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Case Report

Multimodal Conservative Management of Nulliparous Female with Cervical Ectopic Pregnancy: A Case Report

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ARTICLE INFO

Article history:
Received 1 Jul. 2025
Received in revised form 9 Sep. 2025
Accepted 19 Sep. 2025
Published 10 Oct. 2025

Keywords:
Cervical ectopic
Cervical ectopic pregnancy
Conservative management
Multimodal
Nulliparous

ABSTRACT

Cervical ectopic pregnancy is an extremely rare condition with catastrophic sequelae if timely, appropriate management is not performed. While established risk factors include previous cervical surgery, multiple cesarean sections, aggressive curettage, and IVF procedures, our patient had no such predisposing factors – presenting only demographic characteristics of nulliparity and young age. Nulliparity and young age are the most challenging points for fertility conservation, and multimodal conservative management is a highly successful option for appropriately selected patients.

A 22-year-old nulliparous patient presented to our tertiary university hospital for a viable 8-week cervical ectopic pregnancy after failure of treatment with two doses of methotrexate. At 6-month follow-up, β-hCG normalized to <2 mIU/mL, regular menstruation resumed, and transvaginal ultrasound showed complete cervical healing with preserved anatomy. Confirmation of the diagnosis was achieved, and our team selected a multimodal conservative management approach. During admission, severe bleeding was recognized early on, and the patient was successfully handled with satisfactory fertility preservation outcomes.

Fertility preservation is the most challenging point when dealing with cervical ectopic pregnancy, especially in young nulliparous women. However, the best way to manage cervical ectopic pregnancy has not yet been confirmed, and multimodal conservative management can be an effective method.

1. Introduction

Cervical ectopic pregnancy is an extremely rare subtype of ectopic pregnancy, accounting for approximately 1% of all ectopic pregnancies, and occurs in approximately one in 1000 pregnancies [1, 2]. Various risk factors have been identified, including previous endometrial or cervical surgeries, aggressive dilatation and curettage, intrauterine device use, and $\geq$ 2 cesarean sections. Prior ectopic pregnancy, chromosomal abnormalities, and in vitro fertilization are also considered risk factors. Despite these known risk factors, cases involving nulliparous women without any predisposing factors have been reported [3, 4, 5, 6, 7].

Early diagnosis of cervical ectopia is mandatory due to the risk of catastrophic vaginal bleeding, which may necessitate hysterectomy [1]. Transvaginal ultrasound, often supplemented with 3D imaging, is the gold standard for distinguishing cervical abortion from cervical ectopic abortion. Key distinguishing features include an empty endometrium, the presence of the gestational sac within the cervical canal, a closed internal os, a partially opened external os, peritrophoblastic blood flow visualized by colour Doppler, and a negative sliding test of the gestational sac against the cervical canal, which is positively observed in cases of cervical abortion [8, 1, 9].

Many treatment modalities exist, but none have been proven to be superior to the others. These modalities include intramuscular methotrexate injection, either as a single dose or in a multidose regimen. Additionally, options such as ultrasound-guided injection of potassium chloride alone or in combination with local methotrexate into the conceptus, followed by dilatation and evacuation, with or without dilute vasopressin cervical infiltration, and either ultrasound or hysteroscopic-guided evacuation, followed by Foley catheter placement or cerclage acting as a tamponade, are available. Laparoscopic resection and uterine artery embolization followed by evacuation are also viable options [9, 2]. Methotrexate injection alone can be ineffective in patients whose beta-hCG concentration exceeds 10,000 IU/L and/or whose gestational age is greater than 9 weeks. Multimodal conservative management, which involves more than one line of treatment, is a relatively new area with satisfactory results, especially in young, stable, nulliparous patients, where preservation of fertility is a primary concern [10, 8, 11].

In this case report, we present a unique case of cervical ectopic pregnancy in a 22-year-old nulliparous female, highlighting the challenges in diagnosis and management, as well as the utilization of multimodal conservative treatment approaches to preserve fertility and achieve favorable outcomes.

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Published by the American Society for Inclusion, Diversity, and Equity in Healthcare (ASIDE). ISSN (Print) 3066-7224, ISSN (Online) 3066-7232. Hosting by ASIDE Journals.

