

Isolated Fallopian Tube Torsion with a Paratubal Cyst Treated with Laparoscopic Approach in the Third Trimester of Pregnancy: A Case Report and Literature Review

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Submitted: 17.06.2023

Revised: 04.07.2023

Accepted: 16.07.2023

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Keywords: Adnexal torsion; isolated tubal torsion; laparoscopy; pregnancy; third trimester.



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ABSTRACT

A 29-year-old primigravid pregnant women was admitted to our tertiary center with complaints of abdominal pain, nausea, and vomiting at the 29 weeks of gestation. Ultrasonography revealed a 6 cm diameter cystic mass in the right adnexa, and there was a high suspicion of adnexal torsion. On magnetic resonance imaging, the right ovary appeared normal and there was a 6 cm cystic mass adjacent to the right ovary, and the findings supported isolated fallopian tube torsion. Emergency laparoscopy revealed that the right fallopian tube and paratubal cyst were torsioned by 720°, and the fallopian tube was necrotic. This torsion did not include the ovary. Since the color tone of the fallopian tube did not recover after detorsion, the right salpingectomy was performed. After the patient was discharged, routine obstetric follow-ups were continued and 3375 g male infant was delivered by cesarean section at 39 weeks of gestation.

INTRODUCTION

Adnexal torsion refers to the rotation of the adnexa (ovary only, ovary and fallopian tube, and fallopian tube only) on its ligamentous supports and can affect women of all ages, from fetal life to the postmenopausal period.^[1,2] Although the incidence of adnexal torsion is unknown, it is estimated to be responsible for 2.7% of emergency surgeries and 15% of surgically treated adnexal masses in women.^[3,4] It is one of the most common gynecological surgical emergencies as it results in partial or complete obstruction of the blood supply to the ovary and fallopi-

an tube.^[4] Predisposing factors for adnexal torsion include increased ovarian size or ovarian mass, free mobility, long pedicle, and prior adnexal torsion.^[5] In addition, displacement of the uterus outside the pelvis during pregnancy is another risk factor.^[6]

Adnexal torsion during pregnancy is a condition that can cause maternal and fetal morbidity.^[5] Although it can occur in all trimester of pregnancy, it is more common in the first trimester (71%) than in the second (22%) and third (7%) trimesters.^[7] While most pregnant women have ovarian or both ovarian and fallopian tube torsion, isolated fallopian tube torsion is extremely rare.^[6,7] The presentation and

management of pregnant patients with isolated fallopian tube torsion are similar to non-pregnant women. However, diagnosis and treatment of isolated fallopian tube torsion in pregnancy are particularly challenging during the third trimester due to the size of the gravid uterus. Although both laparoscopic and laparotomic approaches are performed in treatment during pregnancy, laparoscopy can be challenging, especially in the third trimester.

We herein report an extremely rare case of isolated fallopian tube torsion treated by laparoscopic approach in the third trimester. In addition, we conducted a literature review on pregnant women with isolated fallopian tube torsion in the third trimester who were treated with the laparoscopic approach.

CASE REPORT

A 29-year-old primigravid pregnant woman was admitted to the obstetrics clinic of our tertiary center with complaints of abdominal pain, nausea, and vomiting at the 29 weeks of gestation. In her history, she had a 5 cm cystic mass in the right adnexa that was detected in the preconceptional period. Ten days ago, she had applied to another secondary center with the complaint of abdominal pain in the right lower quadrant and was discharged after analgesia and hydration. However, the right lower quadrant pain, which increased and decreased from time to time, continued for 10 days before admission to our center.

