

DOI: <https://dx.doi.org/10.18203/2320-1770.ijrcog20261074>

## Case Report

# A cornered conundrum: early diagnosis and management of an unruptured interstitial ectopic pregnancy

Sanjay B. Patil\*, Raksha K. Shetty, Gurpreet K. Rajpal, Pratibha S. Patil

Department of Obstetrics and Gynaecology, BKL Walawalkar Rural Medical College and Hospital, Ratnagiri, Maharashtra, India

**Received:** 15 March 2026

**Accepted:** 06 April 2026

**\*Correspondence:**

Dr. Sanjay B. Patil,

E-mail: drpatils@hotmail.com

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

### ABSTRACT

Constituting about 2.4% of all ectopic pregnancies, an interstitial ectopic pregnancy is a rare but life-threatening condition. Diagnosis can be challenging and it often presents late, with a high risk of catastrophic haemorrhage following rupture. Early diagnosis remains crucial for reducing maternal morbidity. We report a case of a spontaneously conceived interstitial ectopic pregnancy (IEP) diagnosed at an early gestational age in a hemodynamically stable patient presenting asymptotically, for routine antenatal care, with no identifiable risk factors. Transvaginal ultrasonography and magnetic resonance imaging (MRI) pelvis revealed an eccentrically located gestational sac near the right uterine cornu, surrounded by a thin myometrial mantle, separate from the endometrial cavity. Serum  $\beta$ -hCG level was consistent with early gestation. Prompt diagnosis enabled timely surgical intervention before rupture. The postoperative course was uneventful and the patient recovered well. IEP poses significant diagnostic and therapeutic challenges due to its atypical location and risk of delayed rupture. Vigilant early imaging and high clinical suspicion are essential for timely intervention. Early recognition allows for planned surgical management, reducing maternal morbidity and mortality and improving reproductive outcomes.

**Keywords:** Interstitial pregnancy, Ectopic, Laparoscopy, Cornual resection, Laparotomy

### INTRODUCTION

Ectopic pregnancy results due to implantation of embryo outside the uterine cavity, comprising 1.2–1.4% of all pregnancies.<sup>1</sup> Different locations, most commonly the fallopian tube, involving the ampullary (70%), isthmic (12%), fimbrial (11.1%), interstitial (2.4%) regions, ovarian (3.2%), abdominal (1.3%), cervical (<1%) have been reported.<sup>2</sup>

Prevalence of interstitial ectopic pregnancy (IEP) estimates 2–4% of all ectopic pregnancies by most authors and 6–8%, as per some studies.<sup>3-7</sup>

They may remain asymptomatic for a few more weeks as the interstitium can expand to a greater extent compared to rest of the tube, making it challenging to diagnose early.<sup>8</sup> Thus, when they rupture, they can be catastrophic, due to

their size as well as high vascularity of myometrium. As compared to other ectopic pregnancies, there is a greater risk of severe haemorrhage and increased mortality with studies showing approximately 25% of such cases present with haemorrhagic shock.<sup>9</sup>

Management of IEP can either be expectant, medical or surgical depending on the patient factors such as gestational age, parity, size of the gestational sac, presence of foetal cardiac activity and hemodynamic stability.<sup>10</sup>

### CASE REPORT

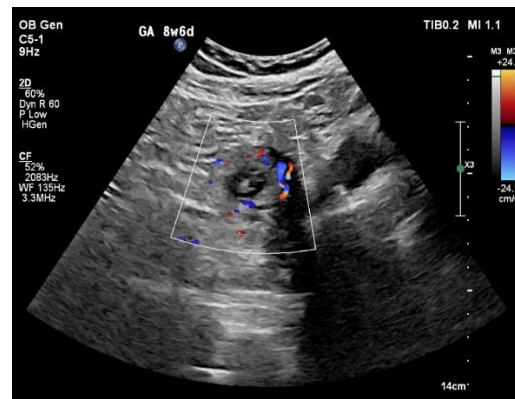
A 30 years old G3 P1 L 1 A1, presented to the antenatal clinic of our hospital, with a positive urine pregnancy test with 2 months of amenorrhoea. At booking, she was otherwise healthy with no complaints nor identifiable risks. She reported no history of chronic illness, no past

