MedJEM DOI: 10.52544/2642-7184(2)1003

Case Report

Point-of-Care Ultrasound Appearance of Cystic Ovarian Teratoma Causing Ovarian Torsion

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ABSTRACT

We present a case of ovarian torsion due to a nine-centimeter cystic ovarian teratoma diagnosed on trans-abdominal point-of-care ultrasound (POCUS). A 29-year-old female presented with abrupt onset of 10/10 left lower quadrant pain for one hour. She had a known left-sided ovarian cyst. Patient was normotensive, not tachycardic, and afebrile. Bimanual exam showed a seven-centimeter left, adnexal mass. POCUS revealed a nine-centimeter cystic structure in the left adnexa with a three-centimeter echogenic focus, consistent with a dermoid plug. A radiology-performed transvaginal ultrasound confirmed the left sided mass with absent blood flow. Emergent diagnostic laparoscopy showed the cyst was torsed twice and was found to contain adipose tissue and hair on pathologic evaluation consistent with a benign cystic teratoma. The patient did well postoperatively and was discharged the next day. Ovarian torsion is a gynecologic surgical emergency. The characteristic appearance of a cyst with "dermoid plug" in the appropriate clinical setting can lead to earlier diagnosis and treatment.

Keywords: dermoid cyst, teratoma, ultrasound

INTRODUCTION

Ovarian torsion is an important and diagnostically challenging emergency condition. We present a case of ovarian torsion caused by a nine-centimeter cystic ovarian teratoma that was identified on arrival to the emergency department (ED) by trans-abdominal point-of-care ultrasound (POCUS).

There are two major classifications of ovarian teratoma, mature and immature. In uncommon cases (0.17-2%), immature teratomas become malignant, most often as squamous cell carcinoma. These immature teratomas often contain immature neural tissue in addition to the mature components.[1,2] In contrast, a mature cystic ovarian teratoma (dermoid cyst) is a benign germ cell tumor and is the most common ovarian neoplasm in the second and third decades of life. Median age at diagnosis is 35 years, with 21.1% of tumors asymptomatic at discovery by imaging or incidentally at surgery for other reasons.[3-5] A mature teratoma consists of ectodermal, mesodermal, and endodermal tissue, and are bilateral in up to 17% of cases.[4] The gross appearance of a benign cystic teratoma is a multi-cystic mass with hair, teeth, and skin mixed with sebaceous and adipose tissue.[4,5] The sonographic appearance is a large cystic structure with a highly echogenic component (dermoid plug) due to the characteristics of the hair and sebaceous glands within the teratoma.[6-8] To our knowledge, the (POCUS) appearance has not been extensively described in the emergency medicine (EM) literature. The Radiology literature has described several features evident on POCUS: the dot-dash sign, hyperechoic lines and dots arising from hairs in different orientation, intra-tumoral fat, high amplitude echoes, and the Rokitansky nodule (dermoid plug), a hyperechoic tubercule within the cystic lumen.[9]

CASE REPORT

A 29-year-old, gravida 0 female with history of ovarian cyst presented to the ED with abrupt onset of severe left lower quadrant abdominal pain

This manuscript has supplementary material: SVideo1

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for one hour. One similar episode of pain, which resolved spontaneously, occurred nine months earlier, and a left-sided ovarian cyst was identified. However, the patient did not seek further care or imaging. She had vomited prior to arrival, with two additional episodes during triage. She reported regular periods, but no current vaginal bleeding. She was sexually active with one partner one week ago without birth control.

On arrival, blood pressure was 127/67 millimeters of mercury (mmHg), heart rate 92 beats per minute, respiratory rate 15 per minute, oral temperature 36.3° centigrade and oxygen saturation 100% on room air. She complained of 10/10 focal left lower quadrant pain. Her body mass index was 35.3 kg/m^2. Her physical exam was notable for severe distress and moderate tenderness in the left lower quadrant, with voluntary guarding, but no rebound. Pelvic exam showed normal external genitalia without bleeding. Bimanual examination showed normal cervix, a small 6 cm uterus, and a 7 cm mobile left, anterior adnexal mass, and mild cervical motion

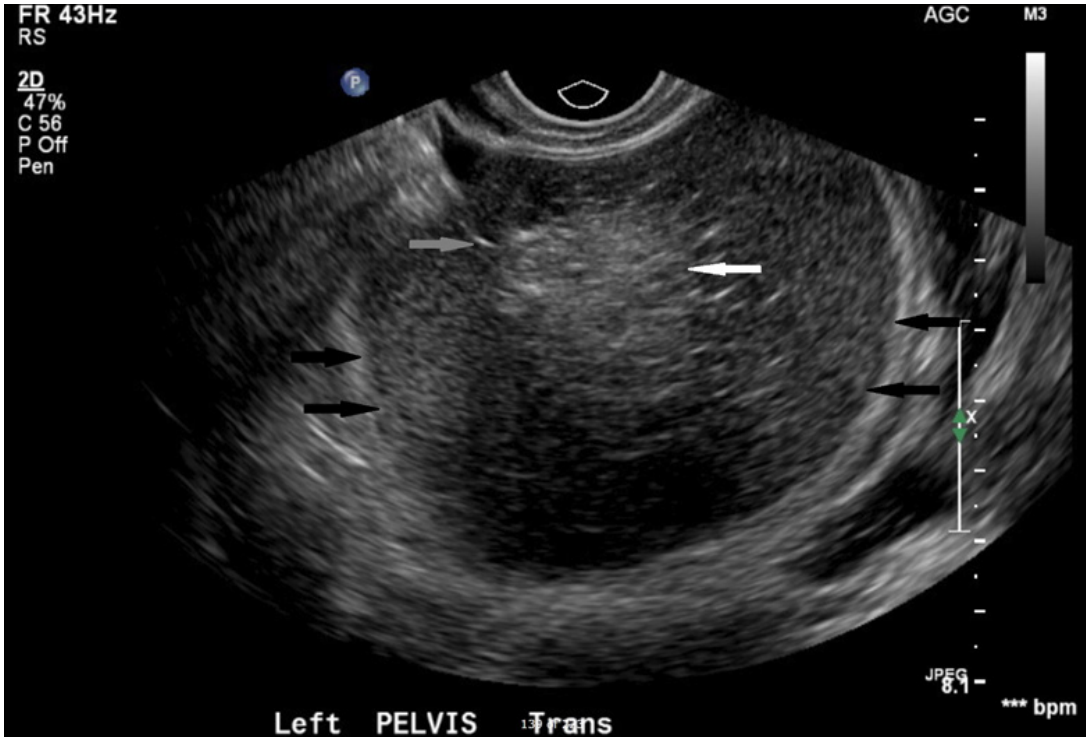

Figure 1 Still image of the left adnexal mass measuring 9 x 7.5 x 6.2 centimeters (black arrow) with numerous fine linear echogenic shadows (grey arrow) and large echogenic nodule measuring 3 centimeters, consistent with dermoid plug (white arrow).

tenderness. The right adnexa was normal.

Trans-abdominal POCUS, performed by the emergency physician as part of the initial exam, revealed a 9 cm cystic structure in the left adnexa with associated 3 cm echogenic focus (see supplementary video SVideo1). Quantitative beta-hCG was <1. Gynecology service was consulted urgently, 15 minutes after arrival, due to concern for ovarian torsion. Radiology performed ultrasound was obtained 3 hours after the patient's initial evaluation. She was treated with intravenous morphine and ondansetron. Transvaginal ultrasound (TVUS) with doppler studies (Figure 1) confirmed a heterogeneous left adnexal mass measuring 9 x 7.5 x 6.2 cm, that contained numerous fine linear echogenic shadows and large echogenic nodule measuring three-centimeters consistent with dermoid plug. There was no internal blood flow. No normal ovarian tissue was identified on the left. The gynecology service saw the patient within one hour of arrival and took the patient to the operating room four hours later. She underwent a laparoscopic left salpingo-oophorectomy. On diagnostic laparoscopy, the mass was removed, and revealed adipose tissue and hair in the cyst and, per the operative report, was consistent with a benign cystic teratoma. Though no formal intraoperative biopsy was performed, the final pathology report confirmed no malignancy.

The mass was torsed twice clockwise. The patient did well postoperatively and was discharged the next day. As no left ovarian tissue was observed, no further intervention was performed to preserve future fertility.

This case highlights the benefits of performing a bedside POCUS during the initial evaluation of a possible ovarian torsion, as well as several of the characteristic features of ovarian teratoma on ultrasound to expedite this time-sensitive diagnosis.

DISCUSSION

We identified the characteristic appearance of a cystic teratoma with high likelihood of torsion on bedside POCUS in the ED and expedited surgical consultation and treatment.

Related case reports in the EM literature suggest that a high index of suspicion and accompanying imaging are key to early diagnosis and prompt surgery to salvage ovarian tissue and fertility. Intermittent torsion makes doppler ultrasound less reliable when suspicion is high, and further supports early identification of a dermoid cyst with POCUS to expedite surgical evaluation.[10-12] Other diagnostic considerations including ruptured ovarian cyst, ectopic pregnancy showing free fluid, uterine leiomyoma, and tubo-ovarian abscess were excluded by POCUS. The limitations of a transabdominal POCUS in evaluation of torsion include large body habitus, ability to identify vascular flow reliably, and operator experience. A study of ultrasound to diagnose ovarian mature cystic teratomas showed a sensitivity of 94.4% and a specificity of 98.2%.[13]

Ovarian torsion is a time-sensitive emergent clinical diagnosis. Characteristic findings of a cyst, classically > 5 cm, and with decreased ovarian blood flow, strongly support the diagnosis. Most patients are asymptomatic, but, as the mass grows, patients are at increasing risk for torsion. This occurs when the ovary, including the cyst or neoplasm, rotates around both the infundibulopelvic and utero-ovarian ligaments.[14,15] As flow becomes compromised, the ovary enlarges, resulting in necrosis, infarction, and local hemorrhage. Torsion presents with pelvic pain (90%), adnexal mass (86-95%), and nausea and vomiting (47-70%).[14,16,17] Treatment involves ovarian cystectomy and surgical detorsion. The imaging study of choice is transabdominal and transvaginal ultrasound.[17] Classic findings are an enlarged and rounded ovary due to edema and engorgement, with heterogeneous appearance of the ovarian stroma and decreased or absent doppler flow within the ovary, specifically the absence of venous outflow.[16,17] Absence of the decrement in blood flow in a suspicious clinical setting does not rule out torsion; definitive diagnosis is by direct surgical visualization of a rotated ovary.

CONCLUSION

Ovarian torsion is a clinical diagnosis supported by radiology-performed TVUS. POCUS can expedite the diagnosis if a cystic ovarian teratoma is identified.

Conflict of interest: the authors declare no conflict of interest or source of funding.

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