

# An Unusual Site of Mature Cystic Teratoma in the Fallopian Tube: A Rare Case Report

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**Background:** Mature cystic teratoma (MCT) is a common benign ovarian germ cell tumor; however, its occurrence in the fallopian tube or paratubal region is exceedingly rare. Preoperative diagnosis is challenging due to nonspecific clinical and imaging findings, often mimicking an ovarian cyst.

**Case Illustration:** A 34-year-old nulliparous woman presented with severe cyclical left lower abdominal pain and a progressively enlarging abdominal mass. Preoperative evaluation suggested a dermoid cyst with bilateral endometriomas. Intraoperatively, revealed a large cyst arising from the left fallopian tube, and histopathology confirmed a mature cystic teratoma with bilateral ovarian endometriomas. This rare case highlights the diagnostic challenge of tubal mature cystic teratoma.

**Conclusion:** Fallopian tube mature cystic teratoma should be considered in the differential diagnosis of complex adnexal masses. Definitive diagnosis relies on intraoperative assessment and histopathological confirmation, particularly in patients with coexisting pelvic pathology.

**Keywords:** fallopian tube, mature cystic teratoma, dermoid cyst

## Background

Mature cystic teratoma (MCT), commonly referred to as a dermoid cyst, represents the most frequent benign ovarian germ cell tumor, accounting for 10–20% of all ovarian neoplasms and up to 60% of benign germ cell tumors in women of reproductive age.<sup>1,2</sup> Histologically, MCTs consist of well-differentiated tissues from embryonic germ layers. They commonly occur during the second to fourth decades of life and are often incidentally detected or identified during evaluation of pelvic pain or an adnexal mass.<sup>3</sup>

In contrast, MCT arising from the fallopian tube or paratubal region is exceptionally rare. Primary tubal teratomas constitute less than 1% of teratomas within the female genital tract, with evidence largely limited to isolated case reports and small case series.<sup>4</sup> The rarity of this entity creates diagnostic challenges, especially in differentiating tubal or paratubal lesions from ovarian masses preoperatively. Its embryologic origin is thought to involve abnormal migration or sequestration of primordial germ cells along the Müllerian tract.<sup>5</sup>

Tubal and paratubal teratomas are often asymptomatic and incidentally detected on imaging or during surgery. Symptomatic patients may present with lower abdominal pain with the imaging findings frequently mimic ovarian dermoid cysts, making definitive diagnosis dependent on intraoperative or histopathological evaluation.<sup>6</sup>

Although malignant transformation occurs in approximately 1–2% of ovarian MCTs, most commonly into squamous cell carcinoma,<sup>7</sup> the malignant potential of tubal or paratubal teratomas remains uncertain due to their extreme rarity. Surgical excision remains the treatment of choice, with fertility preservation prioritized in reproductive-aged women. Several embryological theories have been proposed regarding the origin of tubal teratomas, including aberrant migration of primordial germ cells, ectopic displacement of germ cells during embryogenesis, and development from

supernumerary ovarian tissue adjacent to the fallopian tube. However, the exact pathogenesis remains unclear due to the scarcity of reported cases.<sup>8</sup> This case report aims to describe the characteristics of a rare tubal mature cystic teratoma and to contribute to the limited literature on this uncommon adnexal pathology. This report was prepared in accordance with the CARE reporting guidelines.

