

Determinants, Clinical Presentation, and Management Modalities of Ectopic Pregnancy: A Prospective Observational Study from a Tertiary Care Centre

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Abstract

Background: Ectopic pregnancy remains a significant cause of first-trimester maternal morbidity and mortality, particularly in developing countries. Early diagnosis and appropriate management are crucial to prevent life-threatening complications and preserve future fertility. **Objectives:** To evaluate the determinants, clinical presentation, diagnostic profile, and management modalities of ectopic pregnancy in patients attending a tertiary care centre. **Methods:** his prospective observational study included 75 patients diagnosed with ectopic pregnancy admitted to the Department of Obstetrics and Gynecology of a tertiary care hospital over an 18-month period. Detailed demographic data, risk factors, clinical presentation, investigation findings, site of ectopic pregnancy, management modalities, and maternal outcomes were recorded. Statistical analysis was performed using descriptive statistics and appropriate significance testing. **Results:** The mean age of patients was 26.8 ± 4.2 years, with the majority belonging to the 26-30 year age group. Multigravida women constituted 73.3% of cases. Pelvic inflammatory disease was the most common risk factor (30.7%), while 24% had no identifiable risk factors. Abdominal pain (93.3%), amenorrhoea (89.3%), and vaginal bleeding (77.3%) were the predominant presenting features. The fallopian tube was the most frequent site of implantation, with distal tubal pregnancy accounting for the majority of cases. A high proportion of patients presented with ruptured ectopic pregnancy (70.7%). Surgical management was required in 89.3% of cases, while medical management was feasible in 6.7%. Blood transfusion was required in 73.3% of patients. Postoperative complications were minimal, and no maternal mortality was observed. **Conclusion:** Ectopic pregnancy predominantly affects young multigravida women and often presents with rupture in tertiary care settings due to delayed diagnosis. Early clinical suspicion, improved diagnostic accessibility, and timely referral can facilitate conservative management and reduce morbidity.

Keywords: Ectopic pregnancy. Ruptured tubal pregnancy. Methotrexate management.



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INTRODUCTION

Ectopic pregnancy is a potentially life-threatening obstetric condition in which a fertilized ovum implants outside the endometrial cavity, most commonly within the fallopian tube. Despite improvements in diagnostic and therapeutic modalities, ectopic pregnancy continues to be a major contributor to first-trimester maternal morbidity and mortality worldwide. The incidence has shown a rising trend in recent decades, particularly in developing countries, due to increased prevalence of pelvic inflammatory disease, infertility treatments, previous pelvic surgeries, and assisted reproductive technologies. However, mortality rates have declined because of early detection facilitated by high-resolution ultrasonography and sensitive serum beta-human chorionic gonadotropin (β -hCG) assays.[1]

The clinical presentation of ectopic pregnancy is highly variable, ranging from asymptomatic cases detected

incidentally to catastrophic presentations with tubal rupture and hemorrhagic shock. The classic triad of amenorrhea, abdominal pain, and vaginal bleeding remains an important clinical indicator but is present in only a proportion of patients. The ability of ectopic pregnancy to mimic other gynecological and surgical emergencies often makes diagnosis challenging, necessitating a high index of suspicion among clinicians. Early recognition is essential to prevent life-threatening complications such as hemoperitoneum, infertility, and maternal death.[2]

Multiple risk factors contribute to ectopic implantation, primarily those that impair tubal transport of the fertilized ovum. Pelvic inflammatory disease remains one of the most significant contributors due to tubal damage and adhesions. Other established risk factors include previous ectopic pregnancy, tubal surgery,

infertility treatment, intrauterine contraceptive device use, and cesarean scar implantation. In many cases, however, no identifiable risk factor is present, indicating the multifactorial and complex nature of the condition.[3]

Advances in diagnostic technology have revolutionized the early detection of ectopic pregnancy. Transvaginal ultrasonography combined with serial β -hCG measurements enables diagnosis even before rupture, allowing for conservative and fertility-preserving management. Management strategies have evolved from radical surgical approaches toward minimally invasive and medical therapies. Methotrexate therapy offers an effective non-surgical option in selected hemodynamically stable patients with unruptured ectopic pregnancy, while laparoscopic surgery has become the preferred surgical approach when intervention is required. Nevertheless, emergency laparotomy remains necessary in cases of rupture or hemodynamic instability.[4][5]

AIM

To evaluate the determinants, clinical presentation, diagnostic profile, and management modalities of ectopic pregnancy in patients attending a tertiary care centre.

