

Torsion, infarction, and rupture of a nongravid uterus: a complication of a large ovarian cyst

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Abstract

Torsion of a nongravid uterus is rare, as most cases of uterine torsion occur during pregnancy. We report a case of a large ovarian cyst causing uterine torsion, infarction, and rupture. A 57-year-old woman presented with acute-onset abdominal pain and increasing abdominal girth over the past year. Contrast-enhanced computed tomography (CT) demonstrated axial rotation and swirling of the uterus and the mesenteric fat, leading to a preoperative diagnosis of uterine torsion. Laparotomy confirmed that the uterine corpus had undergone a 180-degree axial rotation, and further revealed uterine wall infarction and rupture into the endometrium as well as partial decapitation of the uterus from the cervix. The swirled appearance of the uterus, radiologically similar to the “whirlpool sign” seen in bowel volvulus, is an important CT finding to recognize, especially in view of the risk of irreversible ischemic complications this uncommon entity may inflict on the uterus.

Key words: Uterine torsion—Nongravid uterus—Ovarian cystadenoma—Uterine rupture—Whirlpool sign—Computed tomography

A 57-year-old postmenopausal gravida 3, para 3 woman presented to the emergency department with lower abdominal pain that had awakened her. She also complained of nausea and one episode of nonbilious, nonbloody vomiting. She also reported that over the past year she has experienced intermittent episodes of severe abdominal pain and her abdominopelvic girth had also progressively increased. She denied any shortness of breath, leg swelling, vaginal discharge, vaginal bleeding,

diarrhea, or constipation. Past gynecologic history was significant for two prior cesarean sections and bilateral tubal ligation.

Initial physical examination was significant for a distended abdomen with a palpable mass filling the abdomen. Pelvic examination revealed the cervix to be high within the vagina. CA-125 level was 28 units/mL, within the normal range.

Pelvic ultrasound demonstrated a large cystic mass without mural nodularity extending superiorly to the level of the left hepatic lobe (Fig. 1). Because the uterus and ovaries were not visualized on ultrasound in their usual positions (Fig. 2), computed tomography (CT) was obtained and it demonstrated a 30.8 cm (craniocaudal) × 26.8 cm (transverse) × 17.0 cm (anteroposterior) cystic mass arising from the left adnexa. In addition, both the vagina and cervix were retracted cranially, and the uterus demonstrated rotation around its central axis. Swirling of the uterus and the mesenteric fat, resembling the whirlpool appearance of a hurricane on a weather map, was also noted on both transverse and sagittal scans (Fig. 3, Videos 1–3). A preoperative diagnosis of uterine torsion was made. A 4.8-cm right adnexal cyst was also incidentally noted.

Laparotomy demonstrated a very large left ovarian cyst that had a smooth surface and appeared necrotic at its base (Fig. 4). The uterus was small, measuring approximately 8 cm in length, and had undergone at least 180° torsion along the corpus, with the left ovarian mass having undergone an additional 360° torsion. The anterior uterine wall was necrotic and had ruptured through to the endometrium, and the lower uterine segment was partially decapitated from the cervix (Fig. 5), likely due to deprivation of vascular supply and resulting infarction. A total hysterectomy with bilateral salpingo-oophorectomy was performed.

The histological report identified the left ovarian mass to be a benign multilocular cyst. The cyst weighed 9.2 kg and measured 29 × 27 × 20 cm. It demonstrated an in-

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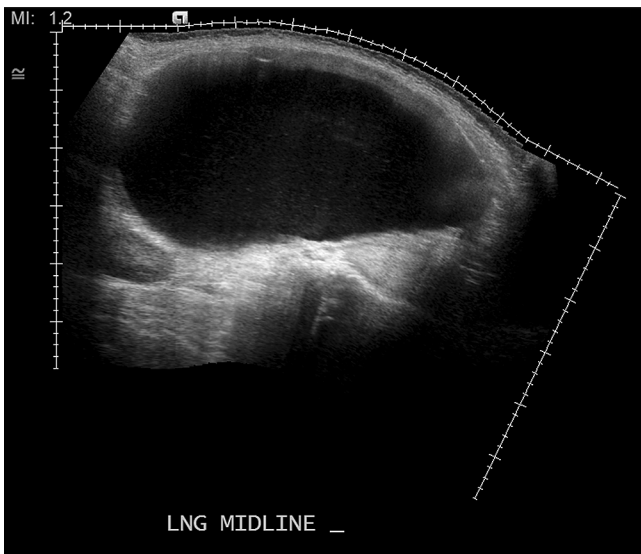


