



COMPREHENSIVE ANALYSIS OF ECTOPIC PREGNANCIES: INCIDENCE, RISK FACTORS, AND OUTCOMES IN A TERTIARY CARE CENTER

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ABSTRACT

BACKGROUND:

Background: Ectopic pregnancy is a potentially life-threatening condition and a leading cause of maternal morbidity in the first trimester, requiring prompt diagnosis and effective management to prevent serious complications.

Aim and Objective: To evaluate the incidence, risk factors, clinical presentation, diagnostic methods, and outcomes of ectopic pregnancies in a tertiary care centre over 14 months.

Materials and Methods: A prospective cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Index Medical College, Hospital and Research Center, Indore, Madhya Pradesh, India, from May 2014 to June 2015. A total of 85 women diagnosed with ectopic pregnancy during the study period were included. Data were collected on patient demographics, clinical symptoms, risk factors, diagnostic approaches, and treatment outcomes. Diagnostic tools included transvaginal ultrasonography and serum beta-hCG levels. Management options included medical treatment with methotrexate and surgical intervention (laparoscopy or laparotomy). Data were analyzed using descriptive statistics and chi-square tests.

Results: The incidence of ectopic pregnancy was 1% among the 8,500 pregnancies recorded during the study period. Most patients (62%) were aged 25-35 years. The most common symptoms were abdominal pain (91%) and vaginal bleeding (75%). Significant risk factors included pelvic inflammatory disease (40%), previous ectopic pregnancy (18%), and tubal surgery (16%). Transvaginal ultrasonography demonstrated a diagnostic accuracy of 98%. Medical management with methotrexate was successful in 52% of cases, while surgical intervention was required in 48%. The overall treatment success rate was 92%, with no maternal mortality reported.

Conclusion: Ectopic pregnancy remains a significant cause of maternal morbidity, with key risk factors including pelvic inflammatory disease and previous ectopic pregnancy. Early diagnosis and appropriate management are crucial for successful outcomes. Further studies in diverse populations are necessary to validate these findings.

Keywords: Ectopic pregnancy, incidence, risk factors, diagnosis, management, methotrexate, laparoscopy, maternal morbidity.

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INTRODUCTION

Ectopic pregnancy, defined as the implantation of a fertilized ovum outside the uterine cavity, is a critical obstetric emergency and remains a leading cause of maternal morbidity and mortality in the first trimester of pregnancy.¹ The condition accounts for approximately 1-2% of all pregnancies, yet it is responsible for a disproportionately high number of maternal deaths. The most common site of ectopic implantation is the fallopian tube, although other locations, such as the ovary, cervix, and abdominal cavity, are also possible.² The aetiology of ectopic pregnancy is multifactorial, with recognized risk factors including previous pelvic inflammatory disease (PID), tubal surgery, history of infertility, use of assisted

reproductive technologies, and prior ectopic pregnancy.^{1,3}

Early diagnosis and management are crucial to prevent life-threatening complications such as tubal rupture and hemorrhagic shock.⁴ Advances in diagnostic techniques, particularly the widespread use of transvaginal ultrasonography and sensitive serum beta-hCG assays, have significantly improved the early detection of ectopic pregnancies. Management options have also evolved, ranging from medical treatment with methotrexate to laparoscopic surgery, depending on the clinical scenario and patient preference.^{5,6}

Despite these advances, ectopic pregnancy remains a significant clinical challenge, particularly in low-resource settings where access to diagnostic and

therapeutic facilities may be limited. This prospective cross-sectional study aims to assess the incidence, risk factors, clinical presentation, diagnostic approaches, and outcomes of ectopic pregnancies in a tertiary care setting. By identifying key factors associated with ectopic pregnancy, this study seeks to contribute to improved clinical management and outcomes for affected women.

Materials and Methods

This prospective cross-sectional study was conducted over 13 months, from May 2012 to June 2013, to evaluate the incidence, risk factors, clinical presentation, diagnostic methods, and outcomes of ectopic pregnancies.

The study included all women diagnosed with ectopic pregnancy who presented to the Department of Obstetrics and Gynecology during the study period. The inclusion criteria were:

- Women with a confirmed diagnosis of ectopic pregnancy based on clinical, ultrasonographic, and surgical findings.
- Patients aged between 18 and 45 years.
- Patients who provided informed consent to participate in the study.

Exclusion criteria included:

- Patients with a heterotopic pregnancy (simultaneous intrauterine and extrauterine pregnancy).
- Patients with incomplete medical records.

Data Collection

Data were collected prospectively using a structured data collection form. The following information was recorded:

- **Demographic Data:** Age, gravidity, parity, and socioeconomic status.
- **Clinical Presentation:** Symptoms such as abdominal pain, vaginal bleeding, and syncope were documented. The duration of symptoms before presentation was also noted.
- **Risk Factors:** History of pelvic inflammatory disease, previous ectopic pregnancy, history of tubal surgery, use of intrauterine contraceptive devices (IUCDs), infertility treatment, and other relevant factors were recorded.

