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Study on Ectopic Pregnancy — Presentation and Management

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ABSTRACT

Introduction: *Ectopic pregnancy (EP), the implantation of a fertilized ovum outside the uterine cavity, is a significant contributor to early pregnancy-related morbidity and mortality, particularly in low-resource settings like Bangladesh. Delayed diagnosis and restricted healthcare access contribute to poor outcomes, with tubal pregnancies being the most common.* ***Methods and materials:*** *This one-year cross-sectional study (January–December 2024) at Enam Medical College and Hospital, Dhaka, enrolled 80 ectopic pregnancy patients. Data on demographics, risk factors, clinical features, diagnostics, management, complications, and outcomes were collected. Ethical approval was obtained, and informed consent was secured from all participants.* ***Results:*** *The mean age of participants was 28.06 ± 4.70 years, with most being married (98.8%) and urban residents (97.5%). Risk factors included infertility (31.3%), abortion (15.0%), and PID (5.0%). Common symptoms were vaginal bleeding (97.5%) and abdominal pain (93.8%). USG showed an empty uterus and adnexal mass in 87.5% each, and free fluid in 68.8%. Most ectopic pregnancies were tubal (88.8%), mainly in the right tube (62.5%). Surgery was the primary treatment (83.7%), with laparotomy (62.5%) and salpingectomy (73.8%) most common, while methotrexate was used in 16.3%. Complications included ICU admission (11.3%) and one death (1.3%). Treatment type was significantly associated with outcomes ($p < 0.001$).* ***Conclusion:*** *Ectopic pregnancy remains a critical emergency in Bangladesh, with late presentations leading to higher surgical rates. Early diagnosis and access to conservative treatment options can reduce morbidity. A focus on improving diagnostic infrastructure and patient awareness is essential to improve outcomes.*

Keywords: *Ectopic-Pregnancy, Methotrexate, Salpingectomy, Ultrasonography, Bangladesh*

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INTRODUCTION

Ectopic pregnancy, defined as the implantation of a fertilized ovum outside the uterine cavity, remains a significant cause of maternal morbidity and mortality worldwide [1]. While the global incidence of ectopic pregnancy ranges from 1% to 2% of all reported pregnancies, the burden is disproportionately higher in low- and middle-income countries due to delayed diagnosis and limited access to timely healthcare services [2]. The condition, if not detected and managed promptly, can lead to life-threatening complications such as tubal rupture and internal hemorrhage [2]. Globally, ectopic pregnancy accounts for approximately 5%–10% of all pregnancy-related deaths in the first trimester [3]. In developing countries across Asia, including Bangladesh, the condition contributes notably to maternal mortality. In Bangladesh specifically, maternal health indicators have improved in recent years, but ectopic pregnancy continues to present as a critical emergency, especially in rural areas where healthcare resources are scarce [4]. A study from Dhaka Medical College Hospital reported that ectopic pregnancies constituted about 0.6% of all admissions in the obstetrics and gynecology department, with a high proportion of patients presenting late with ruptured tubes [5]. These patterns reflect diagnostic delays and the lack of awareness among patients and primary care providers. In South Asia, cultural and socioeconomic factors often compound the risk. For example, early marriage, high fertility rates, and unsafe abortion practices contribute to repeated pelvic infections and tubal damage, thereby increasing the risk of ectopic implantation [6]. In India, the incidence of ectopic pregnancy ranges between 1 in 112 to 1 in 130 pregnancies, with similar contributing factors observed [7]. Meanwhile, studies from Nepal and Pakistan also report increasing trends in ectopic pregnancies, particularly in urban tertiary centers where diagnostic tools such as transvaginal

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ultrasonography and β-hCG assays are more readily available [8]. The most common site for ectopic implantation is the fallopian tube, particularly the ampullary region [9]. Other less frequent but more dangerous locations include cervical, interstitial, ovarian, abdominal, and cesarean scar ectopic pregnancies. While the classical triad of symptoms—amenorrhea, vaginal bleeding, and lower abdominal pain—is well known, its presence is variable, often leading to diagnostic uncertainty [9]. The condition may be mistaken for threatened abortion, ruptured ovarian cysts, or pelvic inflammatory disease, particularly in settings where imaging support is limited [10]. The introduction of high-resolution ultrasonography and serial serum β-hCG testing has revolutionized the early diagnosis of ectopic pregnancy in high-income countries [11]. However, in regions like Bangladesh, access to such diagnostic tools remains inconsistent. As a result, many patients are diagnosed only after rupture, necessitating emergency surgery and increasing the risk of adverse outcomes [11]. In terms of management, methotrexate-based medical therapy is widely used in early, unruptured ectopic pregnancies in developed settings. However, surgical management—especially salpingectomy via laparotomy—remains the dominant approach in Bangladesh due to late presentation and the lack of facilities for conservative surgery or laparoscopy in many hospitals [12]. This study aimed to explore the clinical presentation and management strategies of ectopic pregnancy in a tertiary care setting in Bangladesh.

