# MedPharmRes (MPR) TITLE PAGE

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| ARTICLE INFORMATION | Fill in information in each box below |
|---|---|
| **Article Type** | Case Report |
| **Article Title (within 20 words without abbreviations)** | **DIAGNOSIS OF ENDOMETRIOID ADENOCARCINOMA OF THE FALLOPIAN TUBE MISINTERPRETED AS OVARIAN CANCER: A CASE REPORT** |
| **Running Title (within 10 words)** | **ENDOMETRIAL CARCINOMA OF THE FALLOPIAN TUBE MISINTERPRETED AS OVARIAN CANCER** |
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## ABSTRACT

Primary fallopian tube cancer is a rare gynecologic malignancy, often misdiagnosed as ovarian cancer due to overlapping clinical and radiologic features. We report a case of a 49-year-old woman presenting with abnormal uterine bleeding and lower abdominal pain. Imaging revealed bilateral adnexal masses and elevated CA 125, HE4, and ROMA index. Surgical exploration identified a left fallopian tube tumor and omental involvement. Histopathology confirmed high-grade endometrioid adenocarcinoma of the left fallopian tube with metastatic deposits. The patient underwent total hysterectomy, bilateral salpingo-oophorectomy, omentectomy, and adjuvant chemotherapy with Paclitaxel and Carboplatin. This case underscores the diagnostic challenge and clinical significance of recognizing fallopian tube carcinoma in patients with adnexal masses and elevated tumor markers.


**Keywords:** Fallopian Tube Neoplasms, Ovarian Neoplasms, Salpingo-oophorectomy, Uterine Hemorrhage, Case Report.

## 1. INTRODUCTION

Primary fallopian tube cancer (PFTC) is a rare gynecologic malignancy, accounting for only 0.14–1.8% of all female reproductive tract cancers. Although previously considered exceedingly uncommon, recent epidemiological studies have reported an increasing

incidence of PFTC globally. In Finland, the incidence rose 4.5-fold between 1953 and 1997 (1, 2). Similarly, data from the United States National Cancer Institute revealed a 4.2-fold increase in cases between 2001 and 2014, with approximately 300–400 new diagnoses annually.

Emerging evidence from histopathologic, genetic, and molecular studies suggests that the majority of high-grade serous carcinomas, historically attributed to ovarian origin, may actually arise from the epithelium of the fallopian tube. It is estimated that up to 80% of such cases may be of tubal origin, implying that the true incidence of PFTC may have been significantly underestimated (3).

Like other gynecologic cancers, the stage at diagnosis plays a critical role in determining prognosis. While early-stage PFTC (stages I–II) is associated with a 5-year survival rate of approximately 65%, this rate drops sharply to 10–20% in advanced stages (III–IV) (4). Accurate staging and prompt initiation of treatment are therefore essential for improving clinical outcomes. However, preoperative diagnosis of PFTC remains particularly challenging, with studies reporting that only 0–20% of cases are identified before surgery. Intraoperative misdiagnosis is also common, occurring in more than half of reported cases (5, 6).

We report a rare case of primary fallopian tube carcinoma in a patient presenting with nonspecific pelvic symptoms, initially misdiagnosed as ovarian malignancy. This case highlights the diagnostic difficulties and underscores the importance of considering PFTC in the differential diagnosis of adnexal masses. This case report was prepared in accordance with the CARE Case Report Guidelines (7).

## 2. CASE PRESENTATION

A 49-year-old Vietnamese female factory worker from Duc Pho Town, Quang Ngai Province, presented to the outpatient clinic with complaints of intermittent vaginal bleeding for approximately one month. The patient's information and case details are presented in accordance with the CARE Case Report Guidelines *[Place Table 1 near this point]* (7). The bleeding was described as brown in color and mixed with blood clots. She also reported mild lower abdominal discomfort but denied associated symptoms such as dizziness, headache, or recent weight loss. Her obstetric history included one spontaneous vaginal delivery 20 years prior. She had no notable medical or surgical history. The patient was premenopausal,

with regular menstrual cycles prior to symptom onset. She had no known family history of gynecologic or breast cancer. Her HPV status was not assessed.

