

Early Diagnosis and Treatment Outcomes of Unruptured Ectopic Pregnancy in a Tertiary Care Hospital

Pollobi Shaha^{1*} , Dalia Halder²

ARTICLE INFO

Received: 8 August 2026
Accepted: 15 August 2026
Published Online: 19 August 2026

DOI: 10.5281/zenodo.22014818

Volume: 10, Number: 1, Page: 267-272

e-ISSN: 2789-5912
ISSN: 2617-0817

*Corresponding author



ABSTRACT

Background: Ectopic pregnancy remains a significant cause of maternal morbidity, particularly when diagnosis is delayed and tubal rupture occurs. Early identification of unruptured ectopic pregnancy provides an opportunity for conservative treatment and improved maternal outcomes. Advances in transvaginal ultrasonography and serum β -hCG monitoring have enhanced early diagnosis and treatment selection. Aim of the study: This study aimed to evaluate the clinical characteristics, diagnostic approaches, treatment modalities, and early treatment outcomes of unruptured ectopic pregnancy in a tertiary care hospital. **Methods & Materials:** This prospective observational study was conducted in the Department of Obstetrics and Gynecology at a tertiary care hospital in Bangladesh over one year. A total of 150 women with confirmed unruptured ectopic pregnancy were included. Patients were categorized into medical management ($n=58$) and surgical management ($n=92$) groups. Demographic characteristics, clinical presentations, diagnostic findings, treatment approaches, complications, treatment success, and follow-up outcomes were assessed. Statistical analysis was performed using SPSS version 26.0, and $p<0.05$ was considered statistically significant. **Result:** The mean age of participants was 28.6 ± 5.2 years, and lower abdominal pain (85.33%) was the most common presenting symptom. Ampullary tubal pregnancy was the predominant ectopic site (72.00%). Medical management was performed in 38.67% of patients, while 61.33% underwent surgical treatment. Overall treatment success was achieved in 88.00% of cases. Treatment success was comparable between medical and surgical groups (86.21%

vs 89.13%, $p=0.61$). Surgical management was associated with shorter β -hCG resolution time (14.8 ± 5.6 vs 24.6 ± 8.2 days, $p<0.001$), whereas medical management resulted in shorter hospital stay (2.8 ± 1.1 vs 4.2 ± 1.5 days, $p<0.001$). Early presentation, β -hCG ≤ 5000 IU/L, adnexal mass ≤ 3 cm, absence of fetal cardiac activity, and early TVS diagnosis were significant predictors of successful outcomes. **Conclusion:** Early detection of unruptured ectopic pregnancy enables individualized treatment selection and favorable clinical outcomes. Both medical and surgical management approaches were effective when appropriately selected. Timely diagnosis through clinical assessment, β -hCG monitoring, and ultrasonography remains essential for reducing complications and improving reproductive outcomes.

Keywords: Unruptured ectopic pregnancy; Early diagnosis; β -hCG; Transvaginal ultrasonography; Methotrexate; Surgical management; Treatment outcome.

1. Honorary, Medical Officer/ Fcps part 2 trainee, Khulna Medical College Hospital, Khulna, Bangladesh (ORCID: 0009-0002-6235-1933)
2. Associate Professor, 250 bed General Hospital, Bagerhat, Bangladesh

INTRODUCTION

Ectopic pregnancy is a potentially life-threatening obstetric condition characterized by the implantation of a fertilized ovum outside the normal endometrial cavity. Although ectopic implantation can occur at various extrauterine sites, the fallopian tube remains the most common location, accounting for the majority of cases. This abnormal implantation can lead to serious maternal complications, particularly when diagnosis and treatment are delayed [1]. Although advances in diagnostic techniques, including improved ultrasonography and sensitive β -hCG assessment, along with evolving management strategies, have significantly improved clinical outcomes, ectopic pregnancy continues to remain a major cause of maternal morbidity and mortality, particularly during the first trimester of pregnancy. Early recognition and timely intervention are essential to prevent severe complications and improve maternal outcomes [2]. Unruptured ectopic pregnancy represents an early stage of the disease in which the gestational sac remains intact, providing an opportunity