Fig. 1. Sagittal transabdominal ultrasound image at the midline. There is a large cystic mass without mural nodularity or septations extending from the pelvis to the level of the left hepatic lobe.

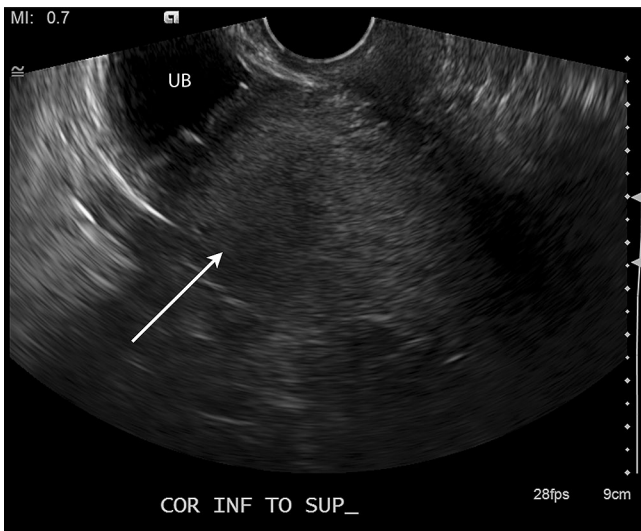


Fig. 2. Coronal grayscale transvaginal ultrasound image of the pelvis. Note that the uterus is not demonstrated in its usual anatomic orientation (*arrow*). *UB* urinary bladder.

tact capsule and a smooth outer surface, and was filled with approximately 8 L of serosanguinous fluid. There was one subcentimeter solid nodule but no papillary projections. In addition, the smaller right ovarian cyst was identified to be a mucinous cystadenoma. Histological analysis also demonstrated extensive hemorrhage

Fig. 3. Uterine torsion. Axial (**A, B**), sagittal (**C–E**), and coronal (**F**) contrast-enhanced CT images of the abdomen and pelvis demonstrate a large cystic mass arising from the left adnexa (*arrowhead*). Note the axial rotation of the uterus around its central axis (*arrow*), as well as retraction of the cervix and vagina cranially on the sagittal images. A smaller right adnexal cystic mass is also imaged (*curved arrow*), found to represent a mucinous cystadenoma.

and infarction through the anterior uterine wall, with blood dissecting through the myometrial muscle fibers (**Fig. 6**).

The patient's postoperative course was unremarkable and she was discharged in good condition.

Discussion

Uterine torsion is defined as the rotation of the uterus on its long axis by more than 45° [1]. The round ligaments, broad ligaments, and uterosacral ligaments normally stabilize the position of the uterus. Excessive traction on the uterus can cause rotation of the uterus on its long axis. Most reported cases of uterine torsion occur during pregnancy. The most common cause of nongravid uterine torsion is a myomatous uterus [2]. Other causes of nongravid uterine torsion include a bicornuate uterus, pelvic adhesions, adnexal masses, and bowel peristalsis. A review of the literature revealed only three published cases of uterine torsion secondary to an ovarian cyst [3–5]. A case of uterine torsion complicated by infarction and rupture has not been reported, to the best of our knowledge. A study using magnetic resonance imaging (MRI) hypothesized that poor healing of the uterine isthmus after cesarean section may result in suboptimal restoration of normal cervical length, leading to an elongated, structurally weakened cervix and increased risk of torsion of the uterus [2].