On examination, the patient appeared in average general condition. Her skin was pink and well-hydrated. Vital signs were stable, with a heart rate of 80 beats per minute and blood pressure of 112/80 mmHg. She weighed 44 kg, with a height of 160 cm, corresponding to a body mass index (BMI) of 17. Cardiovascular and respiratory examinations were unremarkable. Abdominal examination revealed a soft abdomen with a palpable mass approximately 6 cm in the lower abdomen, eliciting mild tenderness.

Gynecological examination showed normal external genitalia and cervix, with minimal vaginal discharge and few vaginal folds. Bimanual pelvic examination identified a uterus of normal size and a tender, firm 5 cm mass in the left adnexa. No significant mass was appreciated in the right adnexa.

Laboratory investigations revealed a normal complete blood count and unremarkable blood chemistry, including liver and renal function tests. Viral serology was positive for hepatitis B surface antigen (HBsAg) but negative for HIV and syphilis. Urinalysis indicated normal glucose, bilirubin, and ketones; however, nitrites were positive, suggestive of a urinary tract infection.

Chest radiography demonstrated no abnormalities. Pelvic ultrasound revealed an anteverted uterus with a thickened, poorly echogenic endometrium measuring 2 mm with irregular borders. Within the endometrial cavity, a cystic lesion measuring 3.7 mm with dense echogenic content was visualized, alongside a solid mass measuring 8 × 3 mm *[Place Figure 1 near this point]*. The right ovary showed a multilocular hypoechoic mass measuring 64 × 47 × 53 mm with internal vascularity *[Place Figure 3 near this point]*. The left ovary presented a larger solid hypoechoic mass measuring 128 × 74 × 75 mm with irregular margins and absent internal vascularity *[Place Figure 2 near this point]*. A moderate amount of pelvic fluid was also noted.

These findings raised the suspicion of a complex adnexal mass, likely of malignant origin, with involvement of both ovaries and endometrial cavity.

Further laboratory evaluation revealed an elevated CA-125 level of 646 U/mL and HE4 level of 303 pmol/L. The Risk of Ovarian Malignancy Algorithm (ROMA) value was 93.01%, indicating a high probability of epithelial ovarian cancer. Alpha-fetoprotein (AFP) was measured at 2.52 ng/mL, and beta-human chorionic gonadotropin (β-hCG) was negative.

Pelvic magnetic resonance imaging (MRI) was subsequently performed using standard multiplanar T1- and T2-weighted sequences, including post-contrast fat-saturated T1 imaging with intravenous Dotarem administration. Imaging revealed a large, irregular mass situated anteriorly in the uterine corpus, measuring 69 × 88 × 118 mm. The mass exhibited intermediate signal intensity on T2-weighted images and low signal intensity on T1-weighted images, with areas of internal fluid and contrast enhancement, along with adherence to the anterior uterine wall and left pelvic sidewall. A second lesion was identified on the right anterior uterine surface, measuring 31 × 31 × 50 mm, with fluid-like signal, diffusion restriction, and a thickened enhancing wall, suggestive of a tubo-ovarian abscess. Additionally, a small anomalous structure was noted within the endometrial cavity, consistent with a potential endometrial polyp. There were moderate ascites and irregular thickening with enhancement of the pelvic peritoneum, raising concern for peritoneal carcinomatosis. Despite these findings, both ovaries appeared normal on MRI, although the left adnexal mass previously identified by ultrasound was not visualized distinctly as an ovarian lesion. Although MRI reported both ovaries as appearing normal, the elevated CA-125 and HE4 levels, together with adnexal masses on ultrasound, initially raised suspicion for epithelial ovarian cancer.

Given the suspicion for gynecologic malignancy, the patient underwent an exploratory laparotomy. The procedure included total abdominal hysterectomy with bilateral salpingo-oophorectomy, omentectomy, and appendectomy. A midline vertical incision was performed, and upon entering the peritoneal cavity, moderate amounts of viscid ascitic fluid were encountered and collected for cytologic analysis. Gross inspection revealed a normal uterus and right adnexa. However, a left tubo-ovarian mass measuring 15 × 8 cm with omental adhesions was noted, consistent with invasive pathology *[Place Figure 4 near this point]*. Surgical excision included removal of the uterus, both ovaries and fallopian tubes, the tumor mass, omentum. An appendectomy was also performed as part of comprehensive surgical staging and to eliminate any possible appendiceal involvement or future diagnostic confusion. Total blood loss was estimated at 300 mL, and the procedure duration was 90 minutes. No intraoperative complications or adverse events were reported and the surgery proceeded without incident.

