

Difficult Diagnosis and Management of a Torsion-Associated Giant Paratubal Serous Borderline Mass: Unraveling a Rare Gynecologic Pathology—A Case Report

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Background: Paratubal borderline tumors are exceptionally rare, particularly when presenting as giant adnexal masses complicated by torsion. Their clinical and radiological features often mimic ovarian lesions, and diagnosis is often only clarified intraoperatively or after definitive histological examination. This report highlights the diagnostic challenges and fertility-sparing management in a young woman with a giant paratubal serous borderline tumor.

Case Presentation: A 25-year-old nulliparous woman presented with acute abdominal pain and distension. Transabdominal ultrasonography by a senior obstetrician–gynecologist revealed a large left adnexal cystic mass (17 × 13 × 9 cm) with minimal vascular flow on Doppler. Laboratory results showed a normal complete blood count and serum CA-125 of 18.06 U/mL (reference <35 U/mL). No MRI was performed due to the emergency presentation with suspected torsion and limited availability. Exploratory laparotomy revealed a torsed giant left paratubal cyst; a fertility-sparing left salpingectomy was performed, preserving the ovary. Histopathology confirmed a serous borderline tumor arising from the paratubal region.

Discussion: This case illustrates the diagnostic difficulty of distinguishing paratubal from ovarian tumors, particularly in emergency torsion. MRI, frozen section, and extended tumor markers may aid diagnosis but are often unavailable in resource-limited settings. Fertility-sparing surgery remains a feasible option in carefully selected young patients, supported by literature showing favorable outcomes.

Conclusion: Giant paratubal serous borderline tumors with torsion are rare and diagnostically challenging. Clinicians should consider paratubal origin in the differential diagnosis of adnexal masses. Recognition of limitations in low-resource settings and prioritization of fertility preservation are essential for optimal patient care.

Keywords: paratubal serous borderline tumor, adnexal torsion, fertility-sparing surgery, low-resource setting

Introduction

Paratubal cysts are frequently overlooked adnexal lesions that arise from the mesosalpinx, accounting for approximately 5–20% of adnexal masses in women of reproductive age.^{1,2} Though typically benign and asymptomatic, these cysts can occasionally grow to remarkable sizes, with “giant” paratubal cysts often defined as those exceeding 15 cm in diameter.^{3,4} Such enlargement may lead to compressive symptoms, distortion of pelvic anatomy, and serious complications such as adnexal torsion.

Among these, adnexal torsion represents a gynecologic emergency, where twisting of the ovary and/or fallopian tube compromises vascular flow, potentially leading to ischemia or necrosis.^{5,6} Compounding the diagnostic challenge, paratubal cysts frequently mimic ovarian cysts on imaging, making preoperative distinction difficult and often only

clarified intraoperatively or after definitive histological examination.^{1,3} Fertility-sparing management important and should be approached within a multidisciplinary team (MDT).

Rarely, these cysts exhibit atypical epithelial proliferation without stromal invasion, classifying them as serous borderline tumors (SBTs)—a distinct pathological entity with intermediate malignant potential.⁷ These cases raise critical management questions, especially in younger patients where fertility preservation is a key concern.

Here, we present the case of a giant paratubal serous borderline tumor complicated by torsion in a young woman. We highlight the diagnostic challenges, surgical decision-making in an emergency, and the implications of resource limitations in a developing-country setting.

Case Report

A 25-year-old nulliparous woman, with no significant past medical or surgical history, presented to the emergency department with sudden-onset severe lower abdominal pain of six hours' duration, accompanied by nausea and progressive abdominal distension. She reported vague intermittent abdominal discomfort over the preceding six months but had not sought medical attention. Her menstrual cycles were regular, and there was no history of hormonal therapy or previous gynecologic disease.

On examination, abdominal distension was evident, with a firm, cystic mass palpable up to the epigastrium, measuring approximately 17×13 cm. The patient was afebrile, hemodynamically stable, and without signs of peritonitis.

Transabdominal ultrasonography was performed by a senior obstetrician gynecologist. It revealed an anteverted uterus with homogeneous echotexture, measuring 7.09×3.30 cm. Adjacent to the uterus, a large, well-defined cystic mass was visualized in the left adnexal region, measuring 17 × 13×9 cm. Color Doppler demonstrated minimal vascular flow (+1). The contralateral ovary and adnexa appeared normal. Static ultrasound images do not clearly demonstrate papillary fronds; however, papillary projections were suspected intraoperatively and subsequently confirmed by histopathology. (Figure 1: ultrasound image with arrows indicating papillary projections).