for timely diagnosis and conservative management before the occurrence of tubal rupture and severe intra-abdominal bleeding [1]. The global incidence of ectopic pregnancy is estimated to be approximately 1–2% of all recognized pregnancies, although the prevalence varies across regions depending on healthcare access, diagnostic facilities, and the prevalence of associated risk factors [3]. In South Asian countries, including Bangladesh, ectopic pregnancy continues to pose a major reproductive health challenge due to delayed presentation, limited awareness, inadequate early pregnancy monitoring, and restricted access to specialized care in some settings. Ectopic pregnancy remains an important cause of maternal morbidity in Bangladesh, as many women present late with tubal rupture and require emergency surgical intervention [4]. However, improved availability of transvaginal ultrasonography and quantitative serum β -human chorionic gonadotropin (β -hCG) measurement has increased the detection rate of unruptured cases, allowing earlier therapeutic intervention [5]. Several risk factors have been associated with ectopic pregnancy,

including previous ectopic pregnancy, tubal surgery, pelvic inflammatory disease, infertility treatment, intrauterine contraceptive device use, previous pelvic infections, and smoking [2]. Early diagnosis depends on a combination of clinical assessment, serial β -hCG monitoring, and transvaginal ultrasonography [6]. The identification of unruptured ectopic pregnancy at an early stage is crucial because treatment options, including expectant management, medical therapy with methotrexate, and minimally invasive surgical procedures, can be selected based on patient characteristics, hemodynamic status, β -hCG levels, and ultrasonographic findings [7,8]. Despite advances in diagnosis and treatment, outcomes of ectopic pregnancy management vary considerably depending on the timing of diagnosis, available resources, and expertise of healthcare providers [9]. In low- and middle-income countries, delayed diagnosis often results in increased surgical intervention, blood transfusion requirements, and prolonged hospital stay [10]. Therefore, evaluating the clinical characteristics, diagnostic approaches, treatment modalities, and outcomes of

unruptured ectopic pregnancy is essential for improving early detection strategies and optimizing patient care. This study aimed to evaluate the early diagnosis and treatment outcomes of unruptured ectopic pregnancy in a tertiary care hospital, focusing on clinical presentation, diagnostic findings, treatment methods, and subsequent outcomes.

METHODS & MATERIALS

This prospective observational study was conducted in the Department of Obstetrics and Gynecology at Khulna Medical College Hospital. The study was carried out over a period of 1 year from January 2024 to December 2024. The study included 150 women of reproductive age with confirmed unruptured ectopic pregnancy. According to the treatment approach, patients were categorized into two groups:

Medical management group (n=58): Patients who received methotrexate therapy for unruptured ectopic pregnancy.

Surgical management group (n=92): Patients who underwent surgical treatment, including laparoscopic surgery or open surgery (laparotomy), for management of unruptured ectopic pregnancy.

Inclusion Criteria

- Women of reproductive age with confirmed ectopic pregnancy.
- Patients diagnosed with unruptured ectopic pregnancy based on clinical assessment, serum β -hCG measurement, and

transvaginal ultrasonography findings.

- Hemodynamically stable patients eligible for medical or surgical management.
- Patients who provided written informed consent and completed clinical follow-up.

Exclusion Criteria

- Patients with ruptured ectopic pregnancy or hemodynamic instability requiring emergency intervention.
- Patients with significant intra-abdominal hemorrhage.
- Patients with heterotopic pregnancy.
- Patients with contraindications to methotrexate therapy.
- Patients with incomplete clinical records or insufficient follow-up information.

Data Collection

Data were collected using a pretested structured form through patient interviews, clinical examination, medical records, laboratory reports, ultrasonography, operative notes, and follow-up records. Demographic data, obstetric history, previous abortion, cesarean delivery, ectopic pregnancy, infertility treatment history, and risk factors were documented. Clinical presentations, symptom duration, urine pregnancy test, serum β -hCG level, and transvaginal ultrasonography findings were recorded. Ultrasonographic parameters included ectopic site, adnexal mass size, gestational sac, fetal cardiac activity, and pelvic fluid status. Treatment details, including methotrexate regimen,

surgical procedures, and operative findings, were collected. Outcomes including treatment success, additional intervention, hospital stay, β -hCG resolution time, complications, readmission, and follow-up reproductive outcomes were assessed.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 26.0. Continuous variables were presented as mean $\pm$ SD, and categorical variables as frequency and percentage. Comparisons between treatment groups were performed using the independent *t*-test and Chi-square/Fisher's exact test. Univariate and multivariable logistic regression analyses were performed to identify predictors of successful treatment outcomes. Associations were presented as adjusted odds ratios (AORs) with 95% confidence intervals (CIs). A *p*-value of <0.05 was considered statistically significant.

