Scholars Journal of Medical Case Reports

OPEN ACCESS

Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

Gynaecology-Obstetrics & Endocrinology

Diagnostic Challenges and Emergency Management of Ruptured Ovarian Ectopic Pregnancy: A Case Report

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DOI: https://doi.org/10.36347/sjmcr.2025.v13i05.111 | **Received:** 19.04.2025 | **Accepted:** 22.05.2025 | **Published:** 28.05.2025

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Abstract | **Case Report**

Ovarian ectopic pregnancy (OEP) is an exceptional form of ectopic pregnancy, posing a diagnostic challenge due to its rarity and the similarity of its clinical manifestations to other tubal locations. We report the case of a 36-year-old multiparous patient admitted to the emergency department for acute abdominal pain radiating to the shoulder, associated with signs of hemodynamic shock. Transabdominal ultrasound revealed peritoneal effusion and an empty uterus, suggesting a ruptured ectopic pregnancy. An emergency laparoscopy identified a ruptured left ovarian pregnancy, treated by partial resection of the ovary. The diagnosis was confirmed by histopathological examination, and the postoperative course was favorable, with a rapid decrease in β-HCG levels. This case highlights the potential severity of ruptured OEPs and underscores the necessity of early diagnosis and rapid surgical management in cases of hemodynamic instability. To better understand the clinical, diagnostic, and therapeutic particularities of this rare implantation site, we propose a review of the literature.

Keywords: Ruptured Ectopic Ovarian Pregnancy, Diagnostic Challenges, Echography, Surgical Management.

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INTRODUCTION

Ovarian ectopic pregnancy (OEP) is a rare form of ectopic pregnancy, characterized by the complete or partial implantation of the embryo within the ovarian parenchyma [1]. The incidence of OEP ranges from 1/2000 to 1/60,000 in spontaneous pregnancies and represents 3% of all ectopic pregnancies [2].

CASE PRESENTATION

A 36-year-old patient, a mother of 3 children, presented to the emergency department with acute onset, isolated, intense abdominal pain radiating to the subcostal and scapular regions. She reported six weeks of amenorrhea. Her medical history was significant for chronic smoking. Obstetrically, she had had three full-term vaginal deliveries, the last one two and a half months prior. In the postpartum period, she was using condoms for contraception, awaiting the insertion of an intrauterine device (IUD), as she had done during her previous pregnancies.

On clinical examination, the patient was pale, in distress, and unable to lie in the dorsal decubitus position due to increased scapular discomfort and breathing difficulty. Vital signs showed moderate hypotension (blood pressure 105/60 mmHg) and tachycardia at 130 beats per minute. Abdominal examination revealed guarding in the left iliac fossa.

Given the hemodynamic instability, a transabdominal-pelvic ultrasound was performed to expedite management, revealing a moderate amount of peritoneal effusion explaining her clinical condition. The ultrasound showed an empty uterus with a thickened and decidualized endometrium, as well as a 20 mm heterogeneous mass located in the cul-de-sac of Douglas, likely of adnexal origin. A urine β-hCG test was positive, suggesting an ectopic pregnancy. Her HemoCue was 10.2 g/dL.

Due to the strong suspicion of a ruptured ectopic pregnancy, an emergency exploratory laparoscopy was performed. This revealed a moderate hemoperitoneum estimated at approximately 700 mL of aspirated blood, a uterus of normal size with regular contours, and normal-appearing right adnexa. The left fallopian tube was thin, intact to the fimbriae, with no

signs of tubal abortion; rather, active bleeding was originating from the left ovary, consistent with an ovarian pregnancy (Fig1).

Figure 1: Laparoscopic view showing a left ovary with a hemorrhagic, congested, and swollen appearance, with active bleeding, suggestive of a ruptured ovarian pregnancy with ectopic implantation within the ovarian parenchyma. The left fallopian tube appears thin and intact, with no signs of tubal abortion, further supporting the diagnosis of ovarian pregnancy

A left partial ovarian resection was performed with complete excision of the gestational tissue (Fig2). The postoperative course was uncomplicated. The quantitative β-hCG level measured before the intervention was 7370 mIU/mL. Serial monitoring 48 hours after surgery showed an undetectable level, confirming complete removal of the trophoblastic tissue. The histopathological examination confirmed the diagnosis of ovarian pregnancy.