Preoperative laboratory tests showed a normal complete blood count with no leukocytosis or anemia. Serum CA-125 was 18.06 U/mL (reference <35 U/mL). Additional tumor markers (eg, HE4, CA19-9) were not performed due to insurance and institutional limitations. MRI was not obtained because of the acute presentation with suspected torsion and restricted availability in our setting.

Given the clinical suspicion of adnexal torsion, an urgent exploratory laparotomy was performed via a midline vertical incision. Intraoperatively, a giant unilocular cyst was identified, arising from the left paratubal region and twisted around the fallopian tube. The left ovary was preserved, and no adhesions were observed. A fertility-sparing left salpingectomy was performed, with removal of the cyst intact. The uterus and right adnexa were normal. (Figure 2: intraoperative images with arrows indicating the paratubal cyst and fallopian tube).

The postoperative course was uneventful, and the patient was discharged on the third postoperative day. Histopathological analysis demonstrated a cyst lined by hyperplastic columnar epithelium with papillary architecture, focal nuclear stratification, and hyperchromasia, without stromal invasion. The adjacent fallopian tube lumen was unremarkable, with no papillary hyperplasia or malignancy. These findings confirmed the diagnosis of a paratubal serous borderline tumor. (Figure 3: histopathology image). At follow-up, the patient reported complete resolution of symptoms and had no recurrence at early postoperative review. Longer-term surveillance is planned.

Discussion

Paratubal cysts are common benign adnexal lesions, but borderline tumors arising from paratubal cysts are extremely rare.^{8,9} Their rarity, combined with overlapping clinical and radiological features with ovarian tumors, makes preoperative diagnosis particularly challenging.^{9,10} In most cases, the diagnosis is often only clarified intraoperatively or after definitive histopathological examination.^{1,5,11}

Our case is noteworthy for several reasons. First, the mass reached a giant size (>15 cm), which is rarely reported in paratubal SBTs.^{2,3,11} Second, the presentation with adnexal torsion compounded diagnostic uncertainty and required urgent surgical intervention — a clinical scenario seldom described in giant paratubal or paraovarian cysts.^{2,6,12} Third, fertility-sparing management was successfully achieved in a young woman, despite the absence of advanced diagnostic modalities such as