RESULT

The mean age of the study population was 28.6 ± 5.2 years, with most participants aged 26–35 years (58.67%). The majority were from urban areas (57.33%). Nulliparous, primiparous, and multiparous women comprised 36.00%, 30.67%, and 33.33%, respectively. Previous abortion (25.33%) was the most common obstetric history, followed by cesarean delivery (21.33%), infertility treatment (9.33%), and previous ectopic pregnancy (8.00%). Previous pelvic surgery (14.67%) and pelvic inflammatory disease (12.00%) were the leading risk factors (Table I).

Table I
Baseline characteristics of study participants with unruptured ectopic pregnancy (*n*=150).

Variables	Frequency (n)	Percentage (%)
Age group		
<25 years	42	28.00
26–35 years	88	58.67
>35 years	20	13.33
Age (years), mean $\pm$ SD	28.6 $\pm$ 5.2	
Residence		
Urban	86	57.33
Rural	64	42.67
Parity		
Nulliparous	54	36.00
Primiparous	46	30.67
Multiparous	50	33.33
Previous obstetric history		
Previous abortion	38	25.33
Previous cesarean delivery	32	21.33
Previous ectopic pregnancy	12	8.00
Infertility treatment history	14	9.33
Risk factors		
Previous pelvic surgery	22	14.67
Pelvic inflammatory disease	18	12.00
IUCD use history	10	6.67

Lower abdominal pain was the most common presenting symptom (85.33%), followed by vaginal bleeding (69.33%) and amenorrhea (64.00%). Dizziness/weakness occurred in 21.33%, while 12.00% were diagnosed incidentally. Diagnosis was

made within ≤ 7 days in 41.33%, 8–14 days in 37.33%, and >14 days in 21.33% of cases. All patients had positive urine pregnancy tests, serum β -hCG assessment,

and transvaginal ultrasonography. The mean β -hCG level was 2850 ± 1620 IU/L, with 52.00% having levels of 1500–5000

IU/L, 29.33% <1500 IU/L, and 18.67% >5000 IU/L (Table II).

Table II

Clinical presentation and diagnostic characteristics of unruptured ectopic pregnancy.

Variables	Frequency (n)	Percentage (%)
Presenting symptoms		
Lower abdominal pain	128	85.33
Vaginal bleeding	104	69.33
Amenorrhea	96	64.00
Dizziness/weakness	32	21.33
Incidental diagnosis	18	12.00
Duration of symptoms before diagnosis		
≤ 7 days	62	41.33
8–14 days	56	37.33
>14 days	32	21.33
Diagnostic methods		
Urine pregnancy test positive	150	100.00
Serum β -hCG measurement	150	100.00
Transvaginal ultrasonography	150	100.00
Diagnostic laparoscopy	34	22.67
Initial serum β -hCG level		
<1500 IU/L	44	29.33
1500–5000 IU/L	78	52.00
>5000 IU/L	28	18.67
Mean β -hCG level (IU/L), mean $\pm$ SD	2850 $\pm$ 1620	

The ampullary tube was the predominant site of ectopic pregnancy (72.00%), followed by isthmic (16.00%), fimbrial (6.67%), ovarian (3.33%), and cervical/other sites (2.00%). Right-sided

involvement occurred in 54.67% of cases. An adnexal mass was detected in all patients, with a mean size of 2.8 ± 0.9 cm. A gestational sac was visualized in 30.67%, fetal cardiac activity in 8.00%, and

minimal pelvic fluid in 25.33% of cases (Table III).

Table III

Ultrasonographic and operative characteristics of unruptured ectopic pregnancy.

