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Ovarian torsion during the first trimester of pregnancy: a case report and review of literature

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Abstract

Background: Ovarian torsion comprises a challenging gynecologic emergency, predominantly concerning women of reproductive age and its occurrence during pregnancy is considered particularly demanding. Despite being characterized by non-specific clinical manifestations, the majority of cases typically present with acute abdominal pain. Pelvic ultrasonography provides useful preclinical information and remains an integral component of the diagnostic approach. Early diagnosis and surgical treatment are imperative in order to preserve ovarian viability and fertility, especially in women of reproductive age.

Case Presentation: We herein report a rare case of ovarian torsion in a 24-year-old pregnant woman presenting with acute lower abdominal pain. Pelvic ultrasonography revealed a right ovarian mass as well as an absence of blood flow to the right ovary. Exploratory laparotomy confirmed the clinical suspicion of right ovarian torsion and oophorectomy was performed; histopathological examination revealed a corpus luteum cyst of the right ovary and confirmed the diagnosis. Following surgery, the patient miscarried.

Conclusion: Ovarian torsion during pregnancy is a challenging condition that necessitates immediate medical intervention.

Keywords: Ovarian torsion, pregnancy, ultrasonography, oophorectomy, gynecologic emergency

Introduction

Ovarian torsion (OT) comprises the fifth most common gynecologic emergency that requires hospital admission, and typically manifests with non-specific symptoms, affecting women of all ages (1). Although isolated fallopian tube torsion is not a common cause of acute abdomen in women of reproductive age, torsion of paratubal, broad ligament and paraovarian cysts may frequently occur (2, 3). The prevalence of OT is higher in women of reproductive age, in those with polycystic ovarian syndrome, or after gonadotrophin ovulation induction for in-vitro fertilization (IVF) or intracytoplasmic injection (ICSI), while other risk factors include history of prior OT or the presence of a mobile ovarian mass (4, 5, 6). Although it is a fairly uncommon surgical emergency, the exact prevalence of adnexal torsion during pregnancy remains uncertain. Of note, adnexal torsion usually occurs in the first and early second trimesters whereas it is exceptionally rare in the third trimester of gestation (7, 8). The patients usually present with an acute onset of moderate to severe pelvic pain (90%) which may be diffuse or localized to one side, accompanied by nausea, vomiting (up to 70%) and rarely fever (2%), which might be an indicator of adnexal necrosis (7, 9, 10, 11). Notably, ultrasonography (USG) reveals an adnexal mass or cyst in up to 93% of patients, which may be palpable on examination (47%), however the absence of an ovarian mass should not diminish the level of clinical suspicion, especially in premenarchal patients. Doppler scan and magnetic resonance imaging (MRI) are also tools of high diagnostic value, in addition to laboratory investigation that may facilitate diagnosis (13).

In this case report, we aimed to discuss a 4⁺⁵ weeks pregnant patient who presented to our emergency department with acute, severe right groin pain and was diagnosed with complete OT by surgery, followed by histological examination that confirmed the diagnosis.

Case presentation

A 24-year-old woman with a pregnancy of 4⁺⁵ weeks presented to the emergency department of University Hospital of Heraklion, Crete, Greece with an acute onset of moderate right groin pain of increasing severity over the past 18 hours, accompanied by nausea and vomiting. The patient was afebrile and a thorough review of her medical history disclosed no known medical conditions, drug use, or previous surgeries.

The patient had a blood pressure of 108/51 mmHg, a heart rate of 72 bpm and a temperature of 36.6°C. There were no signs of vaginal bleeding or discharge. Upon physical examination muscular guarding was noted along with tenderness on the right lower quadrant of the abdomen.

Laboratory findings included a white blood cell (WBC) count of 10,300/mm³ with 84.1% neutrophils, a hematocrit of 34.1%, a hemoglobin of 10.5g/dl, and a platelet count of 299,000/mm³. The prothrombin time was 12.3 sec, the activated partial thromboplastin time was 27.8 sec, and the INR was 1.09. Urine analysis showed no abnormal findings. Her human chorionic gonadotrophin (hCG) levels were 831.63mIU/ml and the progesterone levels were 19.5ng/dl.

A comprehensive ultrasonography (USG) examination was performed in which the uterus was observed without an intrauterine gestational sac. The right ovary had dimensions of 4.13cm × 2.48cm, displaying a heterogeneous mass with cystic areas, while the left ovary appeared normal. Free fluid was present in the Douglass pouch. Ovarian blood flow was not clearly demonstrated by Doppler USG (Figures 1, 2, 3).