When she applied to our center, abdominal examination

revealed tenderness, defense, and rebound in the right lower quadrant, and there was no uterine contraction. Vital signs (arterial blood pressure, pulse, fever, and respiratory rate) were normal. Vaginal examination did not reveal bleeding, rupture of membranes, or cervical dilatation. She did not complain about any bowel or urinary symptoms. Ultrasonography revealed a single fetus with normal amniotic fluid index and measurements compatible with gestational age, and there was no evidence of placental abruption. The cervical length was measured as 35 mm by transvaginal ultrasonography. A 6 cm cystic mass containing a hyperechoic clot was detected in the right adnexal area, adjacent to the right ovary (Figure 1a). No flow was observed in the cyst wall in color Doppler examination. Laboratory examinations revealed hemoglobin 12.2 g/dL, WBC count 13.130/mm³, CRP 3.1 mg/L, sedimentation 61 mm/h, and urinalysis were normal. In the cardiotocography, fetal heartbeats were reactive and there was no uterine contraction. For analgesia, the patient was given 10 mg of paracetamol intravenously, but there was no relief. Magnetic resonance imaging (MRI) was planned because the patient had acute abdomen and there was suspicion of adnexal torsion on ultrasonography. On MRI, the craniocaudal diameter of the right ovary was measured as 3 cm, and there was a 6 cm cystic mass adjacent to the right ovary (Figure 1b-d). MRI findings supported the diagnosis of adnexal torsion and no other abdominal pathology was observed.

Emergency laparoscopy was planned for the patient and

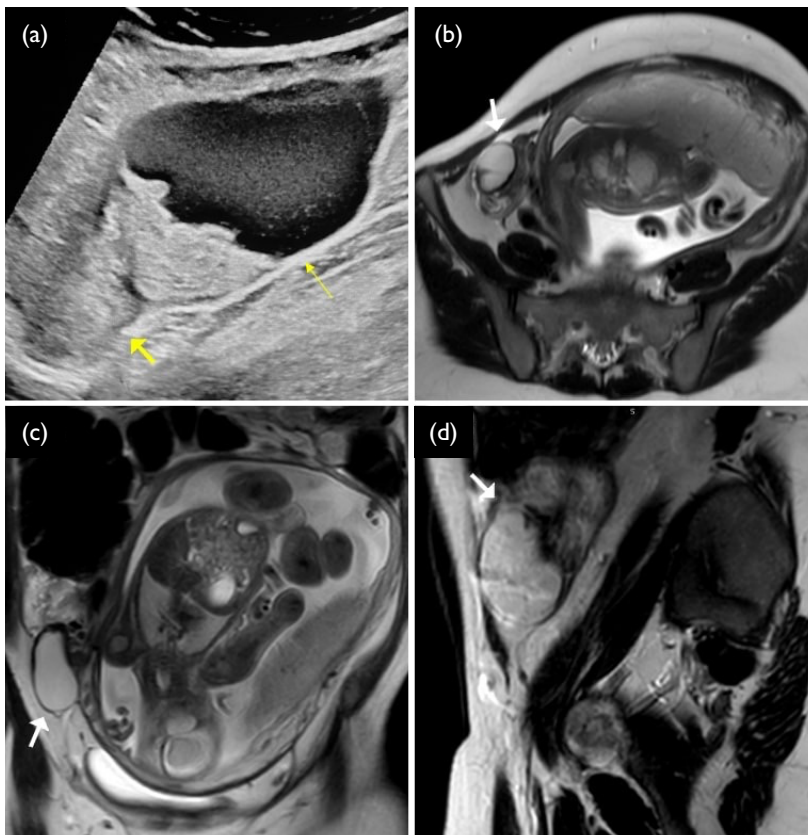


Figure 1. Ultrasonography and magnetic resonance imaging (MRI) images of isolated fallopian tube torsion in the third trimester. Ultrasonographic image of a paratubal cystic mass (thin yellow arrow) with a normal-appearing right ovary (thick yellow arrow) (A). Axial (B), coronal (C) and sagittal (D) images of isolated fallopian tube torsion in the third trimester on magnetic resonance imaging (White arrow indicates isolated fallopian tube torsion).