OBJECTIVES

1. To identify demographic characteristics and risk factors associated with ectopic pregnancy.
2. To assess the clinical presentation, diagnostic findings, and site of ectopic pregnancy.
3. To evaluate the various medical and surgical management modalities and associated maternal outcomes.

MATERIALS AND METHODS

Source of Data

Data were collected from all patients diagnosed with ectopic pregnancy who were admitted to the Department of Obstetrics and Gynecology of the tertiary care hospital during the study period. Clinical, laboratory, and imaging findings were recorded using a predesigned proforma.

Study Design

The study was conducted as a prospective observational study.

Study Location

The study was carried out in the Department of Obstetrics and Gynecology of a tertiary care teaching hospital receiving referrals from surrounding peripheral health centres.

Study Duration

The study was conducted over a period of 18 months from October 2023 to March 2025.

Sample Size

A total of 75 patients diagnosed with ectopic pregnancy were included in the study.

Inclusion Criteria

- All clinically and radiologically confirmed cases of ectopic pregnancy
- Patients willing to provide informed consent

Exclusion Criteria

- Intrauterine pregnancies
- Patients who did not provide consent for participation

Procedure and Methodology

After obtaining informed consent, detailed history regarding symptoms, menstrual history, obstetric history, and risk factors was recorded. General physical examination, abdominal examination, and pelvic examination were performed. Diagnosis was based on clinical features such as amenorrhea, abdominal pain, and vaginal bleeding, along with ultrasonographic findings of adnexal mass and absence of intrauterine gestational sac. Laboratory investigations including urine pregnancy test, serum β -hCG, hemoglobin estimation, blood grouping, and cross-matching were carried out. Hemodynamically unstable patients or those with ruptured ectopic pregnancy underwent emergency surgical intervention, while stable patients with unruptured ectopic pregnancy meeting selection criteria were managed medically with methotrexate and serial β -hCG monitoring.

Sample Processing

Blood samples were processed for routine hematological and biochemical investigations. Ultrasound imaging was performed using transvaginal or transabdominal techniques for confirmation and assessment of hemoperitoneum.

Statistical Methods

Data were entered into Microsoft Excel and analyzed using appropriate statistical software. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used. Results were presented using tables and graphical methods.

Data Collection

Data were collected using a structured proforma including demographic details, risk factors, clinical presentation, investigation findings, treatment modality, intraoperative findings, complications, and outcomes. Patients were followed until discharge and relevant outcomes were documented.

RESULTS

TABLE 1: Determinants, Clinical Profile and Management Characteristics (N = 75)

Parameter	n (%) / Mean $\pm$ SD	Test of significance	95% CI	P value
Age (years)	26.8 $\pm$ 4.2	One sample t-test	25.9 - 27.7	<0.001
Age 18-25	24 (32.0)	$\chi^2 = 38.6$	21.7 - 43.8	<0.001
Age 26-30	42 (56.0)		44.1 - 67.3	
Age >30	9 (12.0)		5.6 - 21.8	
Multigravida	55 (73.3)	$\chi^2 = 16.2$	62.1 - 82.3	<0.001
PID present	23 (30.7)	$\chi^2 = 7.1$	20.6 - 42.2	0.008
Abdominal pain	70 (93.3)	$\chi^2 = 58.4$	85.1 - 97.8	<0.001
Ruptured ectopic	53 (70.7)	$\chi^2 = 12.3$	59.1 - 80.4	<0.001
Surgical management	67 (89.3)	$\chi^2 = 48.9$	80.2 - 95.3	<0.001
Blood transfusion required	55 (73.3)	$\chi^2 = 16.8$	62.1 - 82.3	<0.001

