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Magnetic resonance imaging in diagnosis of serous adenocarcinoma of fallopian tubes: a case report

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ABSTRACT

Serous adenocarcinoma of fallopian tubes is an extremely rare and difficult-to-diagnose type of cancer of the female reproductive system. This condition is often asymptomatic or has a non-specific clinical presentation including serosanguineous vaginal discharge and colic-like pain in the lower abdomen and pelvis. These symptoms are reported in the literature as the Latzko's triad and are considered pathognomonic for tubal cancer, but their combination is observed in less than 15% of patients. The low incidence and lack of the pathognomonic clinical presentation lead to many diagnostic errors or detection of advanced disease, which significantly worsens the patient's prognosis. An accurate surgical diagnosis is made in only 4% of cases. This case report describes serous adenocarcinoma of fallopian tubes with all signs of the Latzko's triad and MRI suggestive of serous adenocarcinoma of fallopian tubes at a preoperative stage.

Keywords: fallopian tube cancer; serous adenocarcinoma of fallopian tubes; magnetic resonance imaging; case report.

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Магнитно-резонансная томография в диагностике серозной аденокарциномы фаллопиевых труб: клинический случай

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АННОТАЦИЯ

Серозная аденокарцинома фаллопиевых труб — крайне редкая и сложная для диагностики форма злокачественных новообразований женской репродуктивной системы. Данная патология часто протекает бессимптомно или сопровождается неспецифической клинической картиной, включающей серозно-кровянистые выделения из влагалища, коликообразную боль в нижней части живота и таза. Эти симптомы известны в литературе как триада Лацко и считаются патогномоничными для рака маточной трубы, однако их сочетание наблюдается менее чем у 15% больных. Низкая частота встречаемости и отсутствие патогномоничной клинической картины приводят к высокому числу диагностических ошибок либо к выявлению заболевания уже в запущенной стадии, что существенно ухудшает прогноз для пациента. Точный диагноз на предоперационном этапе устанавливается всего лишь в 4% случаев. В данном клиническом наблюдении приводится описание случая серозной аденокарциномы фаллопиевых труб со всеми проявлениями триады Лацко и МР-картины, позволившей заподозрить наличие у пациентки серозной аденокарциномы фаллопиевых труб на предоперационном этапе.

Ключевые слова: рак фаллопиевых труб; серозная аденокарцинома фаллопиевых труб; магнитно-резонансная томография; описание клинического случая.

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磁共振成像在输卵管浆液性腺癌诊断中的应用：临床病例

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摘要

输卵管浆液性腺癌是一种极其罕见且难以诊断的女性生殖系统恶性肿瘤。这种病理通常无症状或伴有非特异性临床表现，包括浆液性血性阴道分泌物、下腹部和骨盆绞痛。这些症状在文献中被称为 “Latzko三联征”，被认为是输卵管癌的标志性症状，但只有不到15%的患者会同时出现这些症状。因其发病率低，临床症状不明显，导致大量诊断错误，或发现时疾病已处于晚期，从而大大恶化了患者的预后。只有4%的病例可在术前得到准确诊断。本临床观察描述了一例输卵管浆液性腺癌病例，该病例具有“Latzko三联征”的所有表现和磁共振成像，因此在术前阶段就被怀疑为输卵管浆液性腺癌。

关键词：输卵管癌；输卵管浆液性腺癌；磁共振成像；临床病例描述。

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INTRODUCTION

Serous adenocarcinoma of the fallopian tube (SAFT) is a histological subtype of primary fallopian tube cancer. At present, primary malignancies of the fallopian tube, ovary, and peritoneum are classified together as epithelial ovarian cancer [1], due to their similar clinical presentations and treatment approaches. These cancers are thought to originate from the same precursor cells, as suggested by the shared histological tumor types across all three sites. However, research in this area is still ongoing [1].

Some researchers propose that many cases of ovarian cancer and peritoneal carcinomatosis may originate from undiagnosed fallopian tube cancer. The absence of specific clinical symptoms and imaging characteristics often leads to delayed diagnosis, particularly when the disease has already spread to nearby organs and tissues, making it difficult to pinpoint the primary origin. Detecting fallopian tube cancer in its subclinical phase remains a significant challenge, with most cases diagnosed at an advanced stage, negatively affecting the prognosis [2].

We believe this issue warrants closer attention. This article presents a clinical case of pathologically confirmed SAFT, initially suspected at an early stage based on magnetic resonance imaging (MRI) findings.

CASE DESCRIPTION

Patient information

A 38-year-old female patient was referred to the radiology department at City Clinical Oncology Hospital No. 1 for a contrast-enhanced pelvic MRI to further evaluate bilateral adnexal lesions previously identified through ultrasound (US) and contrast-enhanced computed tomography (CT).

Anamnesis morbi

The patient reported feeling unwell for 2 weeks, presenting with abnormal abdominal pain and heavy menstrual bleeding. These symptoms persisted for 14 days from the onset of her menstrual cycle, leading to her admission to the emergency hospital's gynecology department via ambulance. At the time of admission, her symptoms continued; however, the gynecological examination revealed no abnormalities.

Approximately 10 years earlier, the patient had undergone hysteroscopy for uterine fibroids and had one operative delivery at 38 weeks via lower segment cesarean section.

Upon admission, pelvic US showed a solid mass with irregular margins located in the right ovary. The lesion, measuring about 100 × 60 × 80 mm, demonstrated active vascularity on color flow Doppler (Ovarian-Adnexal Reporting and Data System [O-RADS] 4) and occupied the rectouterine pouch and the entire right adnexal region. The left ovary was not clearly visualized. Additionally, up to 1,000 mL of free fluid (ascites) was detected in the pelvic cavity.

The following morning, a contrast-enhanced CT scan of the abdomen and pelvis revealed ascites and partially calcified cystic and solid formations in the right adnexal area (Fig. 1).

Laboratory tests showed no evidence of inflammation. However, tumor marker levels were elevated: CA-125 was 682.9 IU/mL (reference range, 0.0–35.0 IU/mL) and HE-4 was 106.1 pmol/L (reference range, 0.0–60.5 pmol/L).

The patient was treated with symptomatic medications, including tranexamic acid 500 mg twice daily intravenously and ketorolac 60 mg twice daily intramuscularly.

After symptom resolution and clinical improvement, she was discharged from the gynecology department for outpatient follow-up by a local oncologist to continue diagnostic evaluation and determine an appropriate treatment plan.

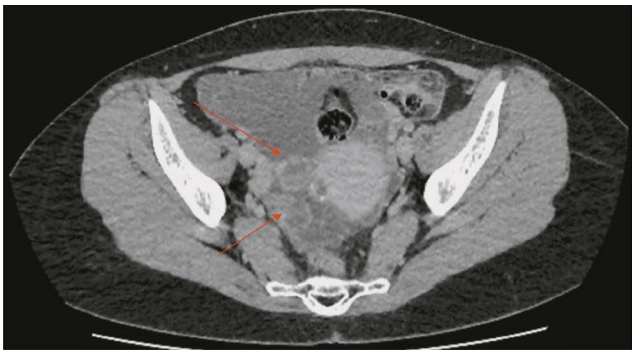

Fig. 1. Pelvic computed tomography (axial view). Rounded cystic and solid lesions (indicated by red arrows) and free fluid (ascites) are visible in the right ovarian area.

Findings of physical, laboratory, and imaging examinations

Five days later, the patient presented to the radiology department of City Clinical Oncology Hospital No. 1 for a