Variables	Frequency (n)	Percentage (%)
Site of ectopic pregnancy		
Ampullary tube	108	72.00
Isthmic tube	24	16.00
Fimbrial region	10	6.67
Ovarian ectopic	5	3.33
Cervical/other site	3	2.00
Side involved		
Right side	82	54.67
Left side	68	45.33
Ultrasound findings		
Adnexal mass detected	150	100.00
Mean adnexal mass size (cm), mean $\pm$ SD	2.8 $\pm$ 0.9	
Gestational sac visualized	46	30.67
Fetal cardiac activity present	12	8.00
Minimal pelvic fluid	38	25.33
No free fluid	112	74.67
Operative confirmation		
Unruptured tubal pregnancy confirmed	150	100.00

Regarding treatment, 38.67% of patients received medical management and 61.33% underwent surgery. Methotrexate single-dose and two-dose regimens were used in 28.00% and 10.67% of cases, respectively.

Surgical procedures included laparoscopy (37.33%) and laparotomy (24.00%), with salpingectomy (52.00%) being the most common procedure, followed by salpingostomy (9.33%). Overall treatment

success was achieved in 88.00%, while 12.00% required additional intervention (Table IV).

Table IV

Treatment modalities and early treatment outcomes.

Treatment approach	Frequency (n)	Percentage (%)
Medical management	58	38.67
Methotrexate single-dose regimen	42	28.00
Methotrexate two-dose regimen	16	10.67
Surgical management	92	61.33
Laparoscopic surgery	56	37.33
Open surgery (laparotomy)	36	24.00
Surgical procedures		
Salpingectomy	78	52.00
Salpingostomy	14	9.33
Overall treatment outcome		
Successful resolution	132	88.00
Additional intervention required	18	12.00
Conversion from medical to surgery	14	9.33

Treatment success was similar between medical and surgical groups (86.21% vs 89.13%, $p=0.61$). Medical management had a shorter hospital stay (2.8 ± 1.1 vs 4.2 ± 1.5 days, $p<0.001$), whereas surgical management achieved faster β -hCG resolution (14.8 ± 5.6 vs 24.6 ± 8.2 days, $p<0.001$) (Table V).

Table V

Comparison of treatment outcomes between medical and surgical management groups.

Outcome parameters	Medical group (n=58)	Surgical group (n=92)	p-value
Treatment success	50 (86.21%)	82 (89.13%)	0.61
Mean hospital stay (days), mean $\pm$ SD	2.8 ± 1.1	4.2 ± 1.5	<0.001
Mean time to β -hCG resolution (days), mean $\pm$ SD	24.6 ± 8.2	14.8 ± 5.6	<0.001
Blood transfusion requirement	2 (3.45%)	8 (8.70%)	0.2
Post-treatment infection	1 (1.72%)	5 (5.43%)	0.4
Readmission within 30 days	3 (5.17%)	4 (4.35%)	0.82

Successful outcomes were independently associated with presentation within 7 days (aOR 3.62, $p=0.003$), β -hCG ≤ 5000 IU/L (aOR 4.15, $p=0.002$), adnexal mass ≤ 3 cm (aOR 3.08, $p=0.011$), absence of fetal cardiac activity (aOR 5.21, $p=0.006$), minimal pelvic fluid (aOR 2.74, $p=0.034$), and early TVS diagnosis (aOR 3.89, $p=0.008$) (Table VI).

Table VI

Predictors of successful early treatment outcome in unruptured ectopic pregnancy (multivariable logistic regression analysis).

Predictors	aOR	95% CI	p-value
Age ≤ 35 years	1.84	0.72–4.68	0.2
Presentation within 7 days	3.62	1.52–8.63	0.003
Initial β -hCG ≤ 5000 IU/L	4.15	1.72–10.01	0.002
Adnexal mass size ≤ 3 cm	3.08	1.29–7.34	0.011
Absence of fetal cardiac activity	5.21	1.61–16.84	0.006
No/minimal pelvic fluid	2.74	1.08–6.93	0.034
Early diagnosis by TVS	3.89	1.42–10.63	0.008

During follow-up, complete β -hCG resolution occurred in 88.00%, 78.67%, subsequent intrauterine pregnancy occurred in 16.00%, recurrent ectopic pregnancy occurred in 4.00%, and 8.00% were lost to follow-up (Table VII).