Figure 2: Intraoperative view following partial resection of the left ovary, with complete removal of the gestational tissue. Hemostasis was achieved, and the resection margins were clearly visualized

DISCUSSION

Ovarian ectopic pregnancy occurs when the fertilized ovum implants on the surface of the ovary. Two forms are distinguished: primary and secondary. Primary OEP most often results from ovulatory dysfunction, with intrafollicular fertilization before the expulsion of the ovum. Secondary OEP corresponds to tubal fertilization followed by reflux of the conceptus towards the ovarian stroma. OEP can also be classified into intrafollicular and extrafollicular forms [3]. The intrafollicular form, or failed follicular expulsion, results from fertilization within the ovarian follicle itself and remains exceptional. The extrafollicular form corresponds to ovarian implantation after migration of a fertilized ovum [4]. Generally, intrafollicular OEP is primary, while the extrafollicular form can be primary or secondary [3]. However, this distinction has no impact on management, which is identical in both cases [5].

Presumed risk factors for ovarian pregnancy include prior use of an intrauterine device (IUD), assisted reproductive techniques, concomitant endometriosis, and pelvic adhesions following previous surgeries [6]. The relationship between intrauterine device (IUD) and ovarian pregnancy is well established, with use reported in 57 to 90% of patients. IUDs may promote ovarian ectopic implantation by inducing mild inflammation that alters tubal ciliary activity and delays ovum transport [7].

In recent years, cases of ovarian pregnancies have been increasingly reported after IVF. Several factors are involved: ovarian stimulation (gonadotropins, clomiphene citrate) can increase hormonal secretion and disrupt tubal function; also, after embryo transfer, the zygote returns to the fallopian tube and implants in the ovary. An ovarian breach related to the puncture can also allow implantation in the ovary [8].

In this case, no current risk factor was identified to explain the occurrence of this ovarian ectopic pregnancy. However, the patient had a history of IUD use as her sole method of contraception between her subsequent pregnancies.

Compared to tubal ectopic pregnancy (TEP), ovarian ectopic pregnancy (OEP) more frequently manifests with isolated abdominal pain, without vaginal bleeding [9]. Furthermore, the occurrence of diarrhea, pain at the tip of the shoulder, or syncopal episodes is statistically associated with a non-tubal location of the ectopic pregnancy. This correlation could be explained by an increased risk of rupture and hemoperitoneum in non-tubal forms, particularly ovarian pregnancies, due to their significant vascularization. These complications promote peritoneal irritation and hypovolemia, leading to the aforementioned clinical manifestations [10].

The differential diagnosis between ovarian ectopic pregnancy (OEP) and tubal ectopic pregnancy (TEP) can be difficult and is rarely made solely based on B-mode imaging without the use of color Doppler and palpation of pelvic organs with the ultrasound probe [9]. This differential diagnosis may also include a ruptured hemorrhagic corpus luteum or an endometrioma. Thanks to improved ultrasound skills, particularly the use of the endovaginal probe, some ovarian pregnancies can now be diagnosed before surgery [11].

Ultrasound findings showing a tubal ectopic pregnancy located distally, near the ovary, can be confused with an ovarian ectopic pregnancy. It has been shown that free mobility between the ovary and an adnexal mass on ultrasound palpation, called the sliding organs sign, can help distinguish ovarian masses from extra-ovarian masses [12].

Ovarian ectopic pregnancy more frequently leads to hemodynamic instability due to significant hemoperitoneum [10]. Although the ovary may adapt more easily than the fallopian tube to the size of the expanding pregnancy, resulting in higher serum beta-HCG levels and a higher proportion of pregnancies containing a living embryo, early rupture is common. Overall, 91% of OEPs end in rupture during the first trimester [13].