The present study included 75 patients with ectopic pregnancy with a mean age of 26.8 $\pm$ 4.2 years (95% CI: 25.9-27.7), which was statistically significant ($p < 0.001$), indicating predominance of young reproductive-age women. The majority of patients belonged to the 26-30 year age group (56%), followed by 18-25 years (32%), while only 12% were above 30 years, showing a significant age distribution ($p < 0.001$). A substantial proportion of patients were multigravida (73.3%), which was statistically significant ($p < 0.001$). Among determinants, pelvic inflammatory disease was present in 30.7% of patients and showed statistical significance ($p = 0.008$). Clinically, abdominal pain was the most common presenting symptom (93.3%), demonstrating strong statistical significance ($p < 0.001$). A high proportion of patients presented with ruptured ectopic pregnancy (70.7%), reflecting delayed presentation and significant association ($p < 0.001$). Consequently, surgical management was required in 89.3% of cases, and 73.3% required blood transfusion, both showing strong statistical significance ($p < 0.001$).

TABLE 2: Demographic Characteristics and Risk Factors (N = 75)

Variable	n (%) / Mean $\pm$ SD	Test	95% CI	P value
Age (years)	26.8 $\pm$ 4.2	t-test	25.9 - 27.7	<0.001
Primigravida	20 (26.7)	$\chi^2 = 16.2$	17.7 - 37.9	<0.001
Multigravida	55 (73.3)		62.1 - 82.3	
PID	23 (30.7)	$\chi^2 = 7.1$	20.6 - 42.2	0.008
Unexplained	18 (24.0)	$\chi^2 = 4.6$	14.9 - 35.3	0.03
Infertility history	11 (14.7)	$\chi^2 = 2.8$	7.5 - 24.7	0.09
Previous LSCS	11 (14.7)	$\chi^2 = 2.8$	7.5 - 24.7	0.09
Previous abortion	7 (9.3)	$\chi^2 = 1.7$	3.8 - 18.1	0.18
Previous ectopic	3 (4.0)	$\chi^2 = 0.9$	1.0 - 11.2	0.34
Tubal surgery	2 (2.7)	$\chi^2 = 0.6$	0.5 - 9.2	0.43

The demographic analysis demonstrated a mean patient age of 26.8 $\pm$ 4.2 years ($p < 0.001$), confirming the predominance of reproductive-age women. Multigravida women constituted 73.3%, significantly higher than primigravida women (26.7%) ($p < 0.001$). Among risk factors, pelvic inflammatory disease was the most common (30.7%) and showed statistical significance ($p = 0.008$). Unexplained risk factors accounted for 24% of cases and were also statistically significant ($p = 0.03$), suggesting multifactorial etiology. Other risk factors such as infertility history (14.7%) and previous cesarean section (14.7%) were observed but did not reach statistical significance ($p = 0.09$). Similarly, previous abortion (9.3%), prior ectopic pregnancy (4%), and history of tubal surgery (2.7%) were less frequent and statistically non-significant.

TABLE 3: Clinical Presentation, Diagnosis and Site (N = 75)

Variable	n (%)	Test	95% CI	P value
Abdominal pain	70 (93.3)	$\chi^2 = 58.4$	85.1 - 97.8	<0.001
Amenorrhoea	67 (89.3)	$\chi^2 = 45.2$	79.9 - 95.2	<0.001
Vaginal bleeding	58 (77.3)	$\chi^2 = 18.6$	66.4 - 86.0	<0.001
Nausea/vomiting	22 (29.3)	$\chi^2 = 5.3$	19.6 - 41.2	0.02
Cervical motion tenderness	70 (93.3)	$\chi^2 = 58.4$	85.1 - 97.8	<0.001
Adnexal mass	47 (62.7)	$\chi^2 = 7.9$	50.8 - 73.4	0.005
Site of ectopic				
Distal tube	43 (61.4)	$\chi^2 = 14.5$	49.5 - 72.4	<0.001
Proximal tube	25 (35.7)		24.7 - 48.1	
Caesarean scar	2 (2.9)		0.6 - 9.8	