Table VII

Follow-up outcomes after treatment of unruptured ectopic pregnancy.

Follow-up outcomes	Frequency (n)	Percentage (%)
Complete β -hCG resolution achieved	132	88.00
Mean duration of follow-up (weeks), mean $\pm$ SD		8.4 ± 2.6
Return of menstruation within 3 months	118	78.67
Subsequent intrauterine pregnancy (among trying couples)	24	16.00
Recurrent ectopic pregnancy	6	4.00
Lost to follow-up	12	8.00

DISCUSSION

Ectopic pregnancy remains one of the most important causes of early pregnancy-related morbidity, and its outcome largely depends on timely diagnosis before tubal rupture occurs [11]. The present study

evaluated 150 women with unruptured ectopic pregnancy and demonstrated favorable outcomes following early diagnosis and individualized management. The mean age of women in the present study was 28.6 ± 5.2 years, with the

majority (58.67%) belonging to the 26–35 years age group. Similar age patterns have been reported in previous studies, where ectopic pregnancy was most frequently observed among women in their late twenties and early thirties. In a study by

Gaskins et al., ectopic pregnancy was predominantly identified among women of reproductive age, particularly between 24 and 44 years. The higher frequency in this age group may reflect increased pregnancy rates, exposure to reproductive risk factors, and previous obstetric interventions during these years [12]. Regarding obstetric characteristics, 36% of women in the present study were nulliparous, while previous abortion (25.33%) and previous cesarean delivery (21.33%) were commonly observed. Similar findings were reported by Barnhart et al., who identified previous tubal damage, pelvic surgery, and previous pregnancy-related complications as important risk factors for ectopic implantation [13]. The most frequent clinical presentations in this study were lower abdominal pain (85.33%), vaginal bleeding (69.33%), and amenorrhea (64%). These findings are comparable with previous studies reporting abdominal pain and vaginal bleeding as the most common symptoms of ectopic pregnancy. Crochet et al. demonstrated that abdominal pain and vaginal bleeding remain the major presenting complaints, although clinical symptoms alone have limited diagnostic accuracy [14]. All patients in the present study underwent serum β -hCG measurement and TVS, emphasizing the importance of combined biochemical and imaging evaluation. The mean initial β -hCG level was 2850 ± 1620 IU/L, and 81.33% of patients had β -hCG levels ≤ 5000 IU/L. Previous studies have shown that lower initial β -hCG concentration is strongly associated with successful medical management. Studies by Kirk et al. & Nowak-Markwitz et al. also found that women with lower baseline β -hCG levels had significantly higher rates of methotrexate success. Similarly, the present study identified initial β -hCG ≤ 5000 IU/L as an independent predictor of successful treatment outcome (aOR=4.15, 95% CI: 1.72–10.01, $p=0.002$) [15,16]. The ampullary region was the most common site of ectopic pregnancy in the present study (72%), followed by the isthmic region (16%). This distribution is consistent with previous epidemiological studies demonstrating that approximately 70% of tubal ectopic pregnancies occur in the ampulla. According to Bouyer et al., the ampulla is the most frequent site because of its longer anatomical segment and favorable environment for implantation [17]. In the current study, most women had no free pelvic fluid (74.67%), and fetal cardiac activity was detected in only 8% of cases, suggesting that diagnosis was achieved before advanced tubal damage occurred. Treatment selection in unruptured ectopic pregnancy depends on hemodynamic stability, β -hCG level, ultrasound findings, and patient preference. In the present study, 38.67% of women received medical

