



Introduction

Ovarian torsion is a rare condition characterized by the twisting of the ovary and its vascular pedicle on the suspensory ligament, leading to impaired venous outflow, followed by decreased arterial inflow, and subsequently ischemia and infarction. It is a gynecologic emergency and is therefore frequently a differential consideration in women presenting with acute lower abdominal or pelvic pain. The clinical presentation in patients with ovarian torsion can be nonspecific, however, and often overlaps with that of other acute abdominal and pelvic pathology seen in the emergency setting. Although definitive diagnosis is achieved through laparoscopy, imaging plays a key role in both the successful early identification of ovarian torsion as well as differentiation from other acute abdominal and pelvic pathology. We describe two cases of ovarian torsion that presented at our institution and characterize the imaging manifestations of ovarian torsion on both ultrasound and MRI with correlation with intraoperative images where possible.

Case Descriptions

The first case is a 40-year-old woman with a history of left ovarian cysts who presented to the Emergency Department with left lower abdominal pain onset two days prior. She was hemodynamically stable and afebrile. Physical examination demonstrated diffuse abdominal tenderness with guarding and no rebound tenderness. Pelvic examination revealed a firm, immobile, tender mass posterior to the uterus on bimanual exam. Quantitative beta hCG was negative. Transvaginal and transabdominal pelvic ultrasounds were performed (Figure 1). OB/GYN were consulted and admitted the patient, who initially opted for observation and conservative management. Pelvic MRI with and without contrast was then performed (Figure 2). The patient then opted for surgical management and underwent diagnostic laparoscopy, which demonstrated a necrotic left ovary and fallopian tube in the posterior cul-de-sac (Figure 4). A left salpingo-oophorectomy was performed. The patient tolerated the procedure well without complications and was discharged home. The second case is a 27-year-old woman with a history of ovarian cysts who presented with intermittent abdominal pain for one month. Less clinical history was available for her case, however, she ultimately presented to our outpatient imaging center for pelvic MRI, which confirmed right ovarian torsion as the etiology of her symptoms (Figure 3).



Figure 1. Case 1: Transvaginal ultrasound. Grayscale and spectral Doppler images of the left ovary demonstrate an enlarged left ovary. Color Doppler flow is present, though decreased.

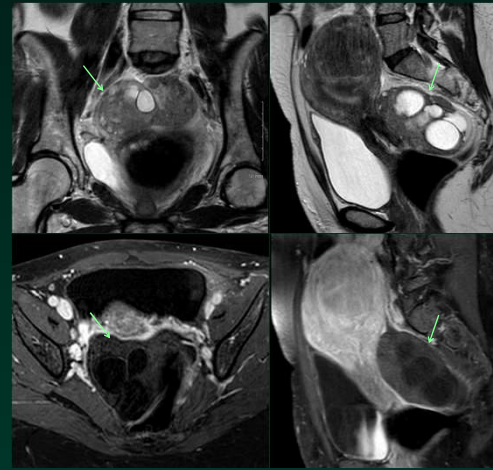


Figure 2. Case 1: Pelvic MRI with and without intravenous contrast. Coronal and sagittal T2 images of the pelvis show the enlarged left ovary within the cul-de-sac to the right of midline (green arrows). Axial and sagittal T1 post-contrast images demonstrate that the ovary does not enhance.

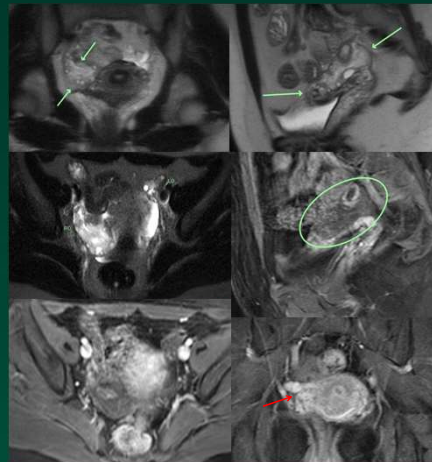


Figure 3. Case 2: Pelvic MRI with and without intravenous contrast. Coronal, sagittal, and axial T2 images of the pelvis demonstrate an enlarged, edematous right ovary with displaced peripheral follicles (green arrows). Sagittal and axial T1 post-contrast sequences show that the right ovary, which contains a corpus luteum, does not enhance (green oval). Coronal T1 post-contrast images show dilated, tangled vessels adjacent to the right ovary (red arrow) consistent with the torsed ovarian vascular pedicle (whirlpool sign).



Figure 4. Case 1: Intraoperative image. An enlarged, necrotic left ovary and fallopian tube were identified during diagnostic laparoscopy.

Discussion

Ovarian torsion makes up 2-3% of gynecologic emergencies, and in 50-90% of cases, it is due to a benign or malignant ovarian mass serving as a lead point^{3,4}. Additionally, conditions resulting in ovarian enlargement such as ovarian hyperstimulation syndrome can also confer increased risk for ovarian torsion². Ovarian torsion is slightly more common on the right side, as the left ovary is relatively tethered in place by the adjacent sigmoid colon³.

The ultrasound features of ovarian torsion are well-described in the literature. On grayscale images, there will be ovarian enlargement with peripheral displacement of the follicles^{1,3}. On color Doppler images, there may be decreased or absent flow, however, the presence of flow does not exclude ovarian torsion¹. In some cases, the twisted vascular pedicle may be visible, also known as the "whirlpool sign." Free fluid may also be present, though nonspecific¹.

While CT is not the modality of choice for evaluating the ovaries, it is often performed in the emergency setting for the undifferentiated female patient presenting with lower abdominal or pelvic pain, and therefore is mainly helpful for identifying or ruling out other potential etiologies for these symptoms. On CT, findings are similar to those seen on ultrasound, including ovarian enlargement with or without underlying cyst or mass, a twisted vascular pedicle, or free fluid³. Additional findings include abnormal or absent enhancement, ipsilateral vascular engorgement, fallopian tube thickening, or ipsilateral deviation of the uterus^{3,4}. An ovary measuring at least 50 Hounsfield units on a noncontrast CT raises concern for hemorrhagic necrosis².

MRI has great utility in confirming or ruling out ovarian torsion and can be useful in sonographically inconclusive cases. Similar to ultrasound and CT, MRI findings suggestive of torsion include an enlarged ovary with or without peripherally displaced follicles, abnormal or absent ovarian enhancement, ipsilateral uterine deviation, or pelvic free fluid³. Twisting of the vascular pedicle is best appreciated on post-contrast sequences⁵. In cases of hemorrhagic necrosis, there may be a rim of increased T1 signal due to the presence of methemoglobin, with internal areas of decreased T2 signal representing additional areas of interstitial hemorrhage^{5,6}.

Additional differential considerations for a complex adnexal/ovarian mass in the patient with acute abdominal/pelvic pain include ectopic pregnancy, hemorrhagic ovarian cysts, benign or malignant ovarian tumors, or torsion of a pedunculated fibroid⁴. Massive ovarian edema is a rare condition which can present similarly to ovarian torsion clinically, however, the ovary will demonstrate enhancement⁴. Polycystic ovarian syndrome or ovarian hyperstimulation syndrome present with ovarian enlargement, however, involvement will be bilateral rather than unilateral as in ovarian torsion⁴.

References

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