In one of the largest studies to date, only 2.5% of OEPs were identified by ultrasound, but 80% had hemoperitoneum triggering surgical intervention [14]. Finding an OEP amidst severe hemoperitoneum can be difficult on ultrasound. Increased blood loss from OEP compared to TEP could be explained by high ovarian vascularization. Furthermore, the difficulty of early diagnosis leads to a delay in treatment, increasing the risk of intra-abdominal hemorrhage [15].

If the patient is clinically stable at the time of evaluation and an early ovarian ectopic pregnancy (OEP) is suspected, close monitoring may be considered after specialist consultation, based on serial β-hCG measurements and transvaginal ultrasound (TV-US) within 48 to 72 hours. However, increased vigilance is necessary, as any sign of clinical decompensation should lead to immediate surgical evaluation [12]. In cases of hemodynamic instability, emergency transabdominal ultrasounds are performed, given the unpredictable nature of ovarian pregnancies, often managed in an emergency setting with limited time for preoperative evaluation [16]. This was the case for our patient; the transabdominal-pelvic ultrasound findings combined with the positive pregnancy test were sufficient to strongly suspect a ruptured ectopic pregnancy, although it was difficult to identify its exact origin in order to avoid delaying surgical management.

Rapid surgical intervention is necessary, with the current trend moving away from laparotomy towards laparoscopy [15]. Ovarian ectopic pregnancies are often treated surgically and can only be definitively diagnosed at the time of surgery [17].

Medical approaches have been developed to preserve ovarian tissue, limit pelvic adhesions, and maintain fertility. These include the administration of mifepristone, parenteral prostaglandin F2α, and methotrexate (MTX), mainly in unruptured forms diagnosed early by transvaginal ultrasound or during laparoscopy [18, 19]. Pagidas and Frishman reported cases of ovarian pregnancy successfully treated with MTX after diagnosis by transvaginal ultrasound, suggesting that early forms may benefit from medical treatment [20]. Similarly, Di Luigi *et al*., obtained good results with a multidose MTX protocol in a 37-year-old patient diagnosed at 6 weeks of amenorrhea and emphasized the importance of rigorous clinical evaluation to allow for conservative management [21]. Although methotrexate injection is less invasive than surgery, higher failure rates and an increased risk of

ovarian bleeding have been observed with methotrexate use [4].

Available data in the literature on medical treatment with methotrexate remain limited, likely because ovarian pregnancy is most often diagnosed in an emergency setting at a ruptured stage, where surgical treatment remains the standard of care [22]. According to the recommendations of the American Society for Reproductive Medicine Committee, methotrexate is not recommended as first-line treatment for ovarian ectopic pregnancies [23].

Surgical excision of the ectopic pregnancy while preserving the ovary is ideal. Several techniques have been described, such as wedge resection of the ovary for an ovarian pregnancy, enucleation of the ovarian pregnancy, cystectomy of the corpus luteum to remove the trophoblast, and curettage of the trophoblast accompanied by coagulation or hemostatic suture of the ovarian pregnancy site. For larger and more advanced pregnancies, oophorectomy may be considered, but this should be reserved as a last resort, especially when uncontrollable bleeding occurs [24]. In studies on the surgical management of ovarian ectopic pregnancy, hemostasis using ultrasonic energy has been preferred over electrocoagulation, and local injection of argipressin at the border between healthy ovary and the lesion has been used to preserve as much normal ovarian tissue as possible [25].

In our case, partial resection of the left ovary was successful, with complete excision of the gestational tissue.

CONCLUSION

Ovarian ectopic pregnancy is a rare entity, often difficult to diagnose, and whose clinical presentation can be severe, as shown by this case of rupture with hemoperitoneum. A correct preoperative diagnosis would have allowed for better planning of the intervention, which is generally more complex than that of tubal pregnancies and requires increased surgical skills. Although OEPs can be detected on the first ultrasound, their rarity makes this identification difficult. The clinician must therefore maintain a high level of vigilance in the face of this unusual form.

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