gynaecological surgeries, no history of chronic medication or contraceptive use, no history of sexual transmitted infection or pelvic inflammatory disease. Vital signs were normal at presentation. No abdominal rigidity, involuntary guarding or tenderness was found. Per vaginal examination revealed anteverted uterus of 6-8 weeks' size with minimal tenderness in right fornix. Routine investigations revealed no abnormality on blood work; serum beta hCG was 68,416 mIU/ml. However, routine ultrasound revealed a single gestational sac at the periphery, on the right side of the uterus with an empty endometrial cavity. Yolk sac was seen; crown rump length (CRL) was 1.38 cm corresponding to 7 weeks + 4 days period of gestation and embryonic cardiac activity was present, suggestive of an unruptured interstitial/cornual ectopic (Figures 1 and 2). Due to her hemodynamic stability, empty endometrial cavity and inability to ascertain type of ectopic pregnancy and suspicion of uterine anomaly, a magnetic resonance imaging (MRI) was done to delineate confounding findings seen on ultrasound and for a better anatomic description. MRI revealed an eccentrically located, 18×16×16 mm (AP×TR×SI) size, T2/STIR hyperintense lesion at the anterolateral part of right side of the uterus, centred at the interstitial portion of the right fallopian tube, immediately lateral to the right uterine angle with an embryo having a CRL of 1.42 cm corresponding to 7 weeks + 5 days. Thinning of myometrial mantle to less than 5 mm thickness was noted around this lesion, which was not communicating with the uterine cavity (Figures 3 and 4). She was counselled on these findings and due to risk of inevitable rupture with significant bleeding, the patient was scheduled for an elective laparoscopic excision of right IEP and ipsilateral salpingectomy. Comprehensive preoperative counselling was done and consent was obtained for potential conversion to laparotomy or emergency hysterectomy should intra-operative complications or uncontrollable haemorrhage occur. Under general anaesthesia, laparoscopy was done and the diagnosis of an unruptured right IEP was confirmed (Figures 5). Excision of the right IEP mass was done laparoscopically using a bipolar vessel sealer device. However, due to inability to arrest bleeding at the raw excised portion of the uterus, near the right cornual end, a laparotomy was done and haemostatic polyglactin sutures were taken over it and right salpingectomy performed; haemostasis was achieved. No complications were observed in the postoperative period and the patient was discharged from the hospital after 72 hours of post-operative care with serum beta hCG level of 9785 mIU/ml. The patient was followed up as outpatient and no complications were reported. The right fallopian tube (3.8 cm in length) and interstitial ectopic mass (3.2×3.2×0.8 cm in dimensions) had been sent for histopathological examination. Oedematous chorionic villi (composed of cytotrophoblast, syncytiotrophoblast) and blood clots in the lumen of the interstitial part of fallopian tube were identified in the sent specimen. Ampullar, isthmic part and fimbriae of right fallopian tube were intact. The patient was advised early booking and close follow-up in her next

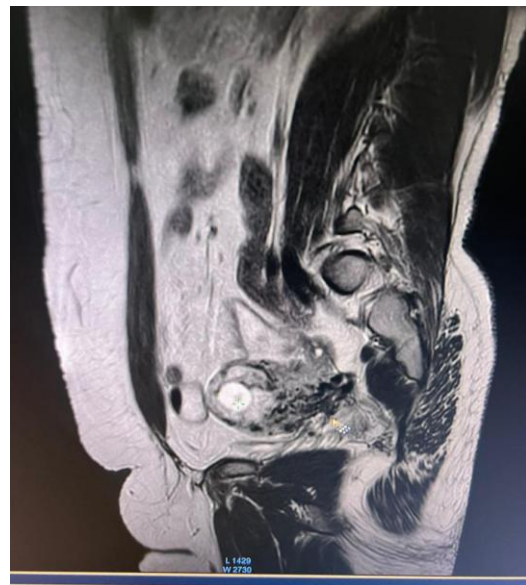
pregnancy and to have a planned caesarean section due to risk of uterine rupture.