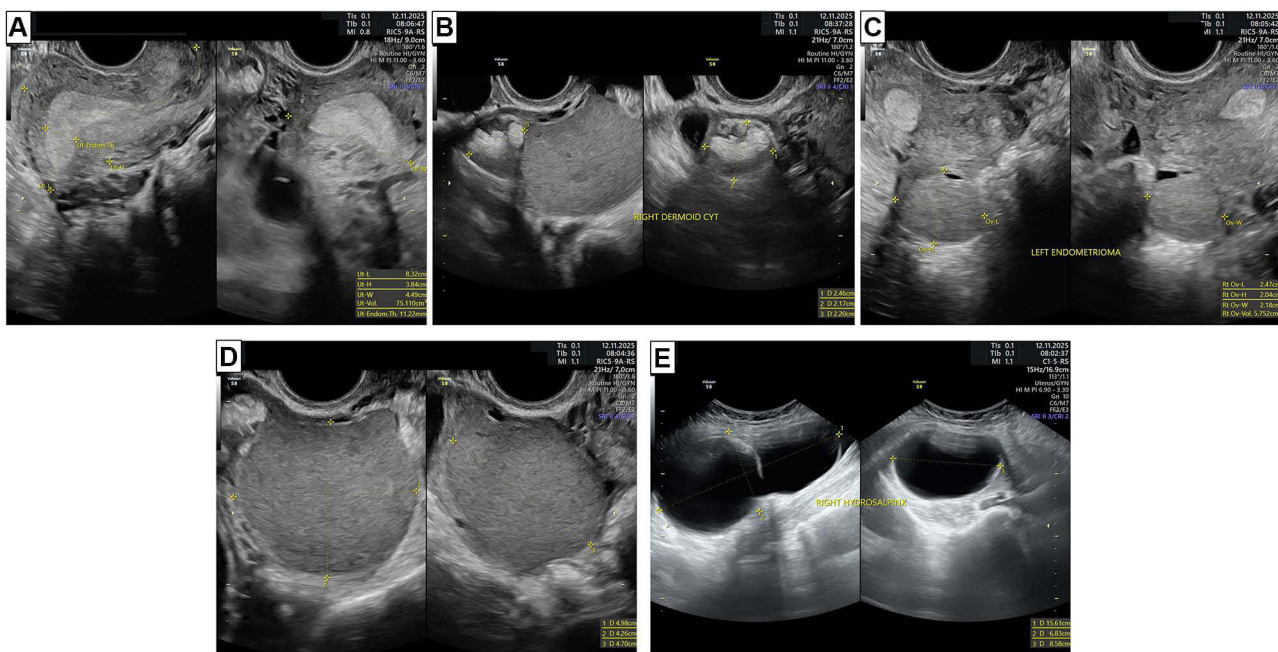
### Case Illustration

A 34-year-old, nulligravida (POA0, married for 6 months) was referred from a regional hospital with a diagnosis of left ovarian endometrioma and right ovarian cystoma. She presented with intermittent left lower abdominal pain for one month, markedly exacerbated during menstruation, particularly on days 3 to 4, and was severe enough to cause diaphoresis and functional limitation. She also reported a progressively enlarging lower abdominal mass over the preceding six months. There was no history of weight loss, abnormal vaginal bleeding, urinary or bowel symptoms, or previous surgery. Menstrual cycles were regular, and the patient desired future fertility. Family history was notable for a maternal ovarian cyst requiring surgery without malignancy.

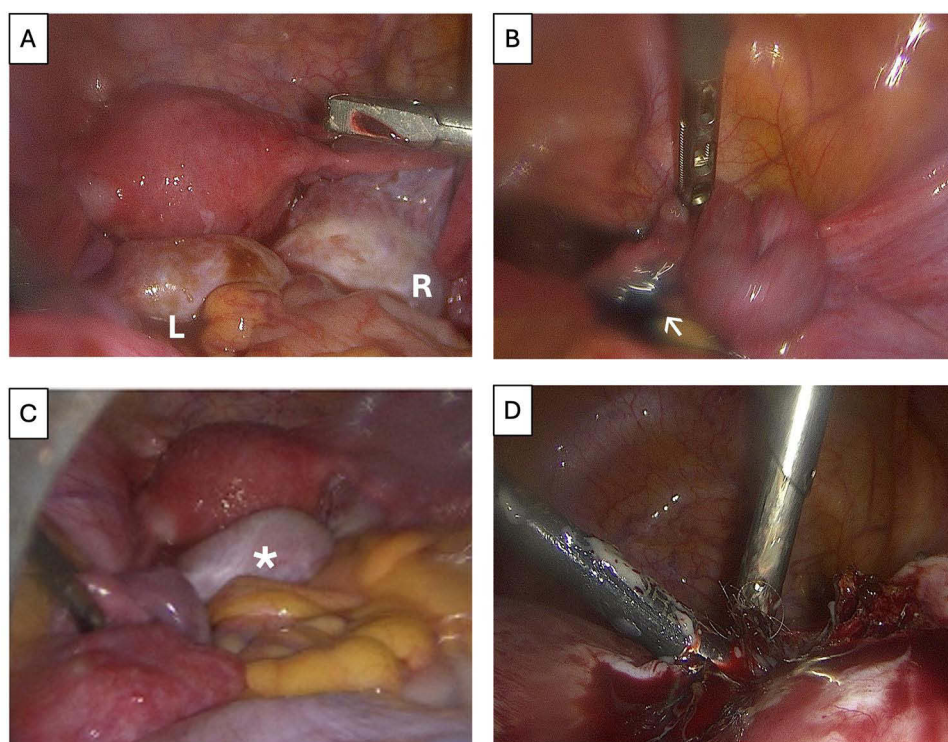
Preoperative transvaginal ultrasonography (Figure 1) demonstrated. A cystic mass with a dermoid plug (echogenic mural nodule) measuring approximately 2.46×2.17 × 2.20 cm. The right ovary demonstrated a large tubular anechoic mass with incomplete septations and a positive waist sign, measuring approximately 15.61×6.83 × 8.58 cm, suggestive of hydrosalpinx. Additionally, a cystic lesion with ground-glass appearance measuring 4.98×4.26 × 4.17 cm was noted, adherent to the posterior uterus, consistent with an endometriotic cyst. The left ovary showed a cystic lesion with ground-glass appearance measuring 2.47×2.04 × 2.18 cm. The sliding sign was negative, suggesting pelvic adhesions.