- **Diagnostic Methods:** The primary diagnostic tool was transvaginal ultrasonography. Serum beta-hCG levels were measured to aid in diagnosis. In cases where the diagnosis was uncertain, laparoscopy was performed.
- **Management:** The treatment approach (medical or surgical) was determined based on the patient's clinical status, beta-hCG levels, and ultrasound findings. Medical management with methotrexate was considered for stable patients with unruptured ectopic pregnancies and no contraindications. Surgical intervention, either by laparoscopy or laparotomy, was performed for patients with hemodynamic instability, signs of tubal rupture, or contraindications to medical management.
- **Outcomes:** The outcomes assessed included treatment success, need for additional interventions, complications, and duration of hospital stay. Follow-up data were collected to assess the resolution of ectopic pregnancy and any long-term complications.

Statistical Analysis

Data were entered into a Microsoft Excel spreadsheet and analyzed using statistical software (SPSS version 18). Descriptive statistics such as mean, standard deviation, frequency, and percentage were used to summarize the data. The association between various risk factors and the occurrence of ectopic pregnancy was analyzed using chi-square tests and logistic regression analysis. A p-value of <0.05 was considered statistically significant.

Results

Incidence and Demographics

During the study period from May 2014 to June 2015, 8,500 pregnancies were recorded at the Department of Obstetrics and Gynecology, Index Medical College, Hospital and Research Center, Indore. Out of these, 85 cases were diagnosed as ectopic pregnancies, giving an incidence of 1% among the pregnant population.

The mean age of the patients was 28.4 ± 5.3 years, with the majority (62%) of the cases occurring in women aged between 25 and 35. The demographic details are summarized in Table 1.

Table 1: Demographic Characteristics of Patients with Ectopic Pregnancy

Characteristic	Number of Patients (n=85)	Percentage (%)
Age (years)		
<25	15	17.6
25-30	35	41.2
31-35	18	21.2
>35	17	20.0
Gravidity		
Primigravida	28	32.9
Multigravida	57	67.1
Socioeconomic Status		
Low	40	47.1
Middle	35	41.2
High	10	11.8

Clinical Presentation

The most common presenting symptoms were abdominal pain (91%), followed by vaginal bleeding

(75%) and syncope (20%). The mean duration of symptoms before presentation was 6.8 ± 2.4 days. Table 2 shows the clinical presentation of the patients.

Table 2: Clinical Presentation of Ectopic Pregnancy Patients

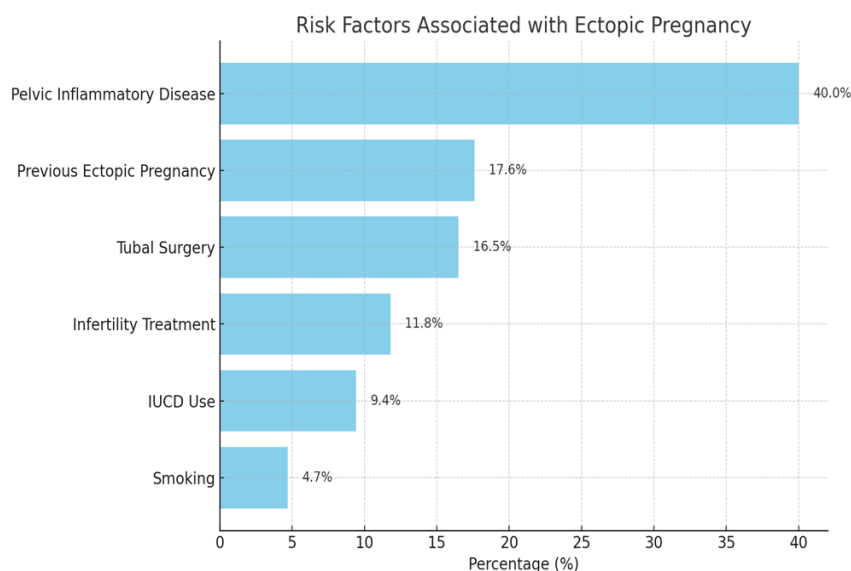
Symptom	Number of Patients (n=85)	Percentage (%)
Abdominal Pain	77	90.6
Vaginal Bleeding	64	75.3
Syncope	17	20.0
Shoulder Pain	8	9.4
Asymptomatic	4	4.7

Risk Factors

Among the patients, the most common risk factors identified were a history of pelvic inflammatory disease (40%), previous ectopic pregnancy (18%), and tubal surgery (16%). Additionally, 12% of the patients had a history of infertility treatment, and 10% were using intrauterine contraceptive devices (IUCDs). Table 3 provides a detailed overview of the identified risk factors.

Diagnostic Methods

Transvaginal ultrasonography was used as the primary diagnostic tool in all 85 cases, with a diagnostic accuracy of 98%. Serum beta-hCG levels were measured in all cases, with a mean level of $2,800 \pm 1,200$ mIU/mL at diagnosis. Laparoscopy was required in 15% of cases to confirm the diagnosis.