Six hours later the patient's clinical status deteriorated and the new laboratory findings were the following: WBCs 9,200mm³/ with 78.1% neutrophils, hematocrit 32.9%, hemoglobin 10.2g/dl, platelets 282,000mm³ and the patient's blood pressure was 106/59mmHg, the heart rate was 94bpm, and the temperature was 36.2°C.



Figure 1. Small amount of free fluid in the Douglas pouch.

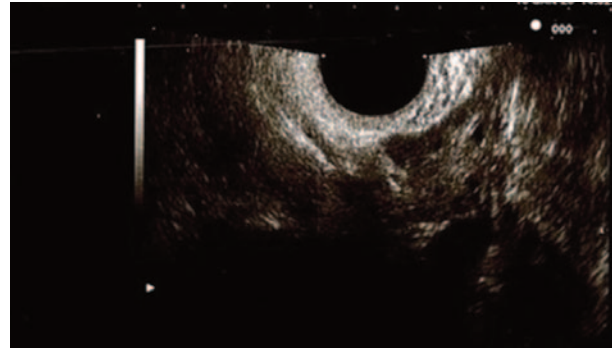


Figure 2. Normal appearing contralateral ovary.

A new USG examination was performed which disclosed an increased amount of free fluid in the Douglas pouch while no ovarian blood flow was demonstrated in the right ovary.

Decision to proceed to urgent laparotomy was made. Intraoperatively, a right OT was detected with a presence of corpus luteum. The right ovary was enlarged with edema and gangrene, while the right fallopian tube was not congested. Right oophorectomy was performed and the excised tissue was sent for histopathologic examination, which validated our intraoperative diagnosis. No haemoperitoneum was present. The left ovary and fallopian tube were normal. On the fourth day post-operatively, β hCG levels were 2,272.51mIU/ml and progesterone was less than 0.5ng/dl. A USG examination was performed, which showed an intrauterine gestational sac with yolk sac and no fetal pole. The next day β hCG levels were 1,100mIU/ml and the patient reported vaginal bleeding. A new USG examination revealed that the patient miscarried.

Discussion

OT may occur in patients of reproductive age particularly when the diameter of the ovary is 5cm or larger (7, 14). Although the exact prevalence of OT during pregnancy remains unknown, studies report an estimated rate of 1/5,000 pregnant women,

most frequently observed in the first and seldom in the third trimester of gestation (8, 16, 17). Within the subset of patients with ovarian hyperstimulation syndrome, the incidence of torsion was reported at 8% and 12% in two series conducted by White et al. and Gorkemli et al. respectively (6, 18). Notably, women undergoing assisted reproductive treatment represent a high proportion of all OT cases (up to one-third) (19).

OT refers to the partial or complete rotation of the ovary around its vascular axis resulting in a partial or complete obstruction of its blood supply. Initially, the arterial supply of the ovary is not compromised to the same extent as the venous drainage. OT constitutes a serious complication that can lead to ischemia, hemorrhagic infarction and necrosis, while posing a risk for peritonitis and sepsis (20, 21, 22).



Figure 3. Enlarged right ovary with ovarian edema. The ovary presents hyperechogenic and blood flow is absent in Doppler study. Transvaginal sonogram indicates a whirlpool sign.

The right adnexa is most commonly implicated, in the majority of cases, potentially due to the greater length of the right utero-ovarian ligament compared to the left, and/or the presence of the sigmoid colon in the left pelvis that may hinder torsion (23, 24). In our case, we identified torsion of the right ovary.

The differential diagnosis of OT encompasses a variety of pathological conditions; appendicitis, ectopic pregnancy, ruptured ovarian cyst, ovarian neoplasm, endometriosis, tubo-ovarian abscess and degenerating leiomyoma constitute the most frequently reported. The diagnosis of OT poses a challenge, as it usually presents with atypical clinical manifestations and non-specific laboratory findings, especially considering the substantial number of pathological conditions that OT may mimic and that must be ruled out. To that end, only a small percentage of cases are correctly diagnosed preoperatively (25). When it comes to laboratory alterations, Ginath *et al.* observed only a mild elevation of WBC count in OT associated with pregnancy compared to non-pregnant women (19). In contrast, a study conducted by Chang *et al.* reported an elevated WBC count in 45% of the patients (26). In our case, WBC count was normal in two consecutive measurements.