Laboratory evaluation, such as routine hematology panels and normal coagulation factor, showed within normal limits. The other reproductive hormones, including Anti-Müllerian Hormone (AMH) (2.39 ng/mL), were within normal reference limits. Hysterosalpingography examination was performed with the conclusion: the right fallopian tube was associated with hydrosalpinx. The left fallopian tube was non-patent (tubal occlusion).

Based on the clinical and imaging findings, the patient underwent laparoscopic exploration. Intraoperatively (Figure 2), laparoscopic evaluation of the pelvic cavity revealed bilateral endometriomas. Chromotubation (tubal patency test) demonstrated bilateral tubal spill, indicating tubal patency, which differed from the previous hysterosalpingography interpretation. A large cystic mass was identified in the left adnexal region. In the Trendelenburg position, the mass was



**Figure 1** Ultrasound findings. Uterus with normal size and density (A), Dermoid cyst (B), bilateral endometriomas (C and D) and suggestive of hydrosalpinx (E).



**Figure 2** Intraoperative findings: laparoscopic view of the pelvic cavity showed bilateral endometriomas (A), (L: left ovary, and R: right ovary), bilateral tubal spill (patency test) (B). After further identification and reposition, a large cystic mass originating from the left adnexal region (C), (with asterisk, \*), with a component of hair identified within the mass, suggestive of a dermoid cyst (D).

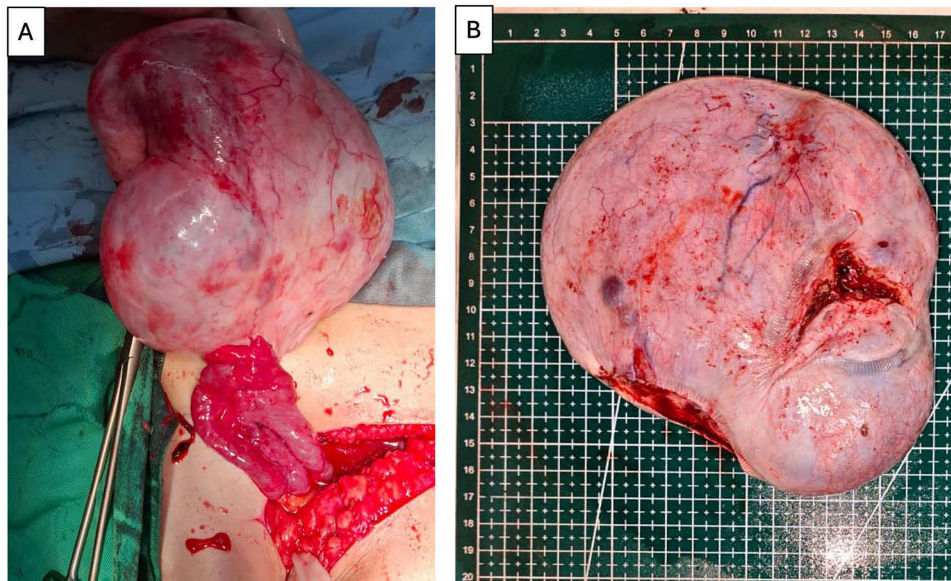
displaced superiorly, revealing a 15×15 cm cystic lesion suspected to originate from the left paratubal area. Initial laparoscopic access was achieved using a 10-mm trocar inserted in the left hypogastrium, penetrating the cyst and allowing drainage of serous fluid.