METHODS & MATERIALS

This descriptive cross-sectional study was conducted at the Department of Obstetrics and Gynecology, Enam Medical College and Hospital, Savar, Dhaka. The study duration was one year, from January 1 to December 31, 2024. A total of 80 female patients who were diagnosed clinically and radiologically with ectopic pregnancy and admitted during the study period were included. This study received ethical clearance from the institutional review board of Enam Medical College. Informed consent was obtained from all participants. Patients with uncertain diagnoses or incomplete records were excluded. Detailed data were collected using a structured case record form. Diagnostic evaluation involved transabdominal and, where available, transvaginal ultrasonography, along with serum β-hCG quantification. Additional parameters such as vital signs and laboratory investigations were noted on admission. Management approaches were categorized as medical or surgical. Patients suitable for medical treatment were administered methotrexate following standard protocol. Data on the duration of hospital stay were recorded. Treatment outcome was evaluated about the mode of management. Statistical analysis was performed using SPSS. The chi-square test was applied to determine associations between variables, and a p-value < 0.05 was considered statistically significant.

Inclusion criteria:

- Women with clinically and radiologically confirmed ectopic pregnancy
- All gestational ages
- All hemodynamic statuses

Exclusion criteria:

- Unconfirmed or suspected cases
- Incomplete clinical data
- Patients unwilling to participate

RESULTS

Among the recognized risk factors, a history of infertility was the most common, reported by 31.3% of patients. Other notable risk factors included a history of abortion (15.0%), pelvic inflammatory disease (5.0%), and previous ectopic pregnancy (2.5%). A history of tubal surgery was reported in 6.3% of cases. [Table I].

Table – I: Distribution of Sociodemographic Characteristics (*n* = 80)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean ± SD	28.06 ± 4.70	
Marital Status	Married	79	98.8
	Unmarried	1	1.2
Residence	Urban	78	97.5
	Rural	2	2.5
Education	No formal education	15	18.8
	Primary	3	3.8
	Secondary	30	37.5
	Higher	32	40.0
Occupation	Housewife	60	75.0
	Student/Service/Others	20	25.0

The most frequently reported symptom was vaginal bleeding (97.5%), followed closely by abdominal pain (93.8%). Shoulder tip pain and syncope/collapse were reported by 36.3% and 18.8%, respectively. [Table II].

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Table – II: Distribution of Obstetric and Risk Factor History (*n* = 80)

Risk Factor	Frequency (n)	Percentage (%)
Previous ectopic pregnancy	2	2.5
History of pelvic inflammatory disease (PID)	4	5.0
History of infertility	25	31.3
History of abortion	12	15.0
History of tubal surgery	5	6.3

The most frequently reported symptom was vaginal bleeding (97.5%), followed closely by abdominal pain (93.8%). Shoulder tip pain and syncope/collapse were reported by 36.3% and 18.8%, respectively. [Table III].

Table – III: Distribution of Clinical Presentations (*n* = 80)

Symptom	Frequency (n)	Percentage (%)
Vaginal bleeding	78	97.5
Abdominal pain	75	93.8
Shoulder tip pain	29	36.3
Syncope/collapse	15	18.8

On ultrasonography (USG), an empty uterus and adnexal mass were each observed in 87.5% of cases. Free fluid in the pouch of Douglas was present in 68.8%. Regarding the anatomical site, 88.8% of ectopic pregnancies were tubal, with the right tube being more commonly affected (62.5%) than the left (37.5%). Non-tubal ectopic pregnancies (scar, cervical, cornual) accounted for 11.2% of the cases. [Table IV].

Table – IV: Distribution of Physical and Diagnostic Findings (*n* = 80)

Finding	Frequency (n)	Percentage (%)
Empty uterus on USG	70	87.5
Adnexal mass	70	87.5
Free fluid in pouch of Douglas	55	68.8
Anatomical Site of EP		
• Tubal	71	88.8
• Non-tubal (scar, cervical, cornual)	9	11.2
Side of Tubal EP		
• Right	50	62.5
• Left	30	37.5

The mean pulse rate was 90.00 ± 7.94 bpm, with a range of 78–110 bpm. The mean systolic blood pressure was 100.14 ± 9.79 mmHg, while the diastolic pressure averaged 69.45 ± 9.41 mmHg. The mean serum β-hCG level was notably variable, with a mean of 10,107 ± 12,650 mIU/mL and a wide range from 1,300 to 50,000 mIU/mL. The average duration of amenorrhea was 6.28 ± 1.26 weeks, and the mean hospital stay was 4.30 ± 1.68 days. [Table V].