**Figure 1: Risk Factors Associated with Ectopic Pregnancy**

Management and Outcomes

Medical management with methotrexate was successful in 52% of cases. Surgical intervention was required in 48% of cases, with laparoscopy performed in 35% and laparotomy in 13% of the patients. The

overall treatment success rate was 92%, with a mean hospital stay of 4.5 ± 1.8 days. There were no maternal deaths during the study period. Table 4 summarizes the management and outcomes of ectopic pregnancies in the study.

Table 3: Management and Outcomes of Ectopic Pregnancy

Management Method	Number of Patients (n=85)	Percentage (%)
Medical Management		
Methotrexate	44	51.8
Surgical Management		
Laparoscopy	30	35.3
Laparotomy	11	12.9
Outcomes		
Successful Treatment	78	91.8
Requiring Further Intervention	7	8.2
Maternal Mortality	0	0.0
Mean Hospital Stay (days)	4.5 ± 1.8	-

Discussion

The present study comprehensively analyses ectopic pregnancies over 13 months in a tertiary care centre, focusing on incidence, risk factors, clinical presentation, diagnostic methods, and outcomes. The findings align with existing literature while also contributing new insights into the management of ectopic pregnancies in the region.¹

The incidence of ectopic pregnancy in this study was found to be 1%, which is consistent with the reported global incidence of 1-2%. Similar to previous studies, the majority of ectopic pregnancies occurred in women aged between 25-35 years. This age group is most associated with active reproductive life, thus making them more susceptible to the risk factors identified.

Abdominal pain and vaginal bleeding were the predominant symptoms in the current study, reported by 91% and 75% of patients, respectively. These findings are consistent with earlier reports by Stovall and Ling (1993)², who noted that abdominal pain and abnormal vaginal bleeding are the most common presenting symptoms in ectopic pregnancies. Syncope, although less common, was present in 20% of the cases, aligning with the findings of Walker et al. (2007)³, who reported a similar prevalence of syncope in ectopic pregnancy cases.

The study identified pelvic inflammatory disease (PID), previous ectopic pregnancy, and tubal surgery as the most significant risk factors, affecting 40%, 18%, and 16% of the patients, respectively. This is in agreement with findings from Bouyer et al. (2003)¹, who reported that PID and previous ectopic pregnancy are major risk factors. The association between tubal surgery and ectopic pregnancy risk is also well-documented, with

studies such as that by Mol et al. (1995) confirming a similar correlation.⁴

In contrast, the use of intrauterine contraceptive devices (IUCDs) was identified in 10% of the patients, which is consistent with previous research indicating that while IUCDs are generally protective against pregnancy, in rare cases where conception occurs, the risk of ectopic implantation is heightened. The study also noted a smaller percentage of patients with infertility treatment as a risk factor, consistent with findings from Clayton and Schieve (2001)⁵, which suggest that assisted reproductive technologies can increase the risk of ectopic pregnancies.

The accuracy of transvaginal ultrasonography in diagnosing ectopic pregnancies in this study was 98%, corroborating the high sensitivity and specificity reported in previous studies. Serum beta-hCG measurements were crucial in the diagnostic process, with findings comparable to those of Barnhart et al. (2002)⁶, who emphasized the role of serial beta-hCG levels in diagnosing ectopic pregnancies. The literature supports the use of laparoscopy as a diagnostic tool in uncertain cases, including the work of Yao and Tulandi (1997)⁷, which highlighted laparoscopy's role in confirming diagnosis when non-invasive methods are inconclusive.

Medical management with methotrexate was successful in 52% of cases in this study. This aligns with the success rates reported by Lipscomb et al. (1998)⁹, who found methotrexate to be an effective treatment option for selected patients with unruptured ectopic pregnancies. The need for surgical intervention in 48% of cases reflects the critical role of surgery, particularly in cases of tubal rupture or contraindications to medical

management, as also discussed by Hajenius et al. (2000).⁹

The overall success rate of 92% in managing ectopic pregnancies in this study is comparable to outcomes reported in similar studies. The absence of maternal mortality during the study period is noteworthy and emphasizes the importance of timely diagnosis and appropriate management, which is consistent with the findings of Bouyer et al. (2002).¹⁰

A key limitation of this study is its single-centre design, which may limit the generalizability of the findings to other populations. Additionally, the reliance on available medical records and patient recall could introduce information bias.

Conclusion

The findings of this study reinforce the importance of early diagnosis and appropriate management of ectopic pregnancies to reduce morbidity and prevent mortality. The study's outcomes are consistent with previous literature, indicating that the identified risk factors, clinical presentations, and management strategies align with established medical knowledge. However, continuous education and training for healthcare providers are essential to maintain and improve the management outcomes of ectopic pregnancies, especially in resource-limited settings.

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