Further exploration revealed a normal-sized uterus. A 7×4 cm cystic mass was noted in the right ovary and a 6×4 cm cystic mass in the left ovary. Both masses were adherent to the posterior pelvis and posterior uterine surface, consistent with bilateral endometriomas and grade II–III pelvic adhesions. During adhesiolysis, hair was identified within the cyst cavity, which had initially been presumed to be a paratubal cyst, suggesting a dermoid cyst. Due to the large size of the dermoid cyst, the procedure was subsequently converted to laparotomy.

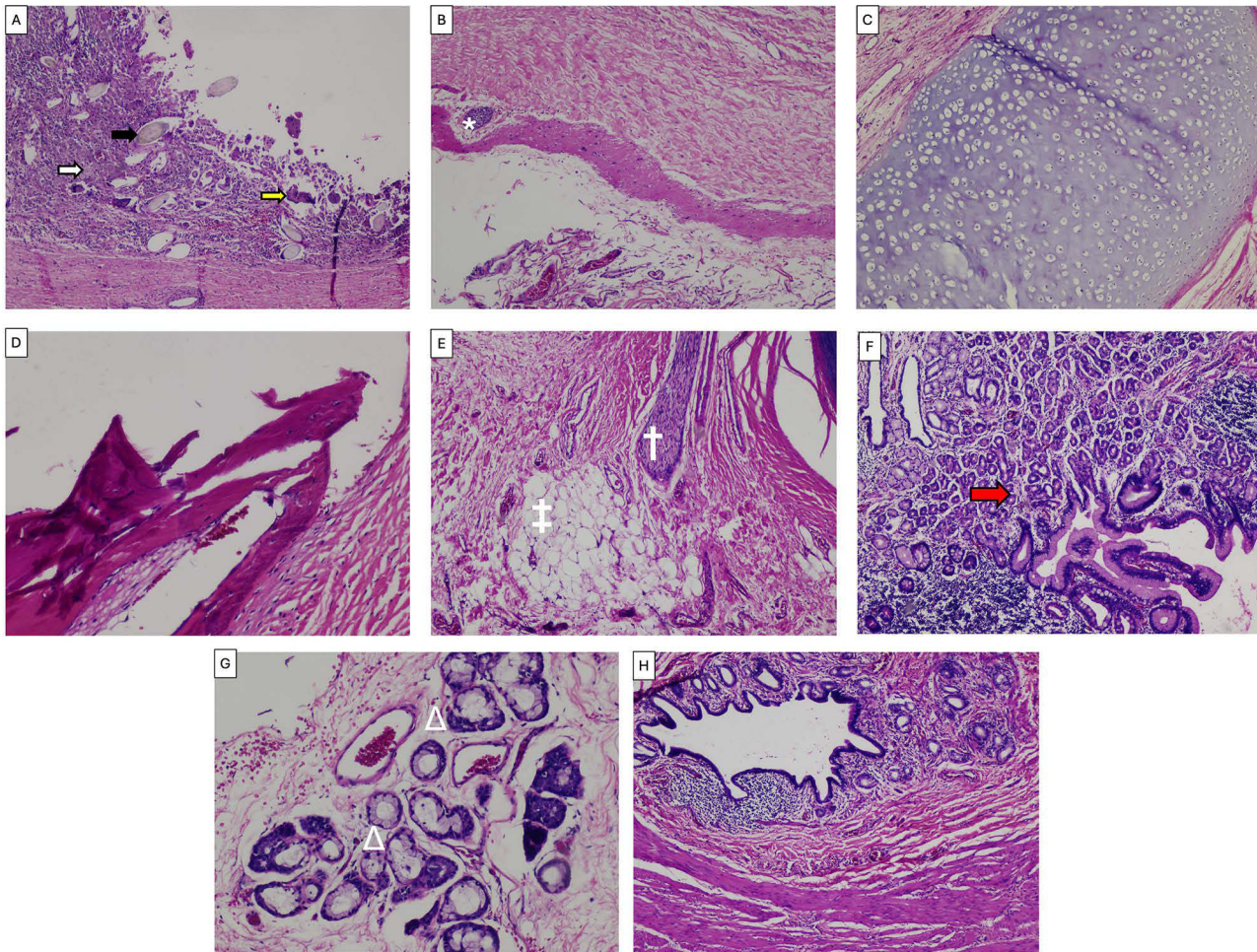
Intraoperatively (laparotomy, shown in Figure 3), a 16×15 x 4 cm grayish-white cystic mass with a regular smooth surface was seen originating from the left Fallopian tube, and left salpingectomy was performed. Bilateral adhesiolysis and cystectomy of both endometriomas were completed, evacuating approximately 70 mL (right) and 40 mL (left) of chocolate-colored fluid, with complete removal of the cyst capsules. Estimated blood loss was approximately 100 mL, with intraoperative urine output of 300 mL. The patient tolerated the procedure well and was transferred to recovery in stable condition.