In regards to imaging modalities, ultrasonography (USG) plays a pivotal role in the preoperative diagnosis of OT. Sonographic findings usually consist of ovarian enlargement, ovarian edema, engorgement, hemorrhage and presence of free fluid in the Douglas pouch. Other anomalies such as anterior positioning of the ovary in relation to the uterus instead of lateral or posterior, decreased or absent ovarian blood flow, and the whirlpool sign may also be detected (26, 27). However, in our case only a subset of these findings was identified. In another study, Doppler ultrasound was normal in 16 patients (57%) and absent or impaired in 12 patients (43%) (28). Intriguingly, patients with im-

paired or absent blood flow in Doppler ultrasound tend to have necrotic ovaries at the time of surgery, however a large proportion of patients with OT have normal Doppler findings preoperatively (up to two-thirds) (29). The sensitivity of USG for the diagnosis of OT ranges between 46 and 75% (30, 31). In a study including 63 patients with suspected OT, the most sensitive sonographic findings were ovarian edema (sensitivity 85.1% and specificity 18.8%), abnormal ovarian blood flow (85.1% and 37.5%) and relative enlargement of ipsilateral ovary (85.1% and 18.8%). A specificity of up to 100% may be achieved by combining two or more sonographic findings, along with a sensitivity of up to 74.5% and 55.3% when combining two or three sonographic findings respectively (31). In our case we detected ovarian edema with ovarian enlargement and abnormal ovarian blood flow, in the context of a complete rotation of the right ovary. These findings were noted at the time of surgery.

Alternative imaging modalities, such as Magnetic Resonance Imaging (MRI) and computed tomography (CT) scans, also constitute valuable diagnostic options. MRI displays a high accuracy rate for the diagnosis of OT in patients presenting with acute pelvic pain; findings include stromal edema, peripherally arranged cysts, ovarian hemorrhage, rotated ovarian pedicle, thickening of the tubal wall more than 10mm and symmetrical and asymmetrical increase in the wall thickness of ovarian cysts and the whirlpool sign (32, 33). In these cases, additional imaging with USG may be unnecessary (34). In our patient, MRI was not performed. Beranger- Gilbert *et al* reported that MRI has an accuracy rate of more than 80% for the diagnosis of OT in patients presenting with acute pelvic pain (35).

Additionally, histopathological findings may vary between pregnant and non-pregnant women. Specifically, pregnant women usually exhibit normal ovarian tissue as one of the most prevalent

histopathological findings. This stands in contrast to previous studies that identified serous cysts, corpus luteum cysts, and follicular cysts as common causative factors for torsion (19). A corpus luteum cyst emerges as the second most frequently observed pathology associated with OT (36). In our case, a histopathological examination was conducted, revealing the presence of a corpus luteum cyst. Another study by Yen et al. which involved 174 pregnant patients with a preexisting adnexal mass of ≥ 4 cm, reported an incidence of OT at 15% with torsion occurring between 10 and 17 weeks of gestation (36), however several other studies report a lower incidence of OT during pregnancy. Moreover, it should be noted that OT may also develop during the postpartum period (37).

Regarding the therapeutic approach to OT, the literature outlines two distinct treatment options. The first one involves adnexectomy, where the affected ovary and fallopian tube are removed. The alternative approach includes conservative surgery which involves adnexal detorsion with or without lesionectomy (38), however adnexectomy becomes necessary if the adnexa appears non-viable following detorsion (39). In our case, an oophorectomy was performed. When treatment is limited to detorsion, there is a potential of OT recurrence in the same pregnancy (40). In a study by Pansky et al., the recurrence rate among cases treated with detorsion was 20%, whereas no recurrence was documented in patients who underwent cystectomy or oophorectomy (41).

Conclusion

Ovarian torsion constitutes a significant gynecologic emergency with a notably challenging diagnostic approach in pregnant women (8). The clinical presentation of this condition during pregnancy is relatively similar to that of the general pop-

ulation, featuring non-specific clinical manifestations, thereby rendering clinical suspicion a challenging task (25). Ultrasonography remains a valuable diagnostic tool that may demonstrate abnormal ovarian blood flow or the presence of an ovarian mass, although instances exist where no evidence of the condition is detected (26, 29). Prompt surgical intervention, consisting of adnexectomy or conservative surgery involving detorsion, is imperative for both diagnostic confirmation and effective management of ovarian torsion (38).

Informed Consent

Patient's informed consent was obtained prior to article submission.

Author Contributions

Ziogou A, Giannakodimos A and Manikas A wrote the original draft.

Giannakodimos I collected and interpreted the data and revised the manuscript.

Ziogou E and Ioannou P revised the manuscript.

Conflict of interest

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