Case Report

Serous Borderline Tumor Arising in a Paratubal Cyst: Case Report and Review of the Literature

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Paratubal cysts are relatively common adnexal findings; however, serous borderline tumors (SBTs) arising from these cysts are exceedingly rare. In this report, we present a unique case of a serous borderline tumor originating from a paratubal cyst in a 41-year-old female who underwent total laparoscopic hysterectomy with bilateral salpingectomy.

The patient presented with pelvic pain, dysmenorrhea, menorrhagia, and dyspareunia. Intraoperatively, a 0.6 cm paratubal cyst was identified in one of the fallopian tubes. Histopathological analysis revealed the presence of a serous borderline tumor within the cyst.

We reviewed the existing literature on paratubal cysts harboring borderline tumors, highlighting reported cases, clinical presentations, histological characteristics, and management strategies. We also discuss possible etiological factors, including a potential link with metabolic disorders.

This case adds to the limited number of reported SBTs arising in paratubal cysts and underscores the importance of histological evaluation even in seemingly benign adnexal lesions.

[N A J Med Sci. 2026;19(1):004-007. DOI: 10.7156/najms.2026.1901004]

Key Words: *serous borderline tumor, fallopian tube, paratubal cyst*

INTRODUCTION

Paratubal cysts are common benign adnexal lesions, occurring in approximately 4–10% of women across all age groups.[1] These cysts are often discovered incidentally and are typically derived from mesothelial tissue or remnants of the Müllerian duct.[2] According to the World Health Organization (WHO) classification of tumors, the essential diagnostic criteria for paratubal cysts include their anatomical location and a characteristic lining of ciliated epithelium.

Borderline tumors are defined histologically by epithelial proliferation without evidence of stromal invasion. A serous borderline tumor (SBT) of the fallopian tube - a distinct entity recognized by the WHO - is a rare, non-invasive, low-grade proliferative serous neoplasm. Fewer than 20 cases have been reported in the literature to date.[3] These tumors are thought to arise from papillary hyperplasia of the tubal mucosa.

Serous borderline tumors arising specifically within paratubal cysts are even more uncommon. Although the WHO classification acknowledges that paratubal cysts can rarely harbor serous borderline tumors, it does not define this presentation as a separate diagnostic entity. Consequently, the pathogenesis, clinical behavior, and prognosis of such tumors remain poorly understood.

In this report, we describe a rare case of a serous borderline tumor arising from a paratubal cyst in a 41-year-old woman with a remote history of Ewing sarcoma. The patient presented with pelvic pain, dysmenorrhea, menorrhagia, and dyspareunia. She subsequently underwent total laparoscopic hysterectomy with bilateral salpingectomy. Intraoperatively, a 0.6 cm paratubal cyst was identified adjacent to one of the fallopian tubes. Histopathologic examination incidentally revealed the presence of a serous borderline tumor within the cyst.

CASE REPORT

A 41-year-old woman with a body mass index (BMI) of 27.5 underwent total laparoscopic hysterectomy with bilateral salpingectomy and excision of pelvic endometriosis. The procedure was performed in response to chronic pelvic pain, dysmenorrhea, menorrhagia, and dyspareunia.

Her medical history was significant for a remote diagnosis of Ewing sarcoma involving the left infraorbital fossa at age 13, for which she received chemotherapy, radiotherapy, and surgical resection. Additional comorbidities included

Received: 09/23/2025; Revised: 03/15/2026; Accepted: 03/18/2026
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obstructive airway disease, hypertension, hyperlipidemia, and menstrual migraine.

On gross examination, the uterus was markedly enlarged, approximately consistent with a 15-17-week gravid size, and globular in contour. One of the fallopian tubes contained a 0.6 cm cyst filled with soft tan material. Microscopic evaluation revealed a paratubal cyst lined by ciliated, tubal-type epithelium (**Figure 1A**). Within the cyst, there were papillary structures with fibrovascular cores, branching into smaller secondary papillae. These were lined by stratified epithelium with tufting and minimal nuclear atypia (**Figures 1B** and **1C**). No stromal invasion or mitotic figures were identified.