management with methotrexate, whereas 61.33% underwent surgical treatment. The overall success rates were comparable between medical and surgical groups (86.21% vs. 89.13%, $p=0.61$). Studies by Hajenius et al. & Saraj et al. demonstrated that systemic methotrexate was an effective alternative to laparoscopic surgery in selected women with unruptured ectopic pregnancy [18,19]. Although surgical management resulted in faster β -hCG resolution in the present study (14.8 ± 5.6 vs. 24.6 ± 8.2 days, $p<0.001$), medical management was associated with a shorter hospital stay (2.8 ± 1.1 vs. 4.2 ± 1.5 days, $p<0.001$). These findings are consistent with previous evidence indicating that methotrexate can reduce hospitalization and avoid surgical morbidity, while surgery provides immediate removal of ectopic tissue and faster biochemical resolution. Therefore, treatment choice should be individualized rather than based on a single approach [20]. The multivariable logistic regression analysis identified several factors associated with successful early treatment outcomes. Early presentation within 7 days (aOR=3.62), initial β -hCG ≤ 5000 IU/L (aOR=4.15), adnexal mass size ≤ 3 cm (aOR=3.08), absence of fetal cardiac activity (aOR=5.21), and early diagnosis by TVS (aOR=3.89) were significant predictors. These findings are consistent with previous studies that identified low β -hCG levels, smaller ectopic mass size, absence of embryonic cardiac activity, and minimal pelvic fluid as favorable criteria for conservative treatment [21]. Follow-up outcomes in the present study were favorable, with complete β -hCG resolution achieved in 88% of patients. Return of menstruation within three months occurred in 78.67% of women, and subsequent intrauterine pregnancy was achieved in 16% among couples attempting conception. Previous studies have demonstrated that fertility outcomes after conservative management of ectopic pregnancy are generally comparable to surgical approaches, particularly when tubal preservation is possible [22]. The recurrent ectopic pregnancy rate in the current study was 4%, which is within the range reported in previous literature [23].

LIMITATIONS

This study was conducted at a single tertiary care hospital with a relatively limited sample size, which may restrict the generalizability of the findings to other healthcare settings. As an observational study, treatment allocation was based on clinical criteria rather than randomization, which may have introduced selection bias. Long-term fertility outcomes were assessed only among available follow-up participants, and some patients were lost to follow-up. Further multicenter studies with larger populations and extended follow-up

are recommended to validate these findings.

CONCLUSION

Early diagnosis of unruptured ectopic pregnancy through timely clinical evaluation, serum β -hCG assessment, and transvaginal ultrasonography allows effective management before life-threatening complications develop. In this study, both medical and surgical approaches demonstrated favorable treatment outcomes, with an overall success rate of 88%. Lower initial β -hCG levels, smaller adnexal mass size, early presentation, absence of fetal cardiac activity, minimal pelvic fluid, and early ultrasonographic diagnosis were significant predictors of successful outcomes. Methotrexate therapy provided effective conservative management in selected patients, whereas surgical intervention ensured definitive treatment when required. Strengthening early pregnancy assessment and referral systems may improve outcomes and reduce maternal morbidity associated with ectopic pregnancy.

FUNDING

No funding sources

CONFLICT OF INTEREST

None declared

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

REFERENCES

1. Vadakekut ES, Gnugnoli DM. Ectopic pregnancy. StatPearls [Internet]. 2025 Jan.
2. Sivalingam VN, Duncan WC, Kirk E, Shephard LA, Horne AW. Diagnosis and management of ectopic pregnancy. Journal of family planning and reproductive health care. 2011 Oct 1;37(4):231-40.
3. Cao X, Yu Z, Wu S. Frontier and Inequality Analyses of the Global Burden of Ectopic Pregnancy: Insights from the GBD 2021. International Journal of Women's Health. 2025 Dec 31;5807-23.
4. Afroz S, Nasrin R, Begum S. Study on Ectopic Pregnancy—Presentation and Management. The Insight. 2025 Oct 14;8(02):274-9.
5. Jahan S, Das TR, Habib SH, Jahan A, Joarder M, Nahar N, Banarjee M. A comparative study between laparoscopic management of ectopic pregnancy and laparotomy: experience in tertiary care hospital in bangladesh: a prospective trial. Bangladesh Journal of Endosurgery. 2014 Jul 18;2(1):1-4.
6. Murray H, Baakdah H, Bardell T, Tulandi T. Diagnosis and treatment of ectopic pregnancy. Cmaj. 2005 Oct 11;173(8):905-12.
7. Barash JH, Buchanan EM, Hillson C. Diagnosis and management of ectopic pregnancy. American family physician. 2014 Jul 1;90(1):34-40.