Gross pathological examination revealed a smooth endometrial surface and unremarkable cervical morphology. The right ovary and fallopian tube appeared grossly normal. The left

adnexa, in contrast, displayed a markedly enlarged fallopian tube with necrosis, hemorrhage, and a friable, white tumor mass. The omentum contained areas of hemorrhage and nodular thickening.

Microscopic analysis revealed a grade 3 endometrioid carcinoma arising in the left fallopian tube, with features of architectural complexity, back-to-back gland formation, nuclear pleomorphism, and high mitotic activity in *[Place Figure 6 near this point]*. The endometrium, cervix, left ovary, and right adnexa showed no evidence of malignancy. Clusters of malignant cells were observed in the omentum, confirming metastatic dissemination. Cytologic analysis of ascitic fluid identified chronic inflammatory cells and reactive mesothelial cells in *[Place Figure 5 near this point]*.

Postoperatively, the patient was diagnosed with primary fallopian tube carcinoma, endometrioid adenocarcinoma type, FIGO stage IIIC, based on the presence of confirmed omental metastases. Although the initial impression was epithelial ovarian cancer, final pathology confirmed the fallopian tube as the primary site. The patient is scheduled for routine follow-up including CA-125 and HE4 monitoring every 3 months, and pelvic imaging every 6 months for the first two years. She is currently scheduled to receive adjuvant chemotherapy with a regimen of Carboplatin and Paclitaxel.

## 3. DISCUSSION

This study reports a rare case of primary fallopian tube cancer (PFTC) in the form of endometrioid adenocarcinoma of the uterus. However, it was not possible to ascertain the incidence rate, associated risk factors, or the recurrence risk of PFTC. Additionally, genetic characteristics of the disease were not explored in this case. Most reported cases of PFTC occur in women between the ages of 50 and 60 years (8-10).

Our patient was underweight (BMI 17), which differs from other studies where most patients were overweight. However, no consistent correlation between BMI and PFTC risk has been confirmed (11-16).

The patient presented with abnormal vaginal bleeding and abdominal pain, two common symptoms of primary fallopian tube carcinoma (PFTC). Abnormal bleeding is frequently reported in the literature, with prevalence ranging from 47.5% to 75% across various studies. Abdominal pain, related to tubal distension or obstruction, was also observed and is reported in 17.4%–42% of cases. While symptom prevalence varies, the key clinical value in this case

lies in the diagnostic challenge due to the nonspecific presentation and radiological resemblance to ovarian cancer (8, 9, 14, 16-20).

In clinical examinations, palpable tumors were detected in this case, with detection rates similar to those in other studies, including Baekelandt (2000) (17) (61%), Ma (2021) (19) (85.9%), and Bao (2016) (16) (19.8%). Liu (2015) (9) reported a detection rate of 24.2%, Cabrero (2013) (18) of 39%, and Sun (2019) (15) of 38.8%. The classical triad of Laztko, which includes vaginal discharge or intermittent bleeding, colicky abdominal pain, and pelvic mass, is a characteristic feature of PFTC, but it is only present in a small percentage of cases (0–15%) (8).

Ultrasonography in this case revealed a large pelvic mass, similar to Li (2021) (14) (89.1%) and other studies. The mass was identified as bilateral ovarian masses with solid components, with the right side showing multiple nodules. This aligns with the typical ultrasonographic signs of PFTC, such as solid or solid-cystic masses. Ludovisi et al. (2014) reported that 96.7% of cases exhibited diagnostic signs of PFTC, with 58% showing tubular solid masses (21). Furthermore, fluid accumulation in the uterine cavity, likely due to obstruction by the ovarian mass, was also observed, with similar findings reported in studies by Yang (2020) (22) (10%) and Ma (2014) (20) (30%).