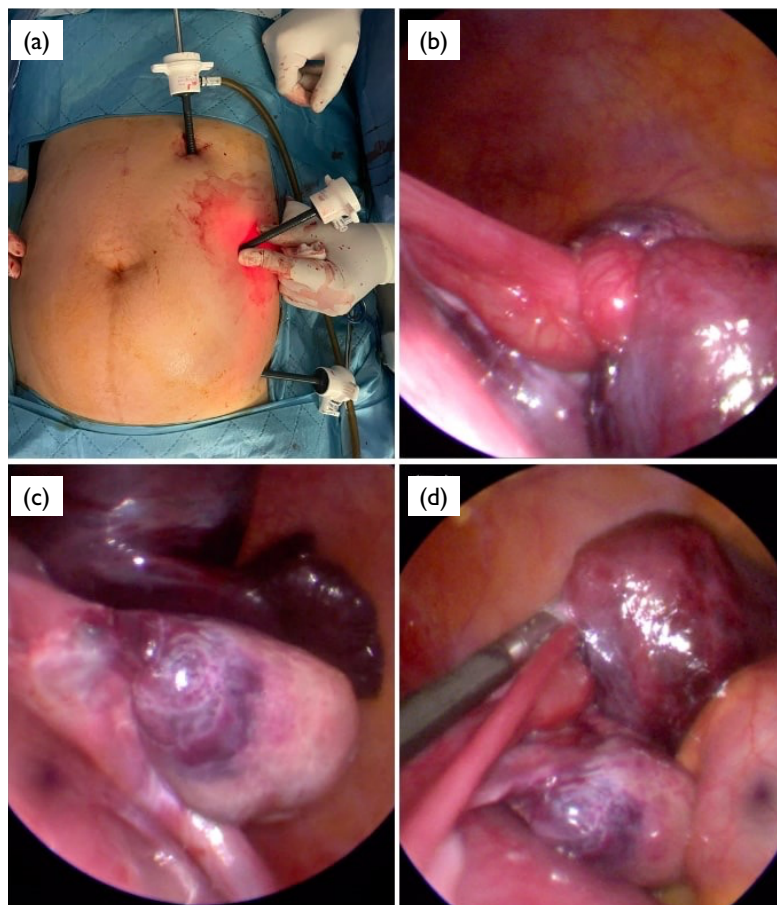


Figure 2. Laparoscopic approach in a pregnant woman with isolated fallopian tube torsion in the third trimester. Insertion sites of 5 mm trocars (A). Laparoscopic image of the right fallopian tube torsioned by 720 degrees (B). The right ovary is not included in this torsion and the right fallopian tube has an ischemic appearance (C). Ischemic right tube with the paratubal cyst excised by a Ligasure (D).

informed consent was obtained. Preoperatively, 12 mg of intravenous betamethasone was given for fetal lung maturation, 100 mg of rectal indomethacin for tocolysis, and 1 g of intravenous cefazolin for antibiotic prophylaxis. After general anesthesia in the supine position, the stomach was emptied with a nasogastric tube. A 5 mm trocar was entered into the abdomen from Palmer's point and the pressure was adjusted to 10 mmHg to provide pneumoperitoneum. Then, two 5 mm trocars were placed in the abdomen from the left subcostal and inguinal area (Figure 2a). The patient was placed in the left lateral oblique position to minimize the compression on the inferior vena cava. In the intraperitoneal exploration, it was observed that the right fallopian tube and paratubal cyst were torsioned by 720° (2 rotations), and the fallopian tube was necrotic (Figure 2b-d). The right ovary was not involved in this torsion. Since the color tone of the fallopian tube did not recover after detorsion, the right salpingectomy and cystectomy were performed. The excised fallopian tube and paratubal cyst were placed in the endobag and removed from the abdomen. Pathological examination of the fallopian tube and paratubal cyst was reported as necrotic fallopian tube and benign paratubal cyst.

In the post-operative period, tocolysis was continued with 25 mg oral indomethacin every 6 h for 48 h, and a second dose of 12 mg betamethasone was administered 24 h after the first dose of betamethasone. At the 12th post-op-

erative h, 4000 units of low molecular weight heparin were started for thromboprophylaxis. The patient was discharged on the second post-operative day and routine obstetric follow-ups were continued. A 3375 g male infant was delivered by cesarean section at the 39th week of gestation. Both ovaries and left fallopian tubes were normal in cesarean section.

REVIEW OF LITERATURE

A literature review was conducted according to the PRISMA guideline. We searched all relevant articles in the international electronic bibliographic database PubMed using a combination of comprehensive search criteria and international MeSH terms. The search was limited to articles published in the English language. We used the following words for selection: "laparoscopy," "tube torsion," "salpingectomy and pregnancy," and "tubal torsion and pregnancy." Two independent researchers selected the most relevant articles by evaluating article titles and abstracts, or the full text if the abstract did not provide sufficient information. Letters to editors, editorials, review articles, duplicates, and meta-analysis were excluded from the study. We included only reports involving pregnant women diagnosed with isolated tubal torsion in the third trimester and treated with the laparoscopic approach. We excluded that studies with ovarian or adnexal torsion,