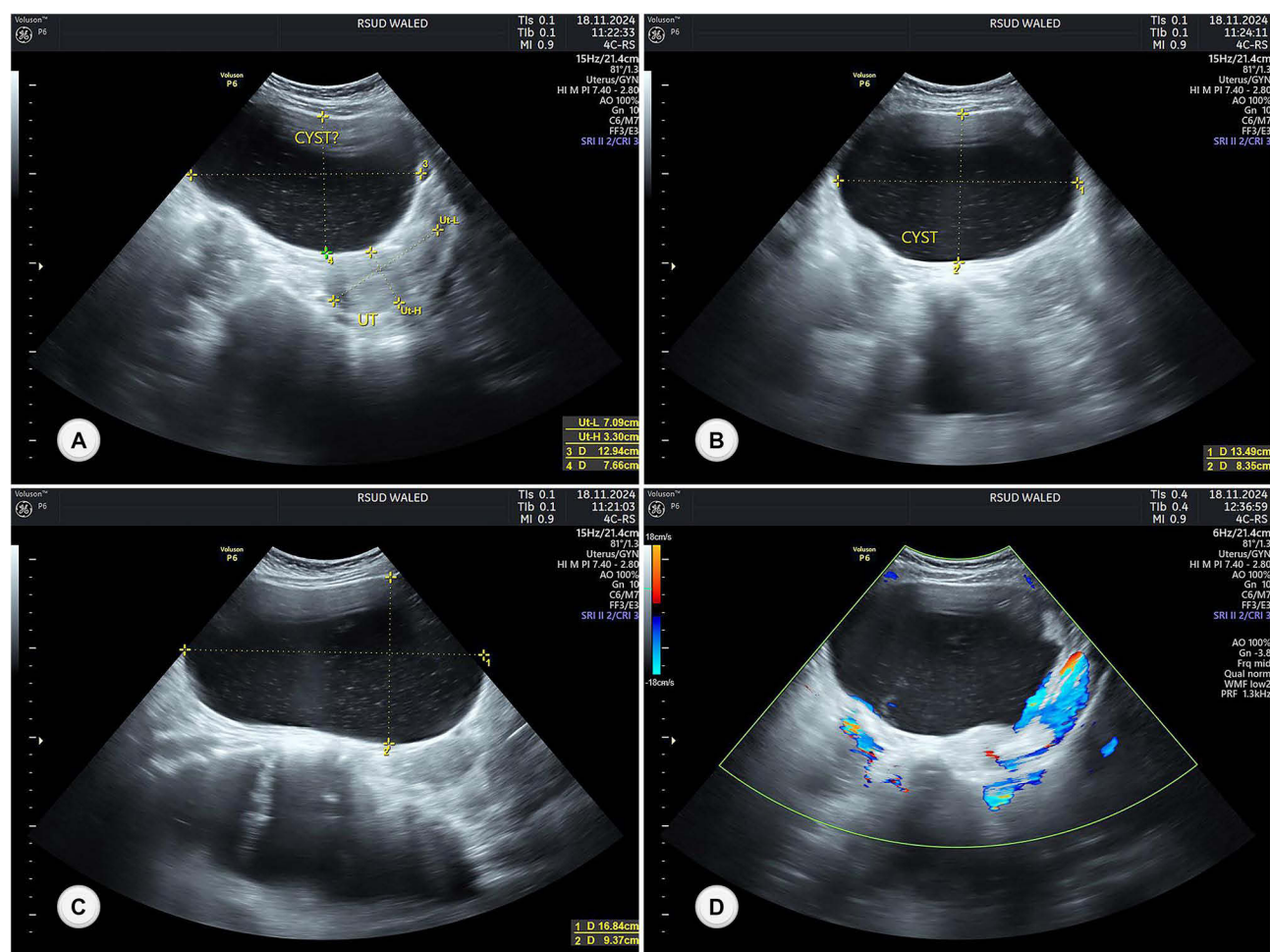


Figure 1 Transabdominal ultrasound of the pelvis. (A) Anteflexed uterus with homogeneous echotexture measuring 7.09×3.30 cm (B) Large left adnexal cyst measuring 13.4×8.3 cm (C) Another section of the cyst measuring 16.8×9.3 cm with thin cyst wall and homogeneous fluid content (D) Color Doppler image of the same cyst demonstrating minimal vascular flow. Note: papillary projections are not demonstrable on static ultrasound images; they were identified intraoperatively and confirmed on histopathology (see Figure 3).

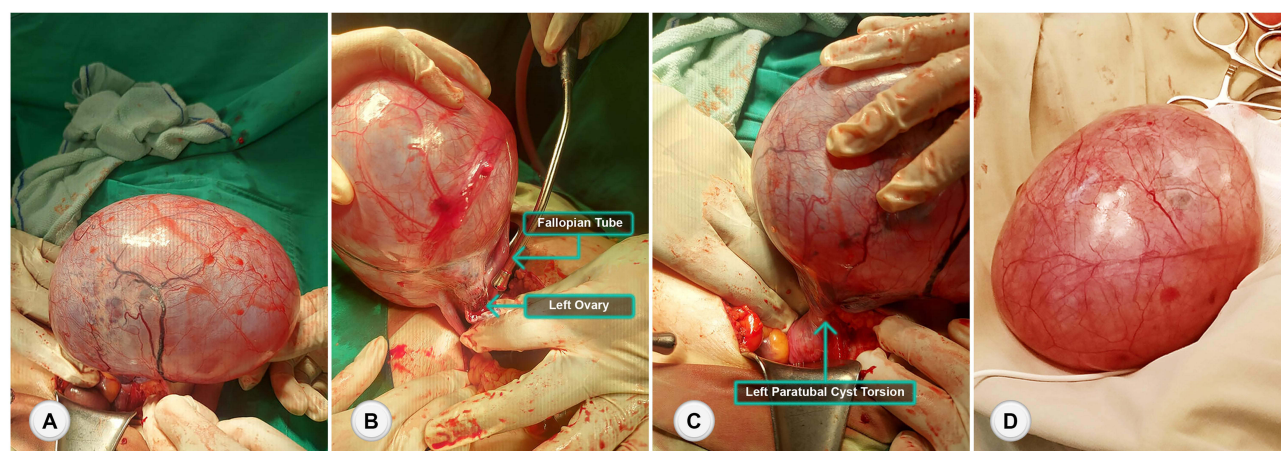


Figure 2 Intraoperative findings during exploratory laparotomy. (A) Giant left paratubal cyst occupying the abdominal cavity (B) Identification of the left ovary and fallopian tube adjacent to the cyst (C) Torsion of the left paratubal cyst (arrow) (D) Gross appearance of the resected cyst following salpingectomy.