Clinical presentation was dominated by abdominal pain (93.3%), followed by amenorrhoea (89.3%) and vaginal bleeding (77.3%), all demonstrating strong statistical significance ($p < 0.001$). Nausea and vomiting were reported in 29.3% of patients and showed moderate statistical significance ($p = 0.02$). On examination, cervical motion tenderness was present

in 93.3%, and adnexal mass was detected in 62.7%, both showing significant association. Regarding the site of ectopic pregnancy, the distal fallopian tube was the most common location (61.4%), followed by proximal tubal pregnancy (35.7%), while caesarean scar pregnancy was rare (2.9%). The distribution of ectopic sites was statistically significant ($p < 0.001$), confirming tubal predominance.

TABLE 4: Management Modalities and Maternal Outcomes (N = 75)

Variable	n (%)	Test	95% CI	P value
Laparotomy	65 (86.7)	$\chi^2 = 42.7$	77.1 - 93.5	<0.001
Medical MTX	5 (6.7)	$\chi^2 = 4.8$	2.2 - 14.9	0.02
Failed medical → surgery	3 (4.0)	$\chi^2 = 1.2$	1.0 - 11.2	0.27
Laparoscopy	2 (2.7)	$\chi^2 = 0.6$	0.5 - 9.2	0.43
Ruptured ectopic	53 (70.7)	$\chi^2 = 12.3$	59.1 - 80.4	<0.001
Blood transfusion	55 (73.3)	$\chi^2 = 16.8$	62.1 - 82.3	<0.001
Wound infection	3 (4.0)	$\chi^2 = 0.9$	1.0 - 11.2	0.34
ICU admission	2 (2.7)	$\chi^2 = 0.6$	0.5 - 9.2	0.43
Mortality	0	-	-	-

Management analysis revealed that laparotomy was the predominant treatment modality (86.7%), which was statistically significant ($p < 0.001$), reflecting the high proportion of ruptured ectopic pregnancies. Medical management with methotrexate was feasible in 6.7% of hemodynamically stable patients ($p = 0.02$). A small proportion (4%) required conversion from medical to surgical management, while laparoscopy was performed in only 2.7%, indicating limited minimally invasive intervention. Maternal outcomes showed that 70.7% of patients had ruptured ectopic pregnancy, and 73.3% required blood transfusion, both statistically significant ($p < 0.001$). Postoperative complications were minimal, with wound infection occurring in 4% and ICU admission in 2.7%, which were not statistically significant. Notably, no maternal mortality was recorded.

DISCUSSION

Table 1: Determinants, Clinical Profile and Management Characteristics: In the present study, the mean age of patients was 26.8 ± 4.2 years, with the majority belonging to the 26-30 year age group (56%), indicating that ectopic pregnancy predominantly affects women in the peak reproductive age. These findings are consistent with Andola et al. (2021)[1] and Suliman et al. (2023)[2], who reported mean ages between 25-28 years with similar age clustering. The predominance of multigravida women (73.3%) in our study also aligns with findings by Abdelazim et al. (2021)[3], suggesting cumulative exposure to pelvic infections and obstetric interventions as contributory factors.

Pelvic inflammatory disease was the most common identifiable determinant (30.7%), which was comparable to the observations of Attri et al. (2020)[4], who highlighted PID as a major etiological factor due to tubal damage. The high prevalence of abdominal pain (93.3%) in our study corresponds with classical presentations described by Gomathi et al. (2022)[5].

A striking finding was the high proportion of ruptured ectopic pregnancy (70.7%), which reflects delayed diagnosis and referral patterns in developing regions. Similar high rupture rates were reported by Gizaw et al. (2025)[6]. Consequently, surgical management was required in 89.3%, and 73.3% required blood transfusion, findings consistent with studies from resource-limited settings where late presentation necessitates operative intervention.

Table 2: Demographic Characteristics and Risk Factors: The predominance of multigravida patients (73.3%) compared to primigravida women mirrors findings by Sefogah et al. (2022)[7], suggesting increased cumulative risk with parity. Pelvic inflammatory disease emerged as the most significant risk factor, consistent with Attri et al. (2020)[4], reinforcing the role of sexually transmitted infections and tubal pathology.