Table 1. Literature review of pregnant women with isolated fallopian tube torsion in the third trimester and treated with laparoscopic approach

Study	Chohan et al. ^[15]	Duncan and Shah ^[12]	Macedo et al. ^[11]	Takeda et al. ^[8]	Present study
Maternal age (years)	33	28	18	30	29
Gravida, parity	G5P4	G1P0	G1P0	G1P0	G1P0
GA at diagnosis (weeks)	35	30	33	31	29
Symptoms (weeks)	Right lower quadrant pain, nausea, vomiting, and uterine contraction Right lower quadrant pain Generalized abdominal pain, nausea and vomiting Right lower quadrant pain Right lower quadrant pain, nausea and vomiting				
Diagnostic imaging method	US	US	US, MRI	US, MRI	US, MRI
Initial diagnosis-method	Ovarian torsion Adnexal torsion Ruptured appendix, ruptured ovarian cyst, or peritoneal inclusion cyst Isolated tubal torsion Adnexal torsion				
Laterality/cyst diameter (mm)method	R/92	R / 47	R/N/A	R/40	R/60
Symptom onset to surgical intervention (mm) method	1 day	1 day	1 day	7 h	10 days
Laparoscopic proceduresurgical intervention (mm) method	Uniloculated fimbrial cyst and ischemic fallopian tube Appendicitis and transmural congestion and edema consistent with torsion of the fallopian tube Ischemic fallopian tube and paratubal cyst Necrotic fallopian tube and paratubal cyst				
Post-operative morbidity	Uncomplicated post-operative course Uncomplicated post-operative course N/A Increased uterine contraction Uncomplicated post-operative course				
GA at delivery (weeks)	38	38	N/A	38	39
Mode of delivery	Vaginal delivery Cesarean section N/A Vaginal delivery Cesarean section				

GA: Gestational age; LESS: Laparoendoscopic single-site surgery; MRI: Magnetic resonance imaging; N/A: Not available; R: Right; US: Ultrasonography.

studies involving non-pregnant women, and studies that were not treated laparoscopically. We collected data on demographic characteristics, clinical features, and fetal and maternal outcomes of the cases.

DISCUSSION

The prevalence of isolated fallopian tube torsion in women is 1/1.500.000, and it is even less common in pregnancy with only case reports in the literature.^[6] Risk factors for

isolated fallopian tube torsion are long fallopian tube, hematosalpinx, hydrosalpinx, paratubal cysts, tubal ligation, fallopian tube neoplasms, and pelvic adhesions, but it can also occur in healthy fallopian tubes without any risk factors.^[8,9] Furthermore, trauma is identified as one of the contributing factors to torsion,^[9] which affects approximately 8% of pregnancies with complications.^[10] However, no signs of trauma were observed in this case.

Patients usually have localized acute abdominal pain accompanied by nausea and vomiting at first admission.^[11] In patients whose treatment is delayed, necrotized fallopian tube due to torsion may cause peritoneal irritation and patients may present with acute abdomen. Since the clinical presentation is non-specific, the diagnosis is based on imaging modalities such as ultrasonography and MRI with a high degree of suspicion. Prompt diagnosis and emergency surgical treatment are essential in pregnant women with isolated fallopian tube torsion, as necrotic tubal tissue may cause preterm delivery, even fetal loss, and maternal morbidity.^[12]

The causes of acute abdominal pain during pregnancy may be obstetric (ectopic pregnancy, pre-term delivery, placental abruption, etc.) gynecological (hemorrhagic ovarian cyst, ovarian cyst rupture, torsion or degeneration of the leiomyoma, tubo-ovarian abscess, etc.), gastrointestinal (acute appendicitis, bowel obstruction, bowel perforation, cholecystitis, etc.), and urinary tract (nephrolithiasis, pyelonephritis, ureteral or renal colic, hydronephrosis, etc.) pathologies, and differential diagnosis may be difficult. Ultrasonography is the first-line diagnostic modality in pregnant women, and isolated tubal torsion is suspected when the ipsilateral ovary appears normal with a paraovarian cyst or hydrosalpinx.^[6] However, it is not easy to evaluate the adnexa in the third trimester due to uterine enlargement. Moreover, as in our case, most cases of isolated fallopian tube torsion during pregnancy reported in the literature are right-sided,^[13] making it difficult to exclude acute appendicitis, which is a common cause of acute abdomen in pregnancy. Considering that the appendix is not always visible on ultrasonography, especially in the third trimester, MRI may be helpful in the differential diagnosis. However, in most of the cases, the definitive diagnosis is made by surgical exploration.^[13]