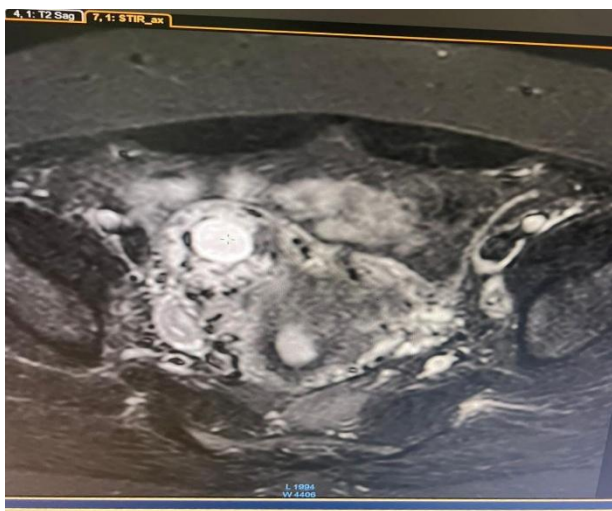
**Figure 1: Transvaginal ultrasound showing right interstitial ectopic pregnancy.**



**Figure 2: Transvaginal ultrasound of interstitial ectopic pregnancy- showing increased vascular Doppler flow around the gestation.**



**Figure 3: MRI pelvis-sagittal view of a mass with an embryo within (green dotted cross) (right interstitial ectopic pregnancy).**



**Figure 4: MRI pelvis-axial view of right interstitial ectopic pregnancy (green dotted cross).**



**Figure 5: Laparoscopic view of unruptured right interstitial ectopic pregnancy.**

## DISCUSSION

Intramural (interstitial) ectopic pregnancy occurs when the blastocyst implants in the interstitial part, which is about 1–2 cm long and 0.7 mm wide and the most proximal portion of fallopian tube that lies within the myometrium. Thus, it is surrounded by a layer of the myometrium, composed mainly of smooth muscle cells, as well as supporting interstitial and vascular tissue.<sup>3,4,11</sup> Cornual pregnancy, on the other hand, specifically refers to a gestational sac within a rudimentary uterine horn, a unicornuate uterus, cornu of a bicornuate uterus or within a septate uterus.<sup>5,12</sup> Due to particularly low sensitivity and specificity of symptoms, IEP poses diagnostic and treatment challenges. Symptoms, including pelvic pain, vaginal bleeding, intra-abdominal bleeding, hypovolemic shock or uterine rupture only occur after 12 weeks' gestation in over 20% of cases.

The clinical triad of ectopic pregnancy, i.e. abdominal pain, vaginal bleeding and amenorrhea, is only present in 40% of cases of IEP, with a mortality rate of up to 2%.<sup>1,3,4,6,13</sup> Implantation into the tubal wall and myometrial

trophoblastic invasion make ultrasound-based differential diagnosis of intrauterine or cornual pregnancy difficult.<sup>3,6,14–16</sup>

Ultrasound diagnostic criteria for IEP include: an empty uterine cavity; a chorionic sac located eccentrically and at >1 cm from the lateral edge of the uterine cavity; a thin (<5 mm) myometrial layer surrounding the chorionic sac in all imaging planes; the interstitial line sign (an echogenic line running from the endometrial echo complex to the gestational sac); has high sensitivity (80%) and specificity (98%) in diagnosis; and no double decidual sac sign, typically seen in an intrauterine pregnancy.<sup>3,6,14–17</sup>

2D Doppler transvaginal ultrasound has higher sensitivity because it can reveal an intense peri-trophoblastic blood flow with numerous tortuous vessels. 3D scans help in obtaining the coronal scans of the uterine fundus, giving a better overview of the cornual regions of uterus. Therefore, 3D ultrasound, if available, can be used to avoid misdiagnosis with early eccentric normal intrauterine pregnancy.<sup>18,19</sup>

MRI may be used to ascertain diagnosis and is pivotal in distinguishing IEP from other forms of ectopic pregnancy, particularly cornual, angular and tubal, as well as identification of uterine anomalies. Thus, it is useful to better define the location of gestational sac with respect to the endometrium which, in some cases can be difficult on ultrasound.