Magnetic resonance imaging (MRI) confirmed the presence of solid masses, displaying low signal intensity on T1-weighted images and intermediate to high signal intensity on T2-weighted images. All masses showed restricted diffusion and enhanced contrast uptake post-injection. These findings are consistent with Ma (2014) (20), which reported that 70% of PFTC cases exhibited tubular-shaped masses with solid components and contrast enhancement. MRI did not detect any metastasis, which contrasts with Ma et al. (2014) (20), who reported metastasis rates of 17%, with pelvic peritoneum infiltration in 30% and abdominal fluid accumulation in 17%. The discrepancy between imaging and intraoperative findings, particularly the unexpected identification of omental metastases, highlights the limitation of MRI in detecting small-volume or microscopic peritoneal spread in PFTC.

The CA 125 levels before surgery in our study increased progressively with disease stage. This finding is in line with Li et al. (2021) (14), who reported that 56.5% of patients had CA 125 levels ≥ 35 U/mL before surgery, with higher levels observed in later stages. Other studies, such as Mi et al. (2016) (23), found similar trends for the tumor marker HE4, with

higher levels in advanced stages of PFTC. Both CA 125 and HE4 are useful markers for diagnosing, assessing treatment response, and detecting recurrence in PFTC.

Surgical diagnosis of PFTC is often challenging, with misdiagnosis rates ranging from 0 to 40.9%. The most common misdiagnoses include ovarian cancer, tubal obstruction, and pelvic organ compression. Residual lesion volume after surgery is one of the most crucial prognostic factors in PFTC patients. Complete hysterectomy with bilateral salpingo-oophorectomy, along with maximal lesion removal and close monitoring for metastasis, is recommended if the patient's health permits.

Regarding lymph node dissection, the role of pelvic and aortic lymph node dissection in PFTC prognosis remains debated. Recent evidence, including the LION trial, suggests that routine lymph node dissection does not improve overall survival or disease-free survival, leading the FIGO (2021) guidelines to recommend against routine lymph node dissection in the absence of clinical suspicion.

Our patient was diagnosed in stage I, consistent with findings from Cabrero et al. (2013) and Li et al. (2021) (18), who reported early-stage diagnosis in the majority of PFTC patients. This early diagnosis may be attributed to symptoms that prompt patients to seek medical attention before the disease progresses.

Histologically, endometrioid adenocarcinoma predominates as the most common type of PFTC, followed by less common types such as serous carcinoma, clear cell carcinoma, transitional cell carcinoma, and carcinosarcoma. Based on clinical, histopathological, and molecular characteristics, PFTC can be categorized into two types similar to ovarian epithelial cancers. Type I tumors, which include endometrioid, clear cell, and mucinous histology, have slower clinical progression and more stable genetic profiles compared to Type II tumors, which are associated with TP53 mutations and poor clinical prognosis.

In terms of prognostic value, Uehira's study found no significant differences in clinical outcomes between various histological types of fallopian tube cancer, except for transitional cell carcinoma. However, recent reports indicate that there may be no difference in overall survival or recurrence-free survival among histological types and grades.

Although intraoperative findings initially suggested disease confined to the pelvis, histopathology confirmed omental metastases, warranting an updated diagnosis of FIGO stage IIIC based on the 2021 staging system for ovarian, fallopian tube, and peritoneal cancers. Accurate staging plays a vital role in determining prognosis and guiding treatment

strategies. The diagnosis of ovarian cancer was initially suspected based on clinical findings and tumor markers, despite normal-appearing ovaries on MRI. This highlights the diagnostic ambiguity often encountered in adnexal malignancies. This case underscores the diagnostic complexity in differentiating primary fallopian tube carcinoma (PFTC) from ovarian cancer, particularly when radiological features overlap. While preoperative imaging revealed bilateral adnexal masses and elevated CA-125 levels findings typically associated with ovarian malignancy, definitive pathology identified the left fallopian tube as the primary site. This highlights the importance of considering PFTC in the differential diagnosis of adnexal tumors, especially when imaging findings are nonspecific.