Physicians may have a conservative tendency such as “wait and see approach,” especially in pregnant women with acute abdominal pain in the third trimester. In a recently published study, the mean time from admission to surgery was significantly shorter in patients in the first trimester compared to late pregnancy.^[7] This is probably related to the difficulty of distinguishing acute abdominal pain from other causes such as premature delivery and the tendency of physicians to avoid surgical intervention in the third trimester. However, such an approach for the torsioned fallopian tube would result in infection in the abdominal cavity and an increased risk of maternal and fetal morbidity and mortality. Therefore, early surgical intervention should be performed in pregnant women with acute abdominal

pain and signs of acute abdomen, regardless of gestational week, unless clearly denied by imaging modalities.^[12]

The traditional approach for the diagnosis and treatment of isolated tubal torsion in pregnancy is exploratory laparotomy. On the other hand, the laparoscopic approach in pregnancy can be used with similar overall outcomes for maternal and fetal well-being.^[14] In the literature review, a total of five cases were reported, including the present case, in which isolated fallopian tube torsion was successfully treated with the laparoscopic approach in the third trimester (Table 1).^[8,11,12,15] The present study provides evidence that the laparoscopic approach performed by experienced operators is safe in the treatment of isolated fallopian tube torsion in the third trimester. Except for uterine contractions in one case, no perioperative or post-operative maternal and fetal complications were observed in any of the previously reported cases, and all cases could be completed laparoscopically. Since the fallopian tube was ischemic during treatment, salpingectomy was performed in most of the patients treated with the laparoscopic approach, as in laparotomy.^[6] In addition, all of the pregnant women who underwent laparoscopy in the third trimester delivered at term, and no complications were encountered in the follow-up of the pregnant women until delivery.

Conclusion

Isolated fallopian tube torsion may cause acute abdominal pain in the third trimester. Although ultrasonography and MRI are guiding, the definitive diagnosis is made by surgical exploration. The laparoscopic approach, which will be performed by an experienced operator in minimally invasive surgery, can be safely applied in the treatment of pregnant women with isolated fallopian tube torsion, even in the third trimester.

Informed Consent

Retrospective study.

Peer-review

Externally peer-reviewed.

Authorship Contributions

Concept: E.E.A., M.A.; Design: T.T.; Supervision: T.T.; Data: H.L.; Analysis: M.A., H.L.; Literature search: E.E.A., H.L.; Writing: E.E.A., H.L.; Critical revision: T.T.

Conflict of Interest

None declared.

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Gebeliğin Üçüncü Trimesterinde Laparoskopik Yaklaşımla Tedavi Edilen Paratubal Kist ile Birlikte İzole Fallop Tüpü Torsiyonu: Olgu Sunumu ve Literatür Derlemesi

Yirmi dokuz yaşında ilk gebeliği olan hasta 29. gebelik haftasında karın ağrısı, bulantı ve kusma şikayetleri ile üçüncü basamak merkezimize başvurdu. Ultrasonografide sağ adnekte 6 cm çapında kistik kitle saptandı ve adneksiyel torsiyon şüphesi mevcuttu. Manyetik rezonans görüntülemesinde sağ over normal görünümdeydi. Sağ over komşuluğunda 6 cm boyutunda kistik kitle mevcuttu ve bulgular izole fallop tüpü torsiyonunu destekler nitelikteydi. Acil laparoskopide sağ fallop tüpü ve paratubal kistin 720 derece torsiyone olduğu ve fallop tüpünün nekrotik olduğu görüldü. Torsiyon sağ overi içermiyordu. Detorsiyon sonrası fallop tüpünün renk tonu düzelmediği için sağ salpinjektomi yapıldı. Hasta taburcu edildikten sonra rutin obstetrik takiplerine devam edildi ve 39. gebelik haftasında sezaryen ile 3375 gr erkek bebek doğurtuldu.

Anahtar Sözcükler: Adneksiyel torsiyon; izole tubal torsiyon; laparoskopi; gebelik; üçüncü trimester.