The clinical presentation of uterine torsion is variable and nonspecific, ranging from abdominal discomfort to an acute abdomen with shock. Physical exam findings may include vaginal bleeding, uterine tenderness, and twisted vaginal canal. Pelvic exam may also demonstrate cranial retraction of the cervix, which was seen in our case. We suspect that our patient's prior episodes of severe abdominal pain were the result of intermittent torsion and detorsion of her uterus by the ovarian mass.

Radiologically, gas may be seen in the uterine cavity on plain radiographs and CT [6]. On ultrasound, an engorged myometrial vein or a change in placental or fibroid position from a prior examination [6] may suggest the diagnosis of uterine torsion. In our patient, CT demonstrated superior retraction of both the uterus and vagina,



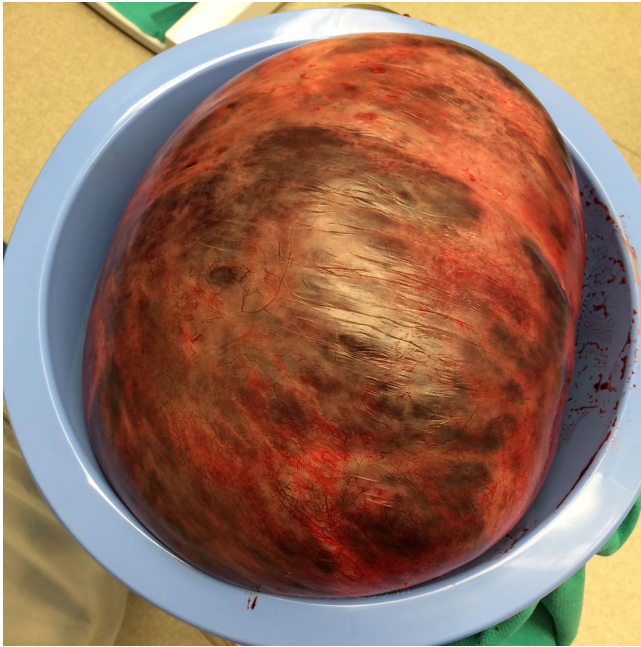


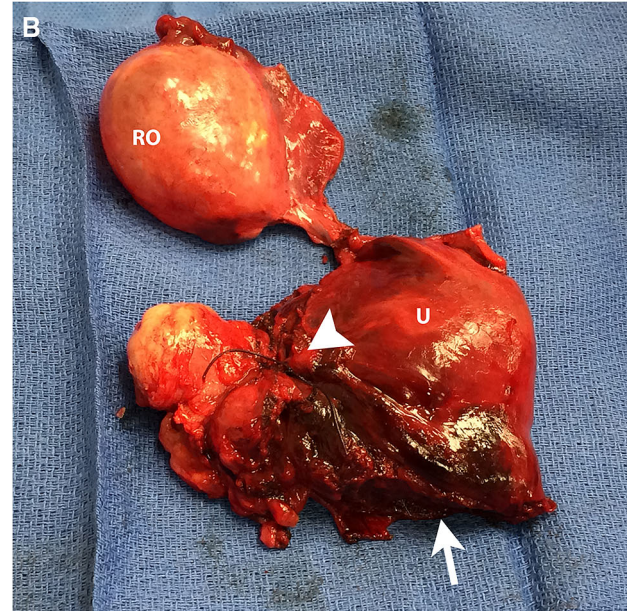
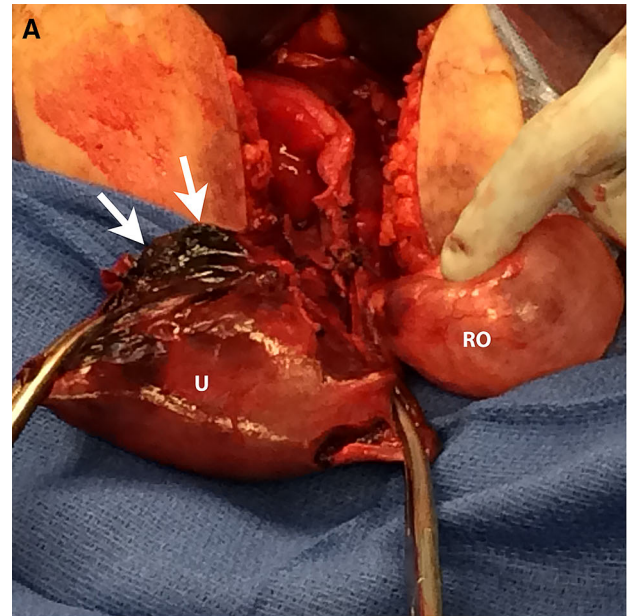
Fig. 4. Postoperative specimen. 9.2 kg left ovarian mass measuring 29 × 27 × 20 cm in size, identified to be a benign multilocular cyst.

