.1
Salpingo-oophorectomy	4	10.5
Salpingotomy	5	13.1
Culf-salpingotomy	2	5.3
Supportive treatment		
Blood transfusion	35	92.1

DISCUSSION

Over the past decade, the incidence of ectopic pregnancy has doubled, attributed to several factors. These include an increase in pelvic infections, changes in contraceptive methods, a rise in tubal and pelvic surgeries, and the use of ovulation induction agents such as clomiphene and gonadotropins, as well as in vitro fertilization and embryo transfer procedures. Among the various causes of pelvic infections, *Chlamydia trachomatis* stands out as a significant contributor in the United States, where it is recognized as the leading reportable communicable disease and a major cause of serious reproductive morbidity. In our study, [4,5] however, we found an exceptionally low prevalence (5.3%) of *Chlamydia trachomatis* infection, indicating that, in our context, it is a rare cause of ectopic pregnancy. Nevertheless, nearly 60% of participants reported a history of previous pelvic infections, suggesting that such infections may still play a role in the pathogenesis of ectopic pregnancies. Research indicates that infections can lead to tubal damage, resulting in the formation of intratubal or peritubal adhesions that impede the transport of the fertilized ovum, even without complete blockage of the tubes.

A significant finding of this study is that 55.3% of patients were in the prime reproductive age group of 15-25 years, which is associated with a higher risk of pelvic infections. Evidence suggests that the prevalence of pelvic inflammatory disease (PID) is at least twice as high in teenagers compared to older women [6,7,] highlighting the need to consider younger pregnant women as a high-risk group for ectopic pregnancies related to PID. Additionally, a history of miscarriages, whether spontaneous or induced, can contribute to the risk of developing PID, as can the use of intrauterine contraceptive devices (IUCDs) and a history of pelvic or tubal surgeries. The study also revealed that over 60% of patients presented with severe anemia, likely due to intrabdominal hemorrhage, underscoring the necessity for prompt emergency obstetric care for this population. The majority of ectopic pregnancies were diagnosed via

ultrasonographic scanning, reinforcing the utility of ultrasound as a reliable diagnostic tool in these cases.

Surgical management predominantly involved unilateral salpingectomy, which remains the most common and effective management for ectopic pregnancy. In a smaller proportion of cases, salpingo-oophorectomy (10%) and salpingotomy (13%) were performed. Salpingectomy is a rapid and technically straightforward operation, and it is generally preferred unless the ovary is grossly diseased or damaged, as advised by Jeffcoate[2]. While some authors have proposed alternative surgical approaches, such as cornual resection or hysterectomy in cases of ruptured interstitial ectopic pregnancy, these methods were not employed in our series. Alongside surgical interventions, patients received broad-spectrum antibiotic coverage for 7-14 days, tailored to their specific clinical needs, as part of their comprehensive management.

Despite the prevalence of *Chlamydia trachomatis* infection in our patient cohort was low, the significant history of pelvic infections among participants suggests a complex interplay of factors contributing to ectopic pregnancy. This highlights the importance of continuous monitoring and preventive strategies, particularly in young women, to address the underlying risk factors associated with ectopic pregnancies and their complications. While the diagnosis of ectopic pregnancy requires meticulous history taking, comprehensive clinical examination, & appropriate investigations, advanced management, including blood transfusion capabilities, anesthesia, antibiotics, and surgical methods, may significantly minimize mortality and morbidity rates associated with ectopic gestation & may preserve the reproductive function of affected patients.

CONCLUSION

This study highlights the prevalence of urogenital Chlamydia trachomatis infection in patients with ectopic pregnancy, revealing a low positivity rate of 5.3% among the participants. The findings underscore the demographic profile of ectopic pregnancy patients, predominantly affecting younger women, particularly those aged 15-25 years. The significant history of pelvic infections and previous abortions among the participants suggests a potential association with the development of ectopic pregnancies. The high rates of anemia and the need for surgical interventions further emphasize the complexity and severity of this condition. These results indicate the necessity for improved screening and preventive measures, particularly in younger women, to address the underlying risk factors associated with ectopic pregnancy and its complications.

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