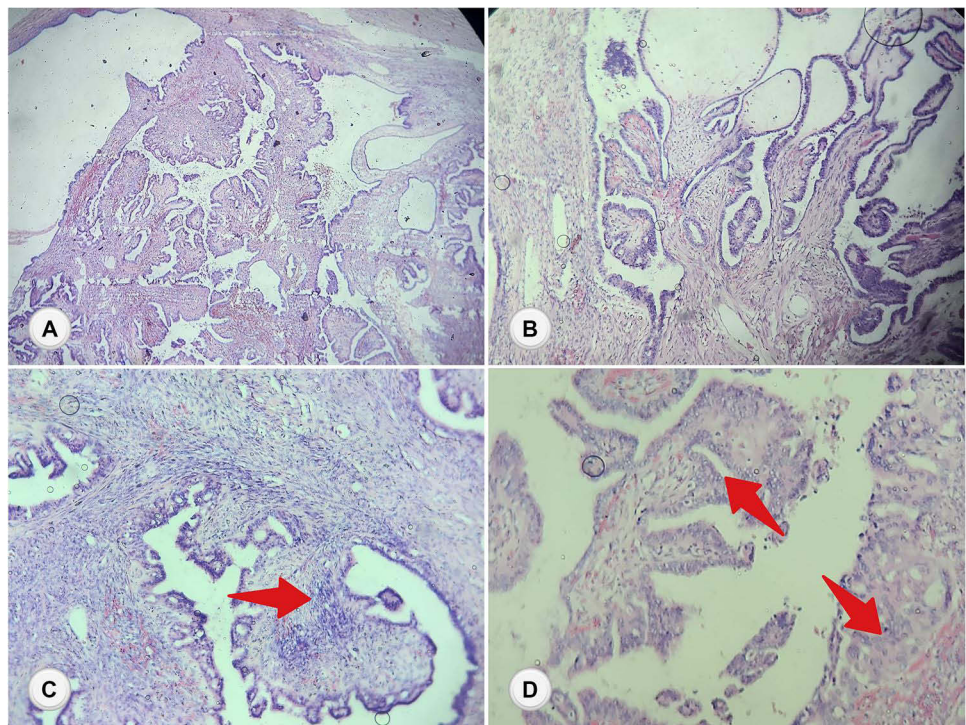


Figure 3 Histopathological examination of the paratubal cyst. (A) Low-power view showing papillary architecture within the cyst wall (H&E stain, ×40) (B) Intermediate magnification demonstrating complex papillary fronds lined by stratified epithelium (H&E stain, ×100) (C) Papillary proliferation without stromal invasion (arrow indicating papillary projection; H&E stain, ×200) (D) High-power view showing epithelial stratification and nuclear atypia (arrows indicating papillary projections; H&E stain, ×200).

MRI, frozen section, or extended tumor marker panels — limitations commonly encountered in low-resource healthcare settings.^{9,13} From 2020 to 2025, giant paratubal or adnexal cysts typically presented with abdominal pain, distension, or anorexia, but none exhibited adnexal torsion as the initial clinical presentation, highlighting the diagnostic dilemma in the current case (Table 1).^{2,4,7}

The pathogenesis of borderline tumors in paratubal cysts remains uncertain. Proposed mechanisms include neoplastic transformation of Müllerian remnants, associations with endosalpingiosis, and histological similarities with ovarian SBTs.^{5,13,15} Histopathology remains the gold standard, with features of epithelial proliferation, papillary architecture,

Table 1 Reported Cases of Giant Paratubal or Adnexal Cysts (2020–2025): Summary of Published Cases Describing Patient Age, Presenting Symptoms, Cyst Site and Size, Tumor Markers, Imaging Findings, Preoperative Diagnosis, Surgical Management, and Histopathology. The Present Case is Highlighted for Comparison

Authors (Year)	Age	Symptoms	Site	Size of the Cyst (cm)	Tumor Markers	Imaging	Diagnosis Before Surgery	Surgical Management	Histopathology
Ganjoei et al (2022) ¹⁴	52	Mild pelvic pain	Right fallopian tube	5 × 3	Normal	USG	Paratubal mass	Cystectomy	Borderline serous tumor
Limaïem & Halouani (2023) ⁵	40	Torsion, acute pain	Right adnexa	9 × 6	CA 125 normal	USG, MRI	Adnexal torsion	Laparoscopy	Serous borderline tumor
Archer et al (2023) ⁶	14	Abdominal distention	Left adnexa	20 × 10	Normal	USG	Giant paratubal cyst	Laparoscopy	Benign paratubal cyst
Romeo et al (2022) ³	12	Abdominal pain, distention	Right adnexa	15 × 10	Normal	USG	Paratubal cyst	Laparoscopy	Benign paratubal cyst

(Continued)

Table 1 (Continued).