Histopathological examination (Figure 4) of the left fallopian surgical specimen revealed a MCT arising from the left fallopian tube. The cyst wall is composed of ectodermal components, characterized by stratified squamous epithelium with bland nuclei. Mesodermal elements were identified, including cartilage with normal-appearing chondrocytes and smooth muscle tissue without atypia. Endodermal components were also present, represented by respiratory-type epithelium with unremarkable nuclei. No primitive neuroectodermal structures were observed. The subepithelial layer showed fibrous collagenous stroma with infiltration of lymphocytes and histiocytes. The cyst lumen contained keratinous debris, and adnexal skin structures were identified within normal limits. No evidence of malignancy was detected.

The other specimens with histopathological description: bilateral ovarian endometrioma: demonstrated fibrous connective tissue stroma with infiltration of lymphocytes and histiocytes, accompanied by vascular dilatation.



**Figure 3** Laparotomy exploration findings: a left cyst mass originating from the left Fallopian tube (A), with a smooth external surface was found (B).



**Figure 4** Histopathological results (H&E stain, ×40). Ectoderm (A and B): (A) Hair shafts (black arrow) with surrounding foamy macrophages (white arrow) and multinucleated giant cell reaction (yellow arrow). (B) Walthard cell nests (asterisk, \*) and glial cells nearby are present. Mesoderm (C–E): (C) Chondroid matrix, (D) Lamellar bone, (E) Fat cells (double dagger, †), and nerve bundle (dagger, ‡). Endoderm (F and G): (F) Glands lined by gastric-type (red arrow) and colonic-type epithelium are seen, (G) seromucous glands (delta, Δ). (H) showed a tubal structure lined by columnar epithelium with underlying fibromuscular stroma.

Endometrial-type stroma was identified, along with hemosiderin deposition and hemosiderin-laden macrophages. No evidence of malignancy was observed.

Based on the combined clinical, imaging, and histopathological data, the final diagnosis: Mature cystic teratoma a.r left fallopian tube; bilateral endometriomas; superficial endometriosis lesions; bilateral patent fallopian tubes; grade II–III pelvic adhesions.

## Discussion

Mature cystic teratoma (MCT), commonly referred to as a dermoid cyst, represents the most common benign ovarian germ cell tumor in women of reproductive age.<sup>1,2</sup> In contrast fallopian tube teratomas are extremely rare, with fewer about 70 cases recorded in the literature to date.<sup>7,9,10</sup> Similar to ovarian MCTs, these lesions are generally benign and predominantly occur during reproductive age; however, preoperative diagnosis remains challenging because most cases mimic ovarian adnexal masses.<sup>11</sup> In the present case, preoperative imaging suggested bilateral endometriomas, hydrosalpinx, and dermoid cyst, whereas intraoperative findings demonstrated a large cystic mass originating from the left fallopian tube rather than the ovary. Similar to previously reported cases, definitive diagnosis was established only intraoperatively and confirmed histopathologically. A comparison of previously reported extra-ovarian and fallopian tube teratoma cases is summarized in Table 1.

In the present case, preoperative hysterosalpingography (HSG) suggested left tubal occlusion and right hydrosalpinx, whereas intraoperative chromotubation demonstrated bilateral tubal patency. This discrepancy may be explained by transient tubal spasm, technical limitations during HSG examination, or interpretation variability, all of which are recognized limitations of HSG assessment. Intraoperative chromotubation under direct visualization is considered more reliable for evaluating tubal patency. This finding highlights the importance of correlating radiologic findings with intraoperative assessment to avoid diagnostic misinterpretation.