Table – V: Distribution of Clinical Parameters (Descriptive Statistics, *n* = 80)

Parameter	Mean ± SD	Range
Pulse (bpm)	90.00 ± 7.94	78–110
BP Systolic (mmHg)	100.14 ± 9.79	70–110
BP Diastolic (mmHg)	69.45 ± 9.41	40–80
Serum β-hCG (mIU/mL)	10,107 ± 12,650	1300–50000
Temperature (°C)	98.05 ± 0.45	96–99
Duration of amenorrhea (weeks)	6.28 ± 1.26	1–8
Hospital stays (days)	4.30 ± 1.68	2–10

Surgical management was the predominant approach (83.7%), whereas medical management using methotrexate was applied in 16.3% of cases. Among surgical interventions, salpingectomy was the most common procedure (73.8%). Regarding surgical routes, laparotomy was used in 62.5% of cases, while laparoscopy or vaginal approaches were used in 37.5%. [Table VI].

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Table – VI: Distribution of Management Approach and Surgical Interventions (*n* = 80)

Variable	Category	Frequency (n)	Percentage (%)
Type of management	Medical	13	16.3
	Surgical	67	83.7
Medical drug used	Methotrexate	13	16.3
Type of surgery	Salpingectomy	59	73.8
	Dilation and Curettage(D&C) and other	21	26.2
Route of surgery	Laparotomy	50	62.5
	Others (laparoscopy, vaginal)	30	37.5

According to this table, 80.0% of patients experienced no complications. However, ICU admission was required in 11.3%, hemorrhage occurred in 1.3%, and mortality was noted in 1.3%. Additionally, 6.3% of patients initially managed medically were later converted to laparotomy due to treatment failure. [Table VII].

Table – VII: Distribution of Complications during Management (*n* = 80)

Complication	Frequency (n)	Percentage (%)
Medical failure → Laparotomy	5	6.3
Hemorrhage	1	1.3
ICU admission	9	11.3
Mortality	1	1.3
No complications	64	80.0

A statistically significant association was found between the type of management and treatment outcomes ($p < 0.001$). Among the medically managed group, 2 patients (2.5%) required conversion to surgery, compared to 12 patients (15.0%) in the surgical group. Treatment success was observed in 11 (13.8%) of the medical group and 53 (66.3%) of the surgical group. No mortality occurred in the medical group, whereas 2 deaths (2.5%) occurred in the surgical group. [Table VIII].

Table – VIII: Association between Type of Management and Treatment Outcome in Ectopic Pregnancy (*n* = 80)

Outcome	Medical (n, %)	Surgical (n, %)	P value
Converted to Surgery	2 (2.5%)	12 (15.0%)	< 0.001
Mortality	0 (0.0%)	2 (2.5%)	
Treatment Successful	11 (13.8%)	53 (66.3%)	
Total	13 (16.3%)	67 (83.7%)	

DISCUSSION

Ectopic pregnancy continues to be a significant cause of maternal morbidity and mortality, especially in developing countries. This study aimed to evaluate the presentation, diagnostic parameters, and management outcomes of ectopic pregnancies in a tertiary care setting in Bangladesh, involving 80 clinically diagnosed cases. In this study, the mean age of patients was 28.06 ± 4.70 years, which is consistent with findings by Zhang et al. (2023), who reported the highest incidence of ectopic pregnancies in women aged 25–34 years [13]. Similarly, a study by Creanga et al. (2011) also found the peak age group to be in the late twenties to early thirties, reflecting the reproductive age range where such events are most prevalent [14]. The overwhelming majority of participants were married (98.8%) and urban dwellers (97.5%), suggesting better healthcare-seeking behavior and early diagnosis among this demographic. In contrast, a study in rural India by Raine-Bennett et al. (2022) reported higher rates among rural women, indicating geographic and healthcare access disparities in ectopic pregnancy diagnosis [15]. Regarding educational background, 40% of the women in our study had higher education, and 37.5% had secondary education, contrasting with studies in more rural or under-resourced areas, such as that by Jurkovic et al. (2011), where a higher proportion of patients had little to no formal education. This difference could influence early symptom recognition and prompt health-seeking behavior. Among risk factors, 31.3% of patients had a history of infertility, followed by 15% with a history of abortion, and 5% with pelvic inflammatory disease (PID). Our infertility rate is notably higher than the 20.5% reported by Strandell et al. (1999), indicating that subfertility remains a strong predictive factor for ectopic gestation in our context. PID is a well-established risk factor due to tubal damage, though our relatively low incidence (5.0%) may reflect underreporting or previous antibiotic use masking the symptoms [16]. In comparison, a study by Deng (2023) reported PID in approximately 30% of ectopic pregnancies in Western populations, suggesting a higher disease burden or more effective documentation practices [17]. Vaginal bleeding (97.5%) and abdominal pain (93.8%) were the most common presenting symptoms in our cohort, consistent with data from Gashawbeza et al. (2021), who