8. guideline NG126 NI. Ectopic pregnancy and miscarriage: diagnosis and initial management.
9. National Guideline Alliance (UK). Expectant versus medical management of tubal ectopic pregnancy: Ectopic pregnancy and miscarriage: diagnosis and initial management: Evidence review B. London: National Institute for Health and Care Excellence (NICE); 2019 Apr. (NICE Guideline No. 126). Available from: <https://www.ncbi.nlm.nih.gov/books/NBK576538/>
10. Lina KS, Khanom ME, Zahan N. Pattern of Presentation and Management of Ectopic Pregnancy in Tertiary Care Hospital. TAJ: Journal of Teachers Association. 2026 Mar 1;39(1):63-70.
11. UK NG. Diagnostic accuracy of ultrasound features for tubal ectopic pregnancy.
12. Gaskins AJ, Missmer SA, Rich-Edwards JW, Williams PL, Souter I, Chavarro JE. Demographic, lifestyle, and reproductive risk factors for ectopic pregnancy. *Fertility and sterility*. 2018 Dec 1;110(7):1328-37.
13. Barnhart KT, Sammel MD, Gracia CR, Chittams J, Hummel AC, Shaunik A. Risk factors for ectopic pregnancy in women with symptomatic first-trimester pregnancies. *Fertility and sterility*. 2006 Jul 1;86(1):36-43.
14. Crochet JR, Bastian LA, Chireau MV. Does this woman have an ectopic pregnancy?: the rational clinical examination systematic review. *Jama*. 2013 Apr 24;309(16):1722-9.
15. Kirk E, Condous G, Van Calster B, Haider Z, Van Huffel S, Timmerman D, Bourne T. A validation of the most commonly used protocol to predict the success of single-dose methotrexate in the treatment of ectopic pregnancy. *Human Reproduction*. 2007 Mar 1;22(3):858-63.
16. Nowak-Markwitz E, Michalak M, Olejnik M, Spaczynski M. Cutoff value of human chorionic gonadotropin in relation to the successful treatment of ectopic pregnancy. *Fertility and sterility*. 2009 Oct 1;92(4):1203-7.
17. Bouyer J, Coste J, Fernandez H, Pouly JL, Job-Spira N. Sites of ectopic pregnancy: a 10 year population-based study of 1800 cases. *Human reproduction*. 2002 Dec 1;17(12):3224-30.
18. Hajenius PJ, Engelsbel S, Mol BW, Van der Veen F, Ankum WM, Bossuyt PM, Hemrika DJ, Lammes FB. Randomised trial of systemic methotrexate versus laparoscopic salpingostomy in tubal pregnancy. *The Lancet*. 1997 Sep 13;350(9080):774-9.
19. Saraj AJ, Wilcox JG, Najmabadi S, Stein SM, Johnson MB, Paulson RJ. Resolution of hormonal markers of ectopic gestation: a randomized trial comparing single-dose intramuscular methotrexate with salpingostomy. *Obstetrics & Gynecology*. 1998 Dec 1;92(6):989-94.
20. Fernandez H, Yves Vincent SC, Pauthier S, Audibert F, Frydman R. Randomized trial of conservative laparoscopic treatment and methotrexate administration in ectopic pregnancy and subsequent fertility. *Human reproduction (Oxford, England)*. 1998 Nov 1;13(11):3239-43.
21. Lipscomb GH, McCord ML, Stovall TG, Huff G, Portera SG, Ling FW. Predictors of success of methotrexate treatment in women with tubal ectopic pregnancies. *New England Journal of Medicine*. 1999 Dec 23;341(26):1974-8.
22. de Bennetot M, Rabischong B, Aublet-Cuvelier B, Belard F, Fernandez H, Bouyer J, Canis M, Pouly JL. Fertility after tubal ectopic pregnancy: results of a population-based study. *Fertility and sterility*. 2012 Nov 1;98(5):1271-6.
23. Panelli DM, Phillips CH, Brady PC. Incidence, diagnosis and management of tubal and nontubal ectopic pregnancies: a review. *Fertility research and practice*. 2015 Oct 15;1(1):15.