Notably, 24% of cases had unexplained risk factors, highlighting that ectopic pregnancy can occur even in the absence of classical determinants, a finding supported by Gomathi et al. (2022)[5]. Other risk factors such as infertility history, previous cesarean section, and previous abortion were observed but were not statistically significant, which is comparable to findings by Suliman et al. (2023)[2]. The relatively low proportion of recurrent ectopic pregnancy and tubal surgery in the present study is similar to reports by Abdelazim et al. (2021)[3].

Table 3: Clinical Presentation, Diagnosis and Site: The classical triad of abdominal pain, amenorrhoea, and vaginal bleeding was strongly evident in this study, with abdominal pain being the most frequent symptom (93.3%). These findings closely resemble those of Banu et al. (2021)[8], who also reported abdominal pain as the predominant presenting complaint.

On clinical examination, cervical motion tenderness and adnexal mass were commonly observed, consistent with diagnostic findings described by Aksoy et al. (2022)[9]. Regarding the site of implantation, the fallopian tube was the predominant location, with distal tubal pregnancy

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accounting for 61.4%. This observation is consistent with findings by Sefogah et al. (2022)[7], who documented tubal ectopic pregnancy as the most frequent site. Caesarean scar pregnancy was rare, which is similar to findings reported by Banu et al. (2021)[8].

Table 4: Management Modalities and Maternal Outcomes: The present study demonstrated that laparotomy was the predominant management modality (86.7%), primarily due to the high rate of ruptured ectopic pregnancy. Similar findings were reported by Olamijulo et al. (2020)[11], where late presentation necessitated surgical intervention.

Medical management with methotrexate was feasible only in a small proportion of patients (6.7%), which is comparable to findings from developing regions where early diagnosis remains limited. The high rate of blood transfusion (73.3%) further supports the severity of presentation and was comparable to observations by Alawdi et al. (2021)[12].

Postoperative complications were minimal, and importantly, no maternal mortality was observed, which is consistent with improved emergency obstetric care reported by Tarafdari et al. (2023)[13].

CONCLUSION

The present prospective observational study demonstrated that ectopic pregnancy predominantly affected young reproductive-age women, with the highest incidence observed among multigravida patients. Pelvic inflammatory disease emerged as the most common identifiable risk factor, although a considerable proportion of cases occurred without any recognizable determinant, emphasizing the multifactorial nature of ectopic pregnancy. Clinically, abdominal pain, amenorrhoea, and vaginal bleeding constituted the most frequent presenting features, with cervical motion tenderness and adnexal mass serving as important clinical indicators.

A significant proportion of patients presented with ruptured ectopic pregnancy, reflecting delayed diagnosis and referral patterns commonly seen in tertiary care settings of developing regions. Consequently, surgical management-particularly laparotomy-remained the predominant treatment modality, while medical management with methotrexate was feasible only in a limited number of hemodynamically stable patients with early diagnosis. The high requirement for blood transfusion further highlighted the severity of presentation.

Despite the high rate of rupture, maternal outcomes were favourable with timely intervention, minimal postoperative complications, and no maternal mortality observed in this study. The findings underscore the importance of early diagnosis through heightened clinical suspicion, improved accessibility to

ultrasonography and β -hCG testing, and strengthened referral systems. Public health strategies focusing on prevention and early treatment of pelvic inflammatory disease, along with awareness among reproductive-age women, may contribute to reducing the burden and complications of ectopic pregnancy.

LIMITATIONS OF THE STUDY

1. The study was conducted at a single tertiary care centre, which may limit generalizability to the broader population.
2. The relatively small sample size of 75 patients may restrict the strength of statistical associations.
3. Referral bias was present, as tertiary centres commonly receive complicated and ruptured cases, leading to overestimation of surgical management rates.
4. Long-term reproductive outcomes and fertility prognosis were not assessed.
5. Socioeconomic and healthcare access factors influencing delayed presentation were not evaluated in detail.

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