Citation: Elshatby BF, Marey A, Elgammal HH, Bakr HA, Gamal MH. Multimodal Conservative Management of Nulliparous Female with Cervical Ectopic Pregnancy: A Case Report. ASIDE Case Reports. 2025;2(2):20-25, doi:10.71079/ASIDE.CR.101025156

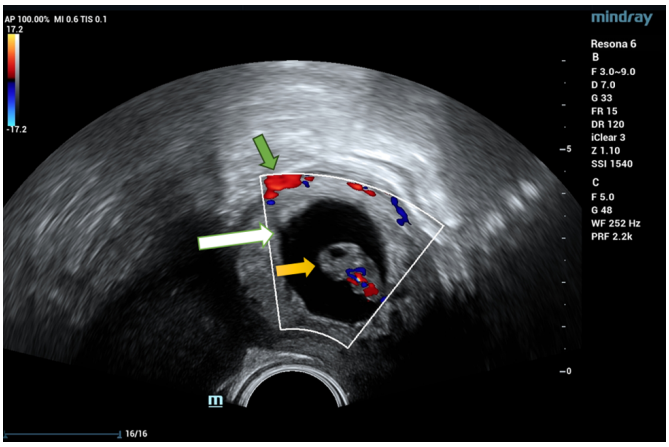

Figure 1: Transvaginal ultrasound with color Doppler demonstrating an intracervical gestational sac (white arrow) containing a pulsating fetal pole (yellow arrow) consistent with 8 weeks of gestation. Peritrophoblastic vascularity (green arrow) is clearly visible on color Doppler imaging, confirming a viable cervical ectopic pregnancy. The gestational sac is located below the level of the internal cervical os, distinguishing this condition from intrauterine pregnancy. Note the characteristic cervical enlargement and the absence of normal uterine cavity implantation.

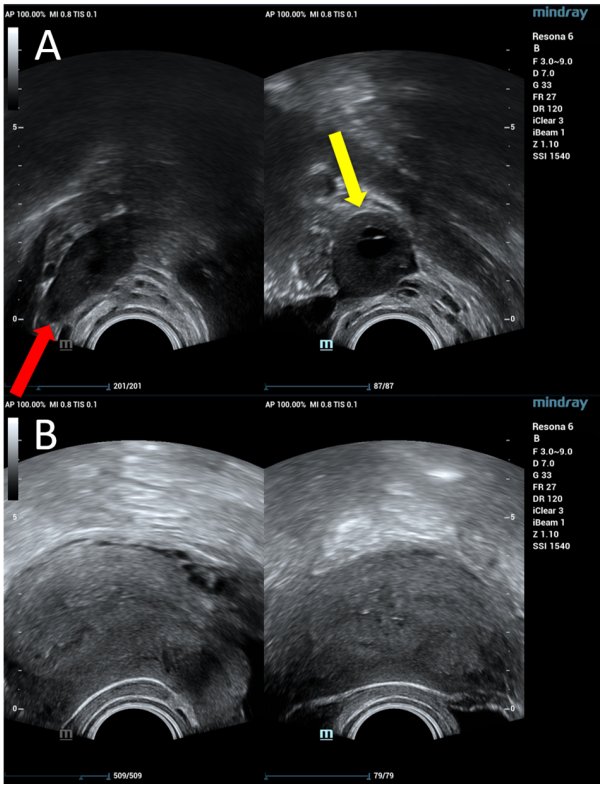

Figure 2: Transvaginal ultrasound systematically excluding tubal ectopic pregnancy, showing (A) normal right adnexa (red arrow) and left adnexa (yellow arrow) with no evidence of extraovarian masses or tubal distension, and (B) empty uterine cavity with normal endometrial stripe thickness, confirming absence of intrauterine pregnancy. The systematic evaluation of both adnexal regions is crucial for differential diagnosis, as tubal ectopic pregnancy represents the most common form of extrauterine pregnancy.

2. Case presentation

A 22-year-old nulliparous female patient at 8 weeks of gestation presented to our outpatient clinic at El Shatby Maternity Hospital (a tertiary referral center in Alexandria, Egypt) on February 6, 2024. She was referred by her private doctor to our hospital after the diagnosis of cervical ectopic pregnancy and received two doses of intramuscular methotrexate 2 days a day. βhCG levels of 43,000, 61,000, and 57,000 mIU/mL on January 25, January 28, and February 4, 2024, respectively. The initial 42% rise (43,000→61,000 mIU/mL) indicated methotrexate resistance, while the subsequent 7% decline (61,000→57,000 mIU/mL) showed minimal treatment response, necessitating alternative management. Ultrasound imaging was performed at our specialized ultrasound unit, confirming the diagnosis of a viable ectopic pregnancy at 8 weeks of gestation. The scan revealed a gestational sac with a pulsating fetal pole surrounded by peritrophoblastic vascularity, an empty uterus, a closed internal os, and a free adnexa (**Figures 1–3**). The patient was admitted to the ward, where she underwent thorough general