Dermoid cyst arises from totipotent primordial germ cells (composed of at least two, and frequently all three, embryonic germ layers). Ectodermal components predominate, accounting for the frequent presence of sebaceous material, keratin, hair follicles, and occasionally teeth or bone within the cyst cavity.<sup>1</sup> The characteristic Rokitansky protuberance (dermoid plug) corresponds to a mural nodule containing various tissue elements. Although the vast majority of MCTs are benign, malignant transformation occurs in approximately 1–2% of cases, most commonly to squamous cell carcinoma, and is more frequently observed in postmenopausal women.<sup>2,7</sup>

**Table 1** Previously Reported Cases of Extra Ovarian Mature Cystic Teratoma

Author/Year	Age	Presentation	Preoperative Diagnosis	Intraoperative Finding	Size (cm)	Management	Key Point
Baek et al, 2016 <sup>12</sup>	31	Adnexal mass	Ovarian cyst	Synchronous ovarian and tubal teratoma	2 × 2 × 15	Salpingectomy + ovarian cystectomy	Coexisting ovarian pathology
Chou et al, 2020 <sup>11</sup>	38	Infertility, abdominal discomfort	Ovarian teratoma/teratocarcinoma	Fimbrial teratoma	11 × 8 × 6	Laparotomy + excision	Large fimbrial lesion mimicked ovarian tumor
Kayastha et al, 2023 <sup>10</sup> – Case 1	32	Infertility	Ovarian dermoid cyst	Tubal teratoma	1 × 1	Laparoscopic excision	Incidentally detected
Kayastha et al, 2023 <sup>10</sup> – Case 2	28	Incidental during cesarean section	None	Tubal teratoma	Small teratoma	Excision	Incidental surgical finding
Yang et al, 2023 <sup>13</sup>	71	Pelvic mass	Adnexal mass	Extragenadal MCT	7.4 × 5.4	Laparoscopic surgical excision	Separate from ovaries
Padula et al, 2024 <sup>14</sup>	40	Pelvic pain	Tubal MCT suspected preoperatively	Intratubal MCT	11 × 6	Salpingectomy	Rare preoperative radiologic diagnosis
Present case	34	Cyclical pelvic pain, abdominal mass	Bilateral endometrioma, hydrosalpinx, dermoid cyst	Left fallopian tube MCT with endometriomas	16 × 15 × 4	Salpingectomy + cystectomy	Separate from ovaries, Diagnostic challenge due to concomitant pelvic pathology

Clinically, dermoid cysts are frequently asymptomatic and discovered incidentally during pelvic examination or routine ultrasonography. When symptomatic, patients may present with chronic pelvic pain, abdominal distension, or a palpable adnexal mass. Acute abdominal pain is most associated with adnexal torsion, a well-recognized complication attributable to the cyst's lipid-rich content and relative buoyancy.<sup>9,15</sup> Less common complications include rupture leading to chemical peritonitis, infection, and, rarely, autoimmune hemolytic anemia. Serum tumor markers such as AFP,  $\beta$ -hCG, LDH, and CA-125 may be evaluated to exclude malignant germ cell tumors; however, these markers are typically within normal limits in MCT.<sup>2,16</sup>

Preoperative diagnosis of dermoid cysts primarily relies on imaging studies, with ultrasonography serving as the first-line modality. Dermoid cysts characteristically appear as complex adnexal masses with echogenic components and posterior acoustic shadowing.<sup>17</sup> Pathognomonic sonographic signs include the "tip of the iceberg" sign (dense echogenic material obscuring deeper structures), the "dermoid mesh" sign (multiple hyperechoic linear interfaces caused by hair fibers), and a hyperechoic Rokitansky nodule projecting into the cyst lumen.<sup>18</sup> Fat-fluid levels may also be identified. Doppler examination typically demonstrates minimal to moderate internal vascularity unless complications such as torsion occur.<sup>17,19</sup> In cases where ultrasonographic findings are inconclusive, additional imaging modalities such as computed tomography (CT) or magnetic resonance imaging (MRI) may be useful to identify intralesional fat and improve diagnostic accuracy.<sup>20</sup>

Despite these imaging characteristics, distinguishing between ovarian and extra-ovarian teratomas remains challenging preoperatively. Fallopian tube teratomas are particularly difficult to diagnose before surgery because they often present as adnexal masses that mimic ovarian dermoid cysts or other cystic lesions. As a result, the definitive diagnosis is frequently established only during surgical exploration or after histopathological examination.