Authors (Year)	Age	Symptoms	Site	Size of the Cyst (cm)	Tumor Markers	Imaging	Diagnosis Before Surgery	Surgical Management	Histopathology
Tjokropawiro (2021) ²	48	Abdominal discomfort	Left adnexa	30 × 15	Not available	USG	Ovarian mass	Laparotomy	Benign paratubal cyst
Almahmeed et al (2022) ⁴	31	Abdominal mass, distention	Right adnexa	10 × 6	Normal	USG	Mesenteric cyst	Cystectomy	Benign paratubal cyst
Mehawej et al (2020) ⁷	85	Diffuse abdominal pain	Right adnexa	22 × 14 × 10	Normal	CT	Ovarian cyst	TAH + BSO	Paratubal SBT
Butureanu et al (2025) ¹²	21	Abdominal distension, discomfort	Right adnexa	36 × 30 × 15	Normal	USG, MRI	Adnexal cyst	Laparoscopy	Giant paratubal cyst with mucinous cystadenoma
Index Case (Present Study, 2025)	25	Acute abdominal pain, distention	Left fallopian tube	17 × 13 × 9	CA 125 normal	USG	Ovarian cyst with torsion	Laparotomy	Paratubal serous borderline tumor

and nuclear atypia without stromal invasion.^{5,11,14} In our case, the adjacent fallopian tube was unremarkable, excluding primary tubal involvement.^{14,15}

Management of borderline tumors is guided by patient age, fertility desire, and intraoperative findings.¹⁶ Conservative, fertility-sparing approaches (salpingectomy or cystectomy with ovarian preservation) are supported by current evidence in young patients.^{3,16} Lymph node involvement in SBTs is rare, and systematic lymphadenectomy is generally not indicated in the absence of invasive implants.^{9,16} Nevertheless, intraoperative frozen section can aid surgical planning, but its unavailability remains a challenge in many institutions.^{9,13} The role of a multidisciplinary team (MDT) is increasingly emphasized in the management of borderline and malignant adnexal tumors.^{9,16} Preoperative MDT planning was not feasible in this emergency torsion case; however, intraoperative and postoperative decisions were discussed with senior gynecologists and pathologists.

Follow-up is essential given the risk of recurrence, albeit low, in borderline tumors.^{11,16} At present, our patient remains well on short-term follow-up; however, long-term surveillance is planned with clinical examination and ultrasonography. This case emphasizes the diagnostic and management dilemmas posed by giant paratubal borderline tumors. It also underlines the challenges of delivering optimal oncologic care in resource-limited environments, where access to MRI, frozen section, and comprehensive tumor markers may be restricted.^{9,13}

Conclusion

Giant paratubal serous borderline tumors are exceptionally rare and pose significant diagnostic challenges, particularly when presenting with adnexal torsion. Accurate preoperative differentiation from ovarian lesions is often difficult and, in many cases, only clarified intraoperatively or through histopathological examination. This case highlights the importance of considering paratubal origin in the differential diagnosis of adnexal masses, even in emergency settings.

Fertility-sparing management can be a safe and feasible option in young women when performed with careful surgical judgment and supported by histopathological confirmation. In resource-limited settings, where MRI, frozen section, and extended tumor marker assays may be unavailable, individualized decision-making and multidisciplinary collaboration remain crucial. Long-term follow-up is essential to ensure early detection of recurrence and to optimize reproductive outcomes.

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics Statement

All procedures performed were in accordance with the ethical standards. The examination was made in accordance with the approved principles.

Informed Consent Patient Statement

No formal ethical clearance was required for the publication of this case. The authors confirm that written informed consent for publication of this case report and any accompanying images was obtained from the patient. The patient was informed in detail about the case content and agreed to its publication. All personal identifiers have been removed to ensure patient anonymity.

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Disclosure

The authors report no conflicts of interest in this work.

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