Line of treatment of IEP can be medical or surgical. Medical treatment is not preferred if any of the following exists: hemodynamically unstable patient, contraindications of methotrexate use, signs and symptoms of impending or ongoing rupture like abdominal and pelvic pain or hemoperitoneum, presence of fetal cardiac activity, and serum  $\beta$ -hCG levels >5000 mIU/ml or gestational sac size >4 cm in diameter.<sup>20</sup>

In this patient, due to the presence of fetal cardiac activity, size of the gestational sac of >4 cm,  $\beta$ -hCG levels of 68,416 mIU/ml and risk of impending rupture, we chose surgical intervention over medical management. Pharmacological management of IEP, in asymptomatic patients includes systemic administration of methotrexate (Mtx). However, in cases of an IEP >5 cm in diameter, this method fails in 9–65% of cases.<sup>21</sup> In general population, the failure rate is about 25% and additional, surgical treatment is often needed.<sup>22</sup> Mtx can also be administered directly into the gestational sac during a local hysteroscopic injection in patients diagnosed at an early stage of IEP.<sup>23</sup> Treatment should be tailored considering the obstetric history, gestational age and desire for future pregnancy.<sup>16,24</sup> Overall efficacy of a single Mtx dose is about 65–95% and such variability is due to factors such as the baseline level of  $\beta$ -hCG (the lower the level, the higher the efficacy of treatment), rate of serum  $\beta$ -hCG rise over 48 hours preceding Mtx administration and rate of decrease in  $\beta$ -hCG levels after the administration of

pharmacological treatment.<sup>25</sup> Multidose Mtx intramuscular regimen combined with mifepristone (600 mg orally), in asymptomatic women with low serum levels of  $\beta$ -HCG at an early gestational age have been proposed.<sup>16</sup> Tulandi and Al-Jaroudi discussed the management of 32 IEP cases.<sup>26</sup> 8 patients were treated with Mtx either systemically (n=4), locally under ultrasound guidance (n=2) or laparoscopic guidance (n=2). 11 patients were treated laparoscopically and 13 by laparotomy. Systemic Mtx treatment failed in 3 patients who then required surgery. After laparoscopic cornual excision, persistently elevated serum  $\beta$ -hCG levels were found in 1 patient who was later successfully treated with Mtx. Subsequently 10 patients conceived, wherein no uterine rupture occurred during pregnancy or labour.<sup>26</sup>

Laparoscopic cornuostomy is the preferred surgical intervention as it causes less tubal damage and better future pregnancy outcomes but cornual resection is advisable in cases of IEP of advanced gestational age and/or when it is >4 cm in diameter. Cornual resection is generally an effective and quite safe procedure, but can cause significant bleeding. Cornual resection by laparotomy or laparoscopy could cause uterine rupture in subsequent pregnancies.<sup>27,28</sup>

Laparoscopic techniques i.e. laparoscopic cornuostomy or cornual wedge resection are currently the treatment of choice in hemodynamically stable patients with IEP and preferable to laparotomy.<sup>7,10,29</sup> The choice depends on patient's condition, logistics and surgical competence.<sup>21,22,24</sup> Laparotomy is the only appropriate route in hemodynamically unstable patients, with suspicion of rupture or recurrent IEP.<sup>21</sup>

In some hemodynamically stable patients with early recognition of IEP, the combined method, described as 'laparoscopy-assisted hysteroscopy' (LAH), could be an alternative minimally invasive approach.<sup>29</sup> Katz et al presented two cases of diagnosed IEP who were successfully treated with LAH.<sup>30</sup> The evacuation of the gestational sac was performed transvaginally under laparoscopic guidance. Similarly, Feng et al described a case of IEP, initially unsuccessfully treated with Mtx and then subsequently treated with LAH.<sup>31</sup> In all the cases presented, cornual resection was not necessary, which is an advantage of this method.

In 2021, Marchand et al presented a systematic review and a meta-analysis of patients diagnosed with IEP wherein they compared the outcomes of the laparoscopic surgery versus laparotomy.<sup>32,33</sup> They concluded that laparoscopic management was associated with a shorter postoperative hospital stay, more favourable outcomes i.e., less intraoperative bleeding and shorter duration of the procedure and a higher risk of rupture with laparotomy.

To recommend a single management method for IEP is difficult due to the highly variable response to treatment

and dynamics of development of symptoms, which can even be life-threatening.