Management is individualized based on age, symptomatology, tumor size, imaging characteristics, and reproductive considerations. When the initial examination results indicate a high suspicion of ovarian germ cell tumours, surgical exploration is recommended to confirm the diagnosis and complete disease staging. Surgical removal is generally recommended for symptomatic lesions, cysts  $\geq 5$ –6 cm because of torsion risk, rapidly enlarging masses, suspicion of malignancy, or postmenopausal status.<sup>1,2</sup>

In reproductive-age women, laparoscopic ovarian cystectomy with maximal preservation of ovarian tissue is the preferred approach. Intraoperative rupture should be minimized to prevent peritonitis; copious peritoneal irrigation is recommended if spillage occurs. Oophorectomy may be considered in postmenopausal women or when ovarian preservation is not feasible.

In the present case, the patient initially presented with symptoms suggestive of endometriosis and adnexal cystic masses. Preoperative imaging suggested bilateral endometriomas, hydrosalpinx, and a dermoid cyst. However, intraoperative findings revealed a large cystic mass originating from the left fallopian tube rather than the ovary. The presence of hair within the cyst cavity raised suspicion for a dermoid cyst, prompting conversion from laparoscopy to laparotomy for safe removal of the mass. Histopathological examination subsequently confirmed the diagnosis of MCT arising from the fallopian tube, demonstrating ectodermal, mesodermal, and endodermal components without evidence of malignancy. A comparison of previously reported extra-ovarian and fallopian tube teratoma cases is summarized in [Table 1](#). However, the coexistence of bilateral endometriomas, pelvic adhesions, and suspected hydrosalpinx in this patient further complicated preoperative localization of the mass and contributed to the diagnostic challenge.

This case highlights the diagnostic challenge associated with rare adnexal tumors such as fallopian tube teratomas. Preoperative imaging may not reliably distinguish between ovarian and extra-ovarian origins, particularly when concurrent gynecological conditions such as endometriosis or hydrosalpinx are present. Therefore, intraoperative assessment and histopathological confirmation remain essential for establishing the definitive diagnosis. In this case, removal of the affected fallopian tube with preservation of the ovaries allowed adequate treatment while maintaining the patient's fertility prospects.

This case report has several limitations. First, additional imaging modalities such as CT or MRI were not performed preoperatively, which might have improved characterization of the adnexal mass and its anatomical origin. Second, serum tumor markers were not evaluated because imaging findings strongly suggested benign pathology without suspicious malignant features. Finally, as a single case report of a rare condition, the findings may not be generalizable

to broader populations. Overall, this case contributes to the limited literature on fallopian tube MCT and emphasizes the importance of considering rare extra-ovarian teratomas in the differential diagnosis of complex adnexal masses, particularly in patients with coexisting gynecological pathology.

## Conclusion

This case emphasizes that mature cystic teratoma of the fallopian tube, albeit exceedingly rare, should be considered in the differential diagnosis of complex adnexal masses presumed to be ovarian in origin. Preoperative imaging and clinical findings may not reliably determine the anatomical origin of the lesion, particularly in the presence of concomitant pathologies such as endometriosis, hydrosalpinx, and pelvic adhesions, which may obscure diagnosis and complicate surgical planning. Therefore, meticulous intraoperative evaluation and histopathological confirmation remain essential for establishing a definitive diagnosis. Complete surgical excision with preservation of fertility should be prioritized in reproductive-aged women whenever feasible. Recognition of this rare entity and awareness of potential coexisting pelvic disease are essential for accurate diagnosis, appropriate operative planning, and optimal clinical outcomes.

## Institutional Approval

Institutional approval was not required for the publication of this single-patient case report, in accordance with institutional policies and the ethical standards of the Declaration of Helsinki.

## Informed Consent Patient Statement

The authors confirm that written informed consent was obtained from the patient. The patient was informed about the details of the case and provided approval for the publication of the case report, including any accompanying images. All identifying information has been appropriately anonymized to ensure patient confidentiality.

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## Disclosure

The authors report no conflicts of interest in this article.

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