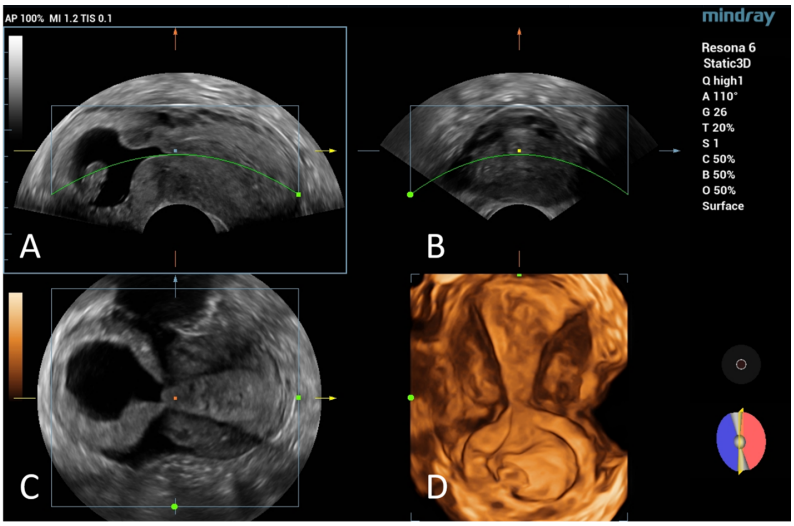

Figure 3: Three-dimensional ultrasound multiplanar reconstruction of cervical ectopic pregnancy demonstrating coronal sections (A, C) and longitudinal section (B) of the cervical pregnancy, providing comprehensive spatial orientation of the gestational sac within cervical tissue. Panel (D) shows a 3D surface rendering of the coronal section, clearly delineating the relationship between the gestational sac and cervical anatomy. The multiplanar approach confirms the gestational sac location below the internal os level and enhances diagnostic confidence.

Figure 4: Intraoperative setup for ultrasound-guided intrafetal injection of potassium chloride and methotrexate as part of multimodal conservative management. The image shows the prepared medications and sterile surgical instruments required for the precise procedure. This conservative approach aims to achieve fetal demise while preserving maternal fertility in appropriately selected cases, requiring expertise in ultrasound-guided interventions.

and local examinations, which revealed only minimal painless vaginal bleeding. Vital signs on admission were stable: blood pressure 120/75 mmHg, heart rate 82 bpm, temperature 36.8°C. The complete blood count showed a hemoglobin level of 12.1 g/dL and a hematocrit of 36.2%. A comprehensive pelvic ultrasound excluded other ectopic sites. No comorbidities were identified.

The laboratory results were unremarkable. Following consultation with ultrasound specialists, the diagnosis was confirmed, and a consensus was reached to pursue multimodal conservative management due to the patient's young age, nulliparity, and stable general condition. The decision was discussed with the patient, and informed consent was obtained.

2.1. Clinical Timeline and Management Rationale

The patient's clinical course followed a structured approach with clear decision points:

2.1.1. Day 1 (February 6, 2024)

Patient admitted with stable hemodynamics (BP 120/75 mmHg, HR 82 bpm), β-hCG 57,000 mIU/mL. Initial assessment confirmed a viable cervical ectopic pregnancy with no signs of active bleeding.

2.1.2. Day 2 (February 7, 2024):

Comprehensive patient counseling regarding treatment options was conducted. A multidisciplinary team discussion involving maternal-fetal medicine, ultrasound specialists, and gynecologic surgery resulted in consensus for multimodal conservative management given the patient's age, nulliparity, and stable condition.

2.1.3. Day 3 (February 8, 2024)

Local potassium chloride and methotrexate intrafetal injection was performed in the operating room(**Figure 4**) due to viable pregnancy and high β-hCG levels (>50,000 mIU/mL) that preclude systemic therapy success. The procedure was completed successfully with no intraoperative bleeding.

2.1.4. Day 5 (February 10, 2024)

The patient developed acute vaginal bleeding with approximately 400 mL of blood loss. Laboratory results showed hemoglobin dropped from 12.1 g/dL to 9.8 g/dL, requiring immediate crystalloid and colloid resuscitation to maintain hemodynamic stability.