Future pregnancies after cornuostomy or wedge resection should be monitored with ultrasound at 5 to 6 weeks of gestation to exclude recurrent ectopic pregnancy and patients are advised to be delivered by elective cesarean section to reduce the risk of uterine rupture at labour.<sup>27,34</sup>

## CONCLUSION

This case emphasizes the importance of early recognition and timely management of interstitial ectopic pregnancy to prevent serious maternal complications. Despite its rarity, the significant risk of hemorrhage warrants a high degree of clinical suspicion. Advances in imaging have improved diagnostic accuracy, but comprehensive patient counselling and diligent follow-up remain integral to optimizing outcomes.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: Not required*

## REFERENCES

1. Rana P, Kazmi I, Singh R, Afzal M, Al-Abbasi FA, Aseeri A, et al. Ectopic pregnancy: a review. *Arch Gynecol Obstet.* 2013;288:747-57.
2. Bouyer J, Coste J, Fernandez H, Pouly JL, Job-Spira N. Sites of ectopic pregnancy: a 10 year population-based study of 1800 cases. *Hum Reprod.* 2002;17(12):3224-30.
3. Ilea C, Ilie OD, Marcu OA, Stoian I, Doroftei B. The very first Romanian unruptured 13-weeks gestation tubal ectopic pregnancy. *Medicina.* 2022;58:1160.
4. Stabile G, Romano F, Zinicola G, Topouzova GA, Di Lorenzo G, Mangino FP, et al. Interstitial ectopic pregnancy: the role of mifepristone in the medical treatment. *Int J Environ Res Public Health.* 2021;18:9781.
5. Durand YG, Capoccia-Brugger R, Vial Y, Balaya V. Diagnostic dilemma between angular and interstitial ectopic pregnancy: 3D ultrasound features. *J Ultrasound.* 2022;25:989-94.
6. Eyvazzadeh AD, Levine D. Imaging of pelvic pain in the first trimester of pregnancy. *Radiol Clin North Am.* 2006;44:863-77.
7. Brincat M, Bryant-Smith A, Holland TK. The diagnosis and management of interstitial ectopic pregnancies: a review. *Gynecol Surg.* 2019;16:2.
8. Alkatout I, Honemeyer A, Strauss A, Tinelli A, Malvasi A, Jonat W, et al. Clinical diagnosis and treatment of ectopic pregnancy. *Obstet Gynecol Surv.* 2013;68(8):571-81.
9. Bhatt S, Ghazale H, Dogra VS. Sonographic evaluation of ectopic pregnancy. *Radiol Clin North Am.* 2007;45(3):549-60.
10. Po L, Thomas J, Mills K, Zakhari A, Tulandi T, Shuman M, et al. Guideline No. 414: management of