## 4. CONCLUSION

Primary fallopian tube cancer is a rare malignancy frequently misdiagnosed as ovarian cancer. While serous carcinoma is the most common histological type, endometrioid carcinoma also occurs. Diagnosis typically relies on symptoms such as abnormal vaginal bleeding or discharge and abdominal pain, alongside imaging findings on ultrasound or MRI suggesting characteristic tubal or ovarian masses. Tumor markers such as CA 125 and HE4 support diagnosis, treatment monitoring, and recurrence detection. Whenever feasible, comprehensive surgical resection—total hysterectomy with bilateral salpingo-oophorectomy and maximal cytoreduction—is recommended to improve patient outcomes. Further research is needed to understand its pathogenesis and optimize diagnostic strategies.

## Patient Perspective

At first, I was scared and confused when told I might have cancer. But after surgery and receiving care from the doctors, I felt more hopeful. I am undergoing chemotherapy now and trying to stay positive for my recovery.

## Information Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

This case report was prepared in accordance with the CARE guidelines. The completed CARE checklist is included as Supplementary *Table 1*.

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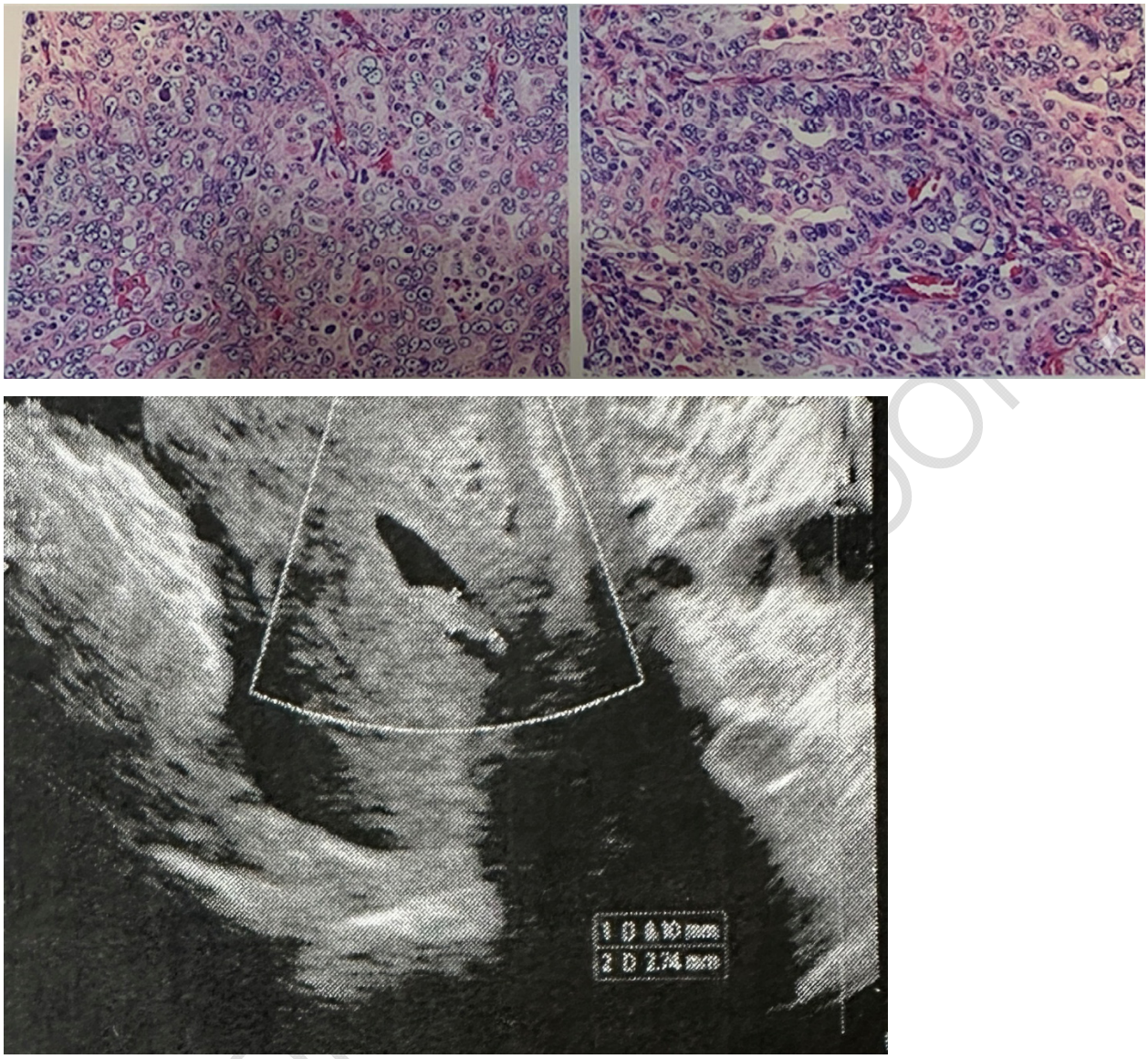
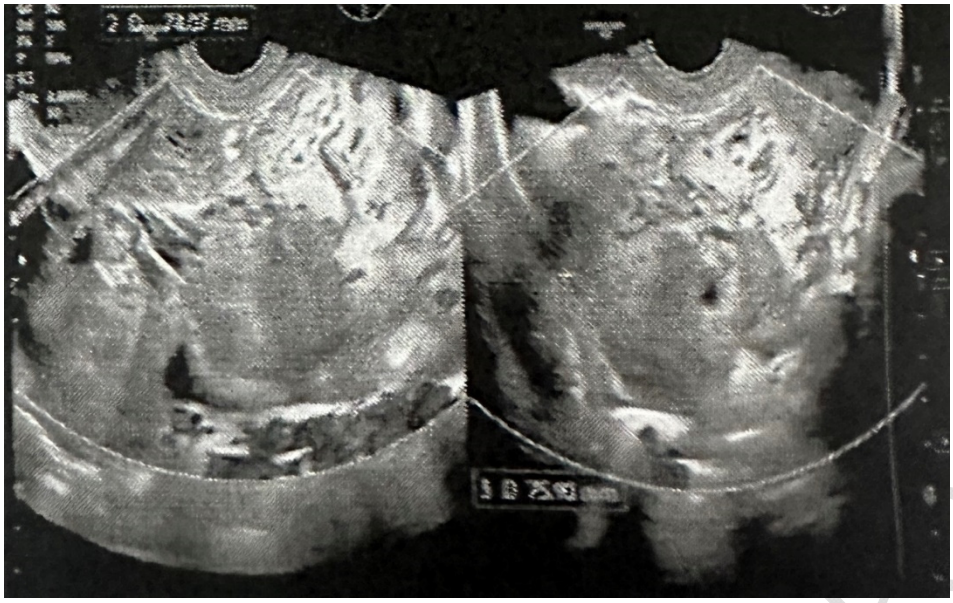