2.1.5. Day 5 (evening)

Emergency dilatation and evacuation with cervical cerclage placement was performed for hemostasis. The bleeding was successfully

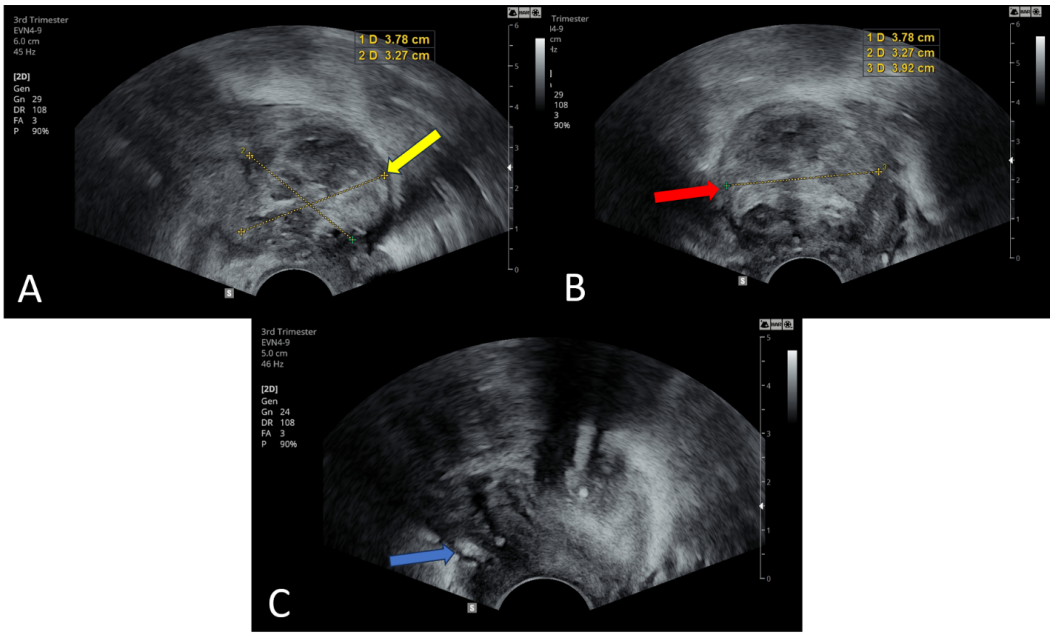

Figure 5: Post-evacuation transvaginal ultrasound assessment demonstrating (A) measurement of intracervical hematoma with anteroposterior and longitudinal diameters (yellow arrow showing measurement calipers), (B) transverse diameter measurement of the organized hematoma (red arrow), and (C) color Doppler evaluation showing echogenic appearance of residual cervical circulation (blue arrow). The presence of an organized hematoma is expected following dilatation and evacuation, with serial monitoring ensuring gradual resolution and successful hemostasis.

controlled, and the patient's condition stabilized without requiring a blood transfusion.

Following the procedure, the patient was transferred to the ward and remained under observation for two days. Follow-up ultrasound revealed the presence of an intracervical hematoma measuring approximately 3 cm × 3 cm, with a color Doppler score of 1 (**Figure 5**). It was decided to continue conservative management. Under antibiotic coverage, the hematoma gradually resolved, and the patient was discharged home one week later, with follow-up scheduled via phone calls and serial β-hCG monitoring. At 6-month follow-up, menstruation resumed with regular 28-day cycles, β-hCG normalized to <2 mIU/mL, and transvaginal ultrasound demonstrated complete cervical healing with normal cervical length (3.2 cm) and competent internal os, indicating preserved reproductive anatomy.

3. Discussion

Ectopic cervical pregnancy (CP) results from the implantation of a fertilized ovum in the endocervical canal below the level of the internal os, with a reported incidence of less than 0.01% of all pregnancies [12]. Risk factors include cervical and uterine abnormalities, prior procedures such as curettages or cesarean sections, smoking, tubal infertility, or IVF treatments [13]. Asymptomatic patients often seek medical attention due to significant painless vaginal bleeding. Despite advancements in diagnostic modalities and reductions in current maternal mortality rates, CP remains a life-threatening condition [14]. The defined criteria for diagnosing cervical pregnancy: uterine bleeding without cramping pain following a period of amenorrhea, disproportionately enlarged soft cervix equal to or larger than the fundus (hourglass appearance), products of conception entirely within and firmly attached to the endocervical canal, a closed internal os, and a partially opened external os [15]. According to Ushakov et al., transvaginal ultrasound (TVS) has 87.5% diagnostic accuracy, with MRI serving as a viable alternative in some instances [16]. Differential diagnosis may confuse cervical pregnancy with spontaneous abortion if pregnancy tissue is detected within the cervical canal [1]. In our patient, ultrasonography confirmed all diagnostic criteria, obviating the need for further tests. In contrast, spontaneous abortion typically involves an open internal os, absence of elongation or enlargement of the cervix, bleeding accompanied by pain, and the presence of blood or remnants inside the endometrial cavity [17].