found these symptoms in over 90% of ectopic cases [18]. Shoulder tip pain (36.3%) and syncope (18.8%) were also observed, reflecting intraperitoneal bleeding, as previously described in a study [19]. These classical signs remain critical in suspecting ectopic pregnancy, especially in emergency settings where imaging may be delayed. Ultrasonographic findings were pivotal in our diagnosis. An empty uterus and adnexal mass were both observed in 87.5% of cases, while free fluid in the pouch of Douglas was present in 68.8%. These findings align closely with the study by Baker et al. (2023), which emphasized the value of transvaginal ultrasound in identifying adnexal masses and free pelvic fluid as indirect evidence of ectopic implantation. Our study confirms that such sonographic patterns remain highly sensitive diagnostic indicators. Most ectopic pregnancies in our study were tubal (88.8%), primarily affecting the right tube (62.5%). The predominance of tubal ectopics is well documented, with estimates ranging from 90–98% globally [20]. The right-sided predominance noted in our series has been similarly observed by Xia et al. (2019), though the exact etiopathogenesis for lateral preference remains unclear. Non-tubal ectopics, though rare (11.2%), pose significant diagnostic and surgical challenges, as also noted in case series by Brahmbhatt et al. (2020) [21]. The average serum β-hCG level was 10,107 ± 12,650 mIU/mL, which shows a wide variability and underlines the difficulty in relying on absolute β-hCG levels for diagnostic purposes, especially in early presentations. Our findings are in line with those who emphasized serial β-hCG measurement trends over single values in diagnosing ectopic pregnancies [22]. Management-wise, surgical intervention was required in 83.7% of patients, with laparotomy (62.5%) being more common than less invasive approaches. This high rate of surgical management reflects late presentation and lack of early diagnosis, in contrast to developed countries where medical management using methotrexate is increasingly successful. For example, Rayet al. (2022) reported methotrexate success rates of up to 66% in selected patients, compared to 16.3% in our study. This discrepancy may be attributed to delayed diagnosis, higher β-hCG levels, and lack of follow-up infrastructure in our setting (23). Salpingectomy (73.8%) was the most common surgical intervention, consistent with current surgical protocols for ruptured or extensively damaged fallopian tubes. Dilation and curettage (D&C) and other minor procedures constituted 26.2%, typically in cases of non-tubal ectopic pregnancies or where retained products of conception were suspected. These results align with the management strategies reported by Menon et al. (2007) [3]. Regarding complications, 80% of patients experienced no adverse events. However, 11.3% required ICU admission, and 1.3% mortality was recorded. A conversion rate of 6.3% from medical to surgical management was noted, underscoring the challenges of conservative treatment in advanced or unstable cases. A statistically significant association ($p < 0.001$) was found between type of management and treatment outcomes, affirming the importance of appropriate patient selection for medical versus surgical treatment. Similar findings were reported by Hajenius et al. (2007), emphasizing the superior success rates of surgery in emergency or high β-hCG cases.

Limitation of the Study:

This study had a single-center design, which may limit the applicability of the findings to wider populations.

CONCLUSION

Ectopic pregnancy remains a major contributor to maternal morbidity and mortality in Bangladesh, primarily due to delayed diagnosis and limited access to early interventions. This study highlights the predominance of surgical management, particularly salpingectomy via laparotomy, reflecting late presentations and the lack of resources for conservative care. To reduce the burden of ectopic pregnancy, health systems must prioritize early recognition through widespread access to transvaginal ultrasonography and serum β-hCG testing. Expanding the availability and training for medical management using methotrexate, particularly in non-ruptured cases, could reduce the need for invasive procedures. Strengthening primary healthcare capacity, especially in rural and under-resourced areas, along with public awareness initiatives, is essential for timely diagnosis, referral, and treatment—ultimately improving maternal health outcomes nationwide.

RECOMMENDATION

To reduce morbidity from ectopic pregnancy, efforts should focus on early diagnosis through expanded access to ultrasonography and β-hCG testing, especially in peripheral centers. Strengthening community awareness about warning signs and improving referral systems can promote timely intervention. Training healthcare providers in medical management protocols and enhancing surgical facilities where necessary will improve overall outcomes.

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