likely due to traction mass effect by the ovarian mass. A whirled appearance of the uterus and cervix corresponds to twisting of the uterine vessels and cervix. This is similar to the “whirl sign” or “whirlpool sign” that is seen in volvulus of the bowel on CT, in which swirling strands of soft-tissue attenuation within a background of the mesenteric fat attenuation represent twisting bowel segments and mesenteric vessels [7]. Lack of contrast enhancement within the uterus may signal infarction [2]. MRI may demonstrate the wall of the upper vagina changing from the normal H configuration to an X-shaped configuration, or differential contrast enhancement between the uterine corpus and the cervix [6].

As demonstrated in our case, torsion of the uterus may progress to uterine infarction and rupture. The critical time after which ischemia becomes irreversible is unclear based on current evidence, given the rarity of the condition [2]. Therefore, prompt and accurate preoperative diagnosis of uterine torsion is crucial and an urgent surgical intervention is warranted. While detorsion can be considered to salvage the uterus, especially in a female of childbearing age, hysterectomy should be considered in cases of prolonged torsion with subsequent necrosis and thrombosis.

Conclusion

Torsion of the nongravid uterus is a rare condition. Delay in diagnosis may lead to uterine infarction and rupture with high morbidity and mortality, emphasizing



◀**Fig. 5.** **A** Operative view after resection of the large left ovarian mass. The uterus (U) had undergone at least 180° torsion along the corpus. The anterior uterine wall was visibly necrotic secondary to ischemia (arrows). A smaller right ovarian mucinous cystadenoma was also present (RO). **B, C** Excised right ovary (RO) and uterus (U). A single suture was placed over a surface defect in the anterior uterine wall (*arrowhead*) where the lower uterine segment was partially decapitated from the cervix. Extensive necrosis and clot can be seen extending through the uterine serosa and myometrium (*arrow*).

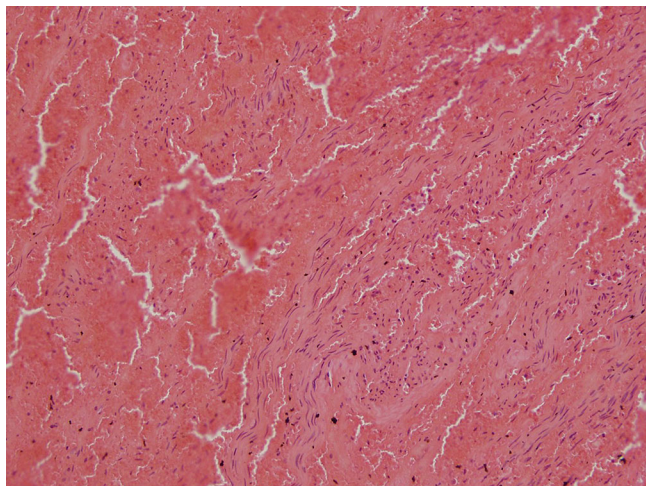


Fig. 6. 20× magnification view of the uterine wall demonstrated hemorrhage dissecting through the myometrial muscle fibers.

the need for a high index of suspicion, especially when interpreting ultrasound and CT imaging. Swirling of the uterus on CT is highly suggestive of uterine torsion, and can resemble the radiologic appearance of the “whirlpool sign” seen in bowel volvulus.

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