Treatment approaches for cervical pregnancy vary. Methotrexate may suffice for patients with mild symptoms, while curettage is often preferred for those experiencing vaginal bleeding. In life-threatening situations, a hysterectomy becomes necessary [18]. Patients should be educated about the risks of future ectopic pregnancy and spontaneous abortion due to potential cervical insufficiency. The conservative management of cervical ectopic pregnancy encompasses various treatment modalities, none of which have been proven to be superior to the others. Options include intramuscular methotrexate injection, ultrasound-guided injection of potassium chloride alone or in combination with local methotrexate, and dilatation and evacuation with or without dilute vasopressin cervical infiltration. Additionally, hysteroscopic-guided evacuation, Foley catheter placement, cerclage, laparoscopic resection, and uterine artery embolization are available options depending on the clinical scenario [9, 2]. In our case, repeated local methotrexate injections were not considered optimal due to the high β-hCG level (57,000 mIU/mL), which correlates with treatment failure rates >80% for single-agent therapy. Multiple injections would increase the risk of cervical necrosis and delay definitive treatment. Uterine artery embolization, while effective, was not readily available at our institution and would incur significantly higher costs with the need for specialized interventional radiology expertise [13].

Foley catheter placement and cerclage are only viable after dilatation and evacuation. In our case, the patient underwent a multimodal conservative approach, including local potassium chloride and methotrexate intrafetal injection followed by dilatation and evacuation. Despite initial successful management with the injection, the patient experienced severe vaginal bleeding after two days, necessitating further intervention with dilatation and evacuation, and cerclage placement for hemostasis [19]. When acute bleeding occurred, immediate source control was prioritized. D&E was selected over conservative management due to the urgent need for trophoblastic tissue removal, as retained products would perpetuate haemorrhage. The addition of cervical cerclage provided an immediate tamponade effect while preserving uterine anatomy. Hysterectomy would have eliminated fertility potential, and continued expectant management posed unacceptable risks of life-threatening haemorrhage in this young nulliparous patient [4].

Fortunately, the bleeding was controlled, and the patient's condition stabilized without the need for hysterectomy. Multimodal conservative management is increasingly recognized as a viable approach for select patients with cervical ectopic pregnancy, particularly young, stable nulliparous women who desire to preserve fertility. However, it is essential to recognize the limitations of conservative management, especially in patients with high beta-hCG levels or advanced gestational age, for whom surgical intervention may be necessary to prevent life-threatening complications [20].

4. Conclusion

Fertility preservation is the most challenging point when dealing with cervical ectopic pregnancy, especially in young nulliparous women. However, the best way to manage cervical ectopic pregnancy has not yet been confirmed, and multimodal conservative management can be an effective method. Close follow-up is mandatory, as catastrophic sequelae can occur if timely management of complications is not appropriate.

Conflicts of Interest

The authors declare that they have no competing interests that could have influenced the objectivity or outcome of this article.

Funding Source

The authors declare that no specific grant or funding was received for this research from any public, commercial, or not-for-profit funding agency.

Acknowledgments

None

Informed consent

The patient provided verbal informed consent to publish this case report and its accompanying images. A standardized verbal consent documentation form was completed, witnessed, and retained in accordance with institutional protocols. All patient identifiers have been removed to protect privacy.

Large Language Model

None

Authors Contribution

BFE contributed to data collection, literature review, following the patient management plan, drafting the discussion section, critical revision, and manuscript review. AM was responsible for drafting the manuscript and improving writing quality. HHE supervised the surgical procedure, provided follow-up care, and revised the initial and follow-up ultrasound scans. HAB conducted the initial diagnostic ultrasound scan. MHG handled manuscript preparation, literature search, submission, and final manuscript revision.

Data Availability

The data supporting the findings of this case report are included within the article. Additional de-identified information may be made available upon reasonable request from the corresponding author.

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