*Figure 1: The ultrasound image reveals a cystic area within the uterine cavity measuring 3.7 mm with an echogenic content and a solid mass measuring 8 x 3 mm. There is no evidence of increased vascularity*



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317 ***Figure 2: The ultrasound image of the left ovary depicts a solid hypoechoic mass***
318 ***measuring 128 x 74 x 75 mm. It lacks septations or nodularity and displays irregular outer***
319 ***margins. No evidence of posterior acoustic enhancement is observed.***

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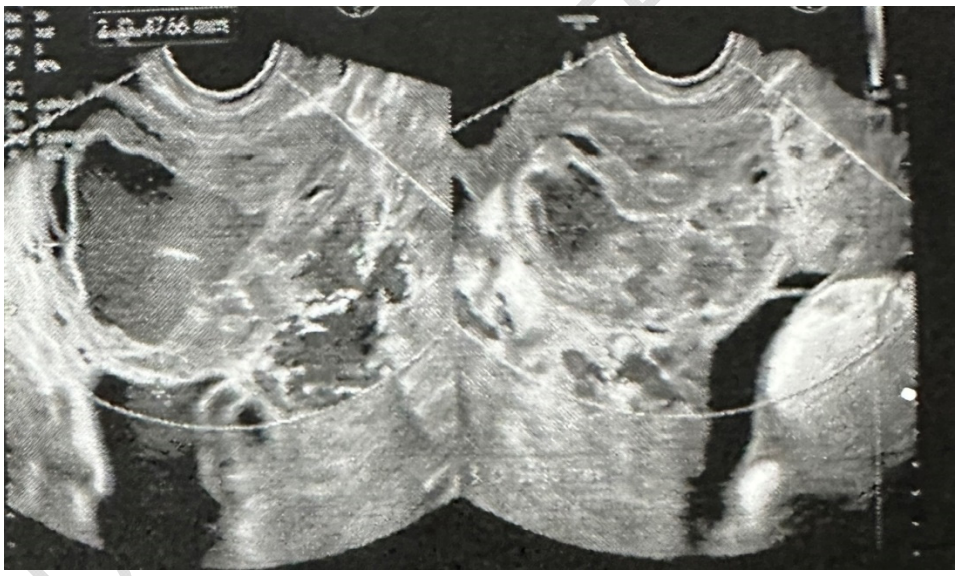