Based on these findings, a diagnosis of serous borderline tumor arising from a paratubal cyst was rendered.

Table 1. Paratubal Borderline Serous Tumors Reported in the Literature.

Author	Year	Age	Obesity History	Gyn history	Presentation	Cystic Mass Size	Lateracy	Treatment	Follow-up
Limaiem[7]	2023	30	NA	Nulliparous	One year history of pelvic pain	9 cm	right	paratubal cystectomy	3 months no recurrence
Shin[8]	2011	27	NA	Nulliparous	Huge pelvic mass & left flank pain	16 cm	right	paratubal cystectomy	20 months no recurrence
Terek[9]	2011	19	NA	Virgin	Abdominal pain & nausea	10 cm	left	Cystectomy	7 months no recurrence
Baek[10]	2019	61	NA	Gravida 3 Para 3	Increased size ovarian cyst	6 cm	left	hysterectomy and bilateral salpingo-oophorectomy (BSO)	24 months no recurrence
Kumbak[11]	2010	39	NA	primigravida	detected during Cesarean section	1) 6 by 3 cm 2) 2 by 2 cm 3) 2 by 2 cm	All 3 left	1) Extirpation during elective cesarean section 2) omentectomy, appendectomy and pelviceparaaortic lymphadenectomy	2 cm cystic mass recurrence 9 months after 2nd surgery; 3 months after, no recurrence
Lee[12]	2016	17	NA	NA	Diagnosis of right ovarian cyst	19 cm	right	Right salpingectomy & right ovarian wedge resection	3 months no recurrence
Seamon[13]	2009	29	Obese (BMI 36)	Nulligravid	Acute onset of persistent shape right lower quadrant pain & mild nausea	12.5 cm	right	Appendectomy, right salpingo-oophorectomy, omentectomy, bilateral pelvic-aortic lymphadenectomy, and multiple pelvic and abdominal peritoneal biopsies	1 year no recurrence
Mehawej[14]	2020	85	Diabetes, hypercholesterolemia, and hypertension	G2P2	Complaints of postmenopausal bleeding	1 cm	right	Abdominal hysterectomy and bilateral salpingo-oophorectomy	3 months no recurrence
Guo	2026	41	Overweight (BMI: 27.5), hypertension, hyperlipidemia	NA	Pelvic pain, dysmenorrhea, menorrhagia, and dysparenunia	0.6 cm	NA	Total laparoscopic hysterectomy with bilateral salpingectomy and excision of pelvic endometriosis	NA

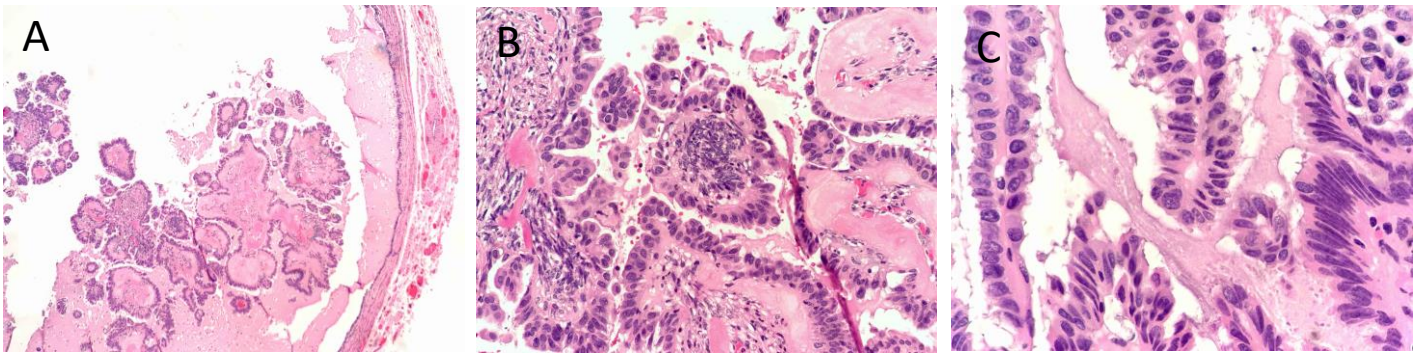

Figure 1. A. shows the paratubal cyst lined by ciliated tubal type epithelium. **B and C** show papillae with fibrovascular branching into smaller papillary structures lined by stratified epithelium with tufting and minimal nuclear atypia.

