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Imaging Findings of Ovarian Dermoid Cyst with Concurrent Torsion and Rupture

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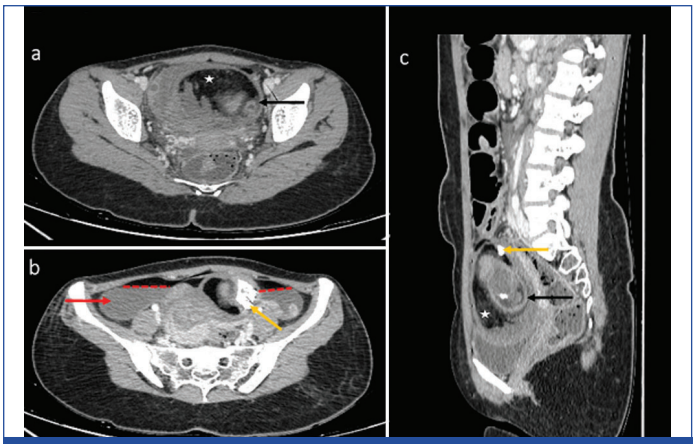
A 25-year-old nulliparous woman presented to the emergency department with complaints of colicky abdominal pain for five days and vomiting of food particles for the past two days. There was no history of fever or diarrhoea. She had been treated conservatively with analgesics at a local clinic before presenting to our hospital. There was no significant past history or known co-morbidities.

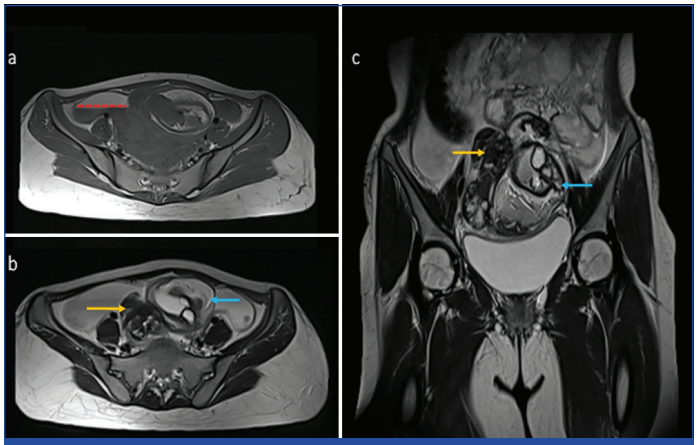
On general physical examination, findings were unremarkable. Abdominal examination revealed mild guarding and tenderness over the right iliac region. An initial provisional diagnosis of acute appendicitis was made, and the patient underwent abdominal ultrasonography. The ultrasound revealed extensive chunky calcifications in the suprapubic and right iliac regions, hyperechoic fluid in the right iliac region and pelvis, but the study was inconclusive due to acoustic shadowing from the calcifications.

Contrast-Enhanced Computed Tomography (CECT) of the abdomen demonstrated a large, well-defined mass measuring approximately 10.0×8.9×5.2 cm (Craniocaudal×Transverse×Anteroposterior) in the midline pelvis. The lesion contained both fluid and fat components with multiple coarse calcifications and appeared to originate from the right adnexa. Several peripherally enhancing cystic areas were also noted within the mass. The right ovary could not be visualised separately. The heterogeneous nature of the lesion, with a mix of fat, fluid, and calcifications, was suggestive of a mature cystic teratoma of the ovary. Moderate free fluid was observed in the subhepatic, perisplenic, bilateral paracolic gutters, interbowel spaces, and pelvic cavity. The presence of fat-fluid levels within this fluid raised suspicion of a ruptured ovarian dermoid [Table/Fig-1].