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322 ***Figure 3: The right ovary exhibits a hypoechoic mass measuring 64 x 47 x 53 mm with***
323 ***less than 10 septations, devoid of nodularity. Its outer border appears regular, while the***
324 ***inner border lacks smoothness, featuring a solid portion measuring up to 34 x 11 x 31 mm***

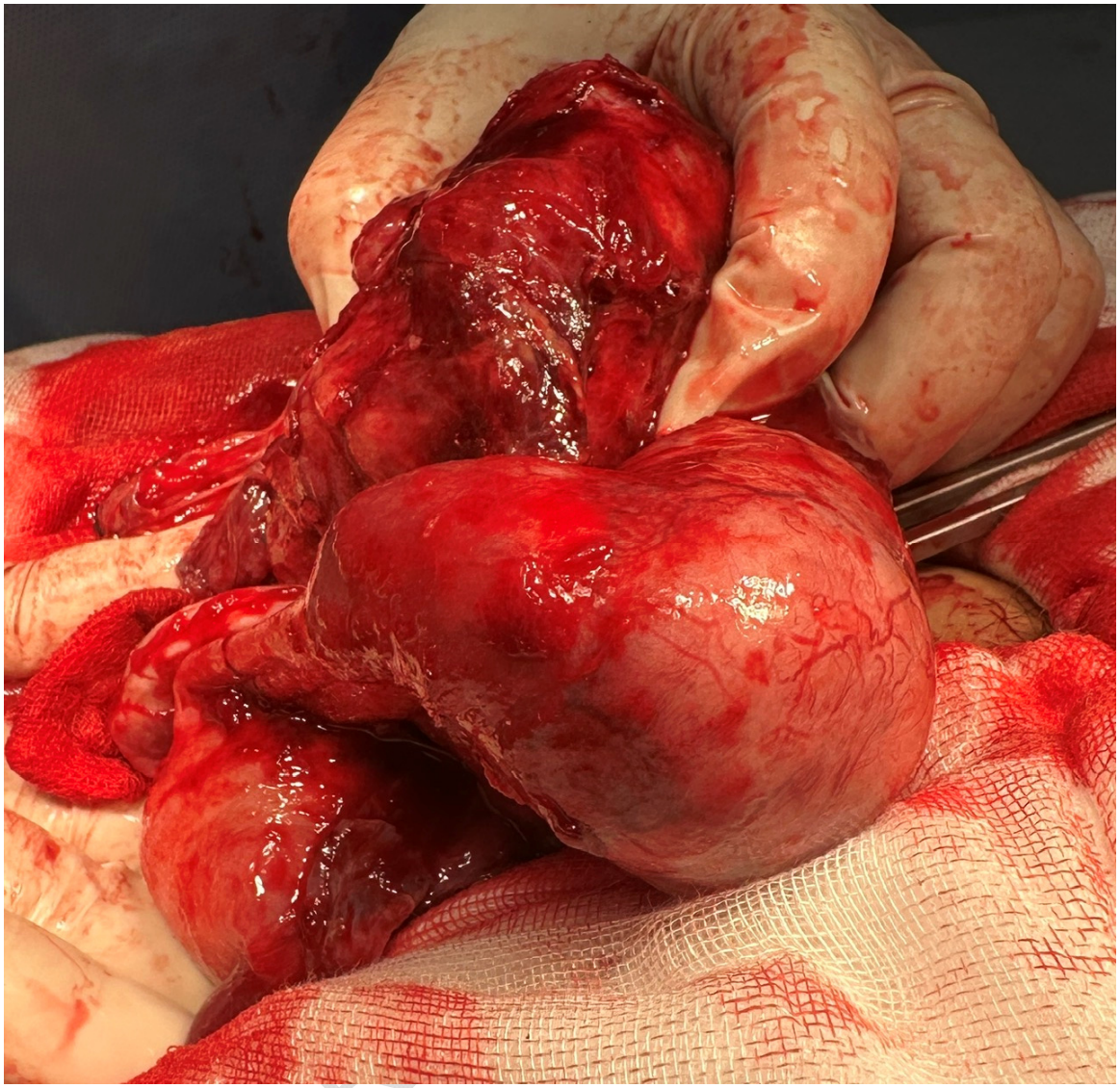