DISCUSSION

Paratubal cysts are a common benign condition, with an incidence of approximately 7.3% in the pediatric and adolescent population.[4] The true prevalence remains uncertain, as most cases are asymptomatic and discovered incidentally during imaging or surgical procedures. Among symptomatic adnexal masses, paratubal cysts account for roughly 10%, with symptoms typically resulting from torsion due to cyst enlargement.[5]

The uniqueness of the present case lies in the small size (0.6 cm) of the paratubal cyst and the incidental finding of a serous borderline tumor (SBT) - a diagnosis that was not clinically suspected prior to histopathologic evaluation. This contrasts with previously reported cases, which generally involve larger cysts presenting with symptoms.

Recent literature has suggested a correlation between obesity, cyst size, and hyperandrogenism in the development of adnexal lesions.[6] Our patient presented with multiple metabolic abnormalities - hypertension, overweight status (BMI 27.5), and hyperlipidemia - which may indicate a predisposition to early neoplastic transformation within paratubal cysts. Although the patient had a remote history of Ewing sarcoma diagnosed at age 13, with complete remission for 28 years, a direct association with the current lesion is unlikely.

To our knowledge, serous borderline tumors arising in paratubal cysts are exceedingly rare. As of February 28, 2025, a PubMed search using the terms "paratubal cysts" and "borderline serous tumor" identified 20 publications. Upon review, eight relevant case reports were selected. These, along with the present case, are summarized in **Table 1**.

Patient ages ranged from 17 to 85 years, with a median age of 30. Gynecologic history was not available in two cases; however, among the remaining seven, five were nulliparous, and two were multigravida and postmenopausal (ages 61 and 85). This pattern suggests that nulliparity and postmenopausal hormonal changes may contribute to the development of SBTs in paratubal cysts.

Notably, for the first time, we examined metabolic history in the context of this entity. Among the nine cases, six lacked metabolic data, but three cases (including ours) documented metabolic abnormalities:

- One case involved obesity (BMI 36).
- Another reported hypertension and hyperproteinemia.
- Our case involved overweight, hypertension, and hyperlipidemia.

These findings suggest that metabolic dysfunction may be a potential risk factor, warranting further investigation. We recommend that future reports include metabolic data to improve understanding of possible etiologic mechanisms.

The most common presenting symptom across the reviewed cases was pelvic or abdominal pain. The average cyst size was 8.9 cm, with tumors arising on both the right and left sides. Our case represents the smallest reported cyst (0.6 cm) to harbor a serous borderline tumor, reinforcing the notion that even very small cysts may have malignant potential.

Cystectomy was the most frequently employed treatment, especially in younger women. In some cases, patients underwent more extensive procedures, including hysterectomy and bilateral salpingo-oophorectomy, as in our patient. Follow-up periods ranged from 3 to 24 months, with no reported recurrences, suggesting that conservative management with cystectomy and close monitoring may be sufficient—particularly for patients desiring fertility preservation.

In summary, we report the smallest documented case of a serous borderline tumor arising from a paratubal cyst, and we review all reported cases to date. Our analysis highlights two potential risk factors for this rare tumor: nulliparity and metabolic abnormalities. While we reviewed nine published cases, the true incidence may be underestimated. For example, Savelli et al. (2006) identified two SBTs among 50 paratubal cysts during a study focused on sonographic features;[2] however, detailed data on these tumors were not available and were thus excluded from our table.

These findings emphasize the importance of careful histopathologic evaluation of all paratubal cysts, regardless of size, and the need for future studies to further elucidate the pathogenesis, risk factors, and optimal management of this rare entity.

CONFLICTS OF INTEREST
None.

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