- pregnancy of unknown location and tubal and nontubal ectopic pregnancies. *J Obstet Gynaecol Can.* 2021;43(5):614-30.
11. Dagar M, Srivastava M, Ganguli I, Bhardwaj P, Sharma N, Chawla D. Interstitial and cornual ectopic pregnancy: conservative surgical and medical management. *J Obstet Gynaecol India.* 2018;68:471-6.
  12. Brewer H, Gefroh S, Bork M, Munkarah A, Hawkins R, Redman M. Asymptomatic rupture of a cornual ectopic in the third trimester. *J Reprod Med.* 2005;50:715-8.
  13. Chan LY, Yuen PM. Successful treatment of ruptured interstitial pregnancy with laparoscopic surgery: a report of 2 cases. *J Reprod Med.* 2003;48:569-71.
  14. Faraj R, Steel M. Management of cornual (interstitial) pregnancy. *Obstet Gynaecol.* 2007;9:249-55.
  15. Garavaglia E, Quaranta L, Redaelli A, Colombo G, Pasi F, Candiani M. Interstitial pregnancy after in vitro fertilization and embryo transfer following bilateral salpingectomy: report of two cases and literature review. *Int J Fertil Steril.* 2012;6:131-4.
  16. Stabile G, Romano F, Buonomo F, Zinicola G, Ricci G. Conservative treatment of interstitial ectopic pregnancy with the combination of mifepristone and methotrexate: our experience and review of the literature. *Biomed Res Int.* 2020;2020:8703496.
  17. Elson CJ, Salim R, Potdar N, Chetty M, Ross JA, Kirk EJ. Diagnosis and management of ectopic pregnancy. *BJOG.* 2016;123:e15-55.
  18. Arleo EK, DeFilippis EM. Cornual, interstitial, and angular pregnancies: clarifying the terms and a review of the literature. *Clin Imaging.* 2014;38(6):763-70.
  19. Diagnosis and management of ectopic pregnancy: Green-top Guideline No. 21. *BJOG.* 2016;123:e15-55.
  20. Brady PC. New evidence to guide ectopic pregnancy diagnosis and management. *Obstet Gynecol Surv.* 2017;72(10):618-25.
  21. Santos LTR, Oliveira SCS, Rocha LGA, Sousa NDS, Figueiredo RS. Interstitial pregnancy: case report of atypical ectopic pregnancy. *Cureus.* 2020;13:e8081.
  22. Casadio P, Arena A, Verrelli L, Ambrosio M, Fabbri M, Giovannico K, et al. Methotrexate injection for interstitial pregnancy: hysteroscopic conservative mini-invasive approach. *Facts Views Vis Obgyn.* 2021;13:73-6.
  23. Mangino FP, Romano F, Di Lorenzo G, Buonomo F, De Santo D, Scrimin F, et al. Total hysteroscopic treatment of cervical pregnancy: the 2-step technique. *J Minim Invasive Gynecol.* 2019;26:1011-2.
  24. Hamon NG, Peng NG, Sharon L. Laparoscopic treatment of an interstitial pregnancy. *Gynecol Obstet.* 2014;4:8.
  25. Haestier A. Guideline for the medical management of ectopic pregnancy with methotrexate, version 5. Norfolk and Norwich University Hospitals NHS Foundation Trust. 2020.
  26. Tulandi T, Al-Jaroudi D. Interstitial pregnancy: results generated from the Society of Reproductive Surgeons' registry. *Obstet Gynecol.* 2004;103:47-50.
  27. Moawad NS, Mahajan ST, Moniz MH, Taylor SE, Hurd WW. Current diagnosis and treatment of interstitial pregnancy. *Am J Obstet Gynecol.* 2010;202:15-29.
  28. Cucinella G, Calagna G, Rotolo S, Granese R, Saitta S, Tonni G, et al. Interstitial pregnancy: a 'road map' of surgical treatment based on a systematic review of the literature. *Gynecol Obstet Investig.* 2014;78(3):141-9.
  29. Panelli DM, Phillips CH, Brady PC. Incidence, diagnosis and management of tubal and nontubal ectopic pregnancies: a review. *Fertil Res Pract.* 2015;1:15.
  30. Katz DL, Barrett JP, Sanfilippo JS, Badway DM. Combined hysteroscopy and laparoscopy in the treatment of interstitial pregnancy. *Am J Obstet Gynecol.* 2003;188:1113-4.
  31. Feng Q, Zhong J, Liu Y, Li ST, Zong L. Surgical treatment of interstitial pregnancy without cornual resection: a case report. *Medicine (Baltimore).* 2022;101:e29730.
  32. Marchand G, Masoud AT, Sainz K, Azadi A, Ware K, Vallejo J, et al. A systematic review and meta-analysis of laparotomy compared with laparoscopic management of interstitial pregnancy. *Facts Views Vis Obgyn.* 2021;12:299-308.
  33. Marchand G, Masoud AT, Galitsky A, Azadi A, Ware K, Vallejo J, et al. Management of interstitial pregnancy in the era of laparoscopy: a meta-analysis of 855 case studies compared with traditional techniques. *Obstet Gynecol Sci.* 2021;64:156-73.
  34. Lau S, Tulandi T. Conservative medical and surgical management of interstitial ectopic pregnancy. *Fertil Steril.* 1999;72:9.

**Cite this article as:** Patil SB, Shetty RK, Rajpal GK, Patil PS. A cornered conundrum: early diagnosis and management of an unruptured interstitial ectopic pregnancy. *Int J Reprod Contracept Obstet Gynecol* 2026;15:1807-11.