***Figure 4: Uterus, left ovary normal, and tumor in the left fallopian tube***

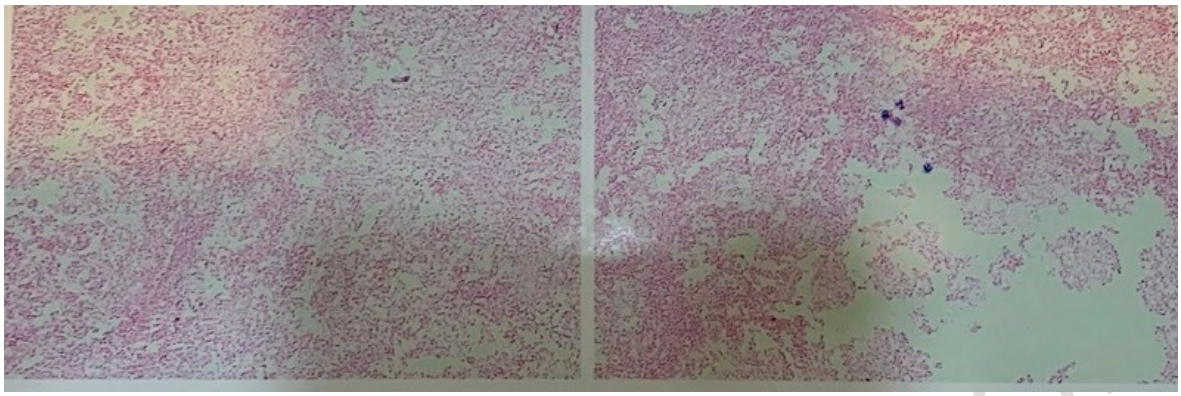

***Figure 5: The cellblock analysis reveals the presence of chronic inflammatory cells and reactive mesothelial cells***

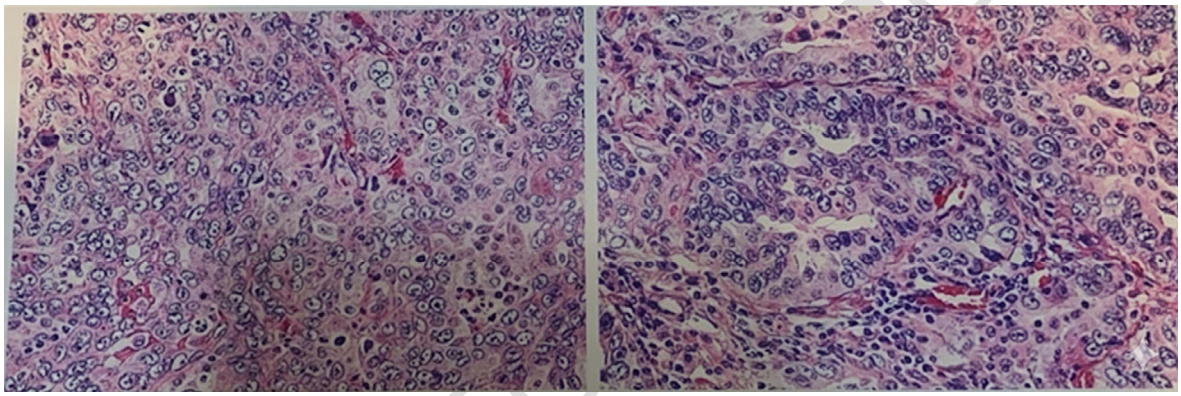

***Figure 6: The left fallopian tube shows the presence of endometrioid adenocarcinoma, grade 3***