[Table/Fig-1]: a-c: Axial and sagittal section of venous phase of contrast-enhanced CT Abdomen shows a large cystic lesion (black arrow in a and c) with fat component (white star in a and c) and coarse calcifications (yellow arrow in b and c) in midline of the pelvis. Moderate free fluid in the pelvis (red arrow in b) with fat-fluid levels (dotted red lines).
*CT: Computed tomography

Magnetic Resonance Imaging (MRI) of the pelvis corroborated these findings, showing a heterointense lesion with fat content and fat-fluid levels on both T1-and T2-weighted images. Additionally, MRI revealed a tortuous and edematous right fallopian tube, indicating the likelihood of adnexal torsion [Table/Fig-2].



[Table/Fig-2] a-c: T1 weighted axial a) T2 weighted axial and coronal sections b and c) of Pelvic MRI shows fat-fluid levels (dotted red line in a) and T1, T2 hetero-intense fat-containing lesion (blue arrow in b and c) with a tortuous and edematous right fallopian tube (yellow arrow in b and c).

Emergency diagnostic laparoscopy was performed, which revealed a ruptured right ovarian dermoid cyst with an inflamed and edematous right fallopian tube. The surgical team proceeded with a right salpingo-oophorectomy. Gross examination of the cut-section of the specimen revealed a brown soft-tissue area, a tooth-like structure, and hair follicles. Histopathological examination showed ovarian parenchyma with numerous entrapped hair follicles, areas of coagulative necrosis, haemorrhage, thrombosed blood vessels, and multinucleated giant cells, confirming the diagnosis of torsion of a mature ovarian teratoma. The patient recovered completely within 15 days and had no postoperative complications during a one-month follow-up.

Mature cystic teratomas are the most common ovarian germ cell tumours, accounting for 10-25% of all ovarian neoplasms in women of reproductive age [1]. Although they are generally asymptomatic, they may present as acute abdomen due to torsion (16%), spontaneous rupture (1.3%), or infection (1.2%) [2].

The co-existence of torsion and rupture, as seen in our patient, is rare and exceptional. Imaging plays a crucial role in identifying these complications, which often mimic other causes of acute abdomen. Ultrasonography is the first-line investigation and may reveal an enlarged ovary with peripheral follicles, absent doppler flow, and the classic “whirlpool sign” indicating a twisted ovarian pedicle [3]. On Computed Tomography (CT), a torsed ovarian dermoid cyst appears as an enlarged adnexal mass with fat, fluid, calcifications, and reduced enhancement. Rupture is demonstrated by the presence of fat-fluid levels, scattered intraperitoneal fat globules, wall discontinuity, and peritoneal thickening due to chemical peritonitis [4,5]. On MRI, torsion appears as an enlarged heterogeneous ovary with a twisted pedicle, T2-hyperintense stromal oedema, T1-hyperintense haemorrhagic areas, and absent or reduced enhancement. Rupture, on the other hand, is identified by T1-hyperintense intraperitoneal fat nodules that suppress on fat-saturated sequences, fat-fluid levels, and cyst wall irregularity [6,7].

Rai K et al., reported a case of a ruptured ovarian dermoid cyst in a 53-year-old woman, where delayed rupture led to intraperitoneal leakage of cyst contents and subsequent chemical peritonitis. CECT revealed classical signs of rupture, facilitating timely diagnosis. The authors emphasised the critical role of CT in early identification [8]. Chandar V et al., reported a case of a 32-year-old woman with a ruptured dermoid causing chemical peritonitis, in which ultrasound and CT demonstrated fat-fluid levels and free peritoneal fat [4]. While their case involved rupture alone, our patient demonstrated dual pathology-torsion with rupture-a much rarer scenario. Fernandes GN et al., described a case of chemical peritonitis due to a ruptured ovarian dermoid cyst in a 30-year-old woman who was 26 weeks pregnant, highlighting the importance of including ruptured dermoid cyst as a differential diagnosis of acute abdomen during pregnancy and the diagnostic utility of MRI in such cases [9].

The present case, along with previously reported cases, suggests that complicated ovarian dermoid cysts can present with an acute abdomen and pose diagnostic challenges. Cross-sectional imaging modalities (CT and MRI) are invaluable in identifying these complications, thereby enabling appropriate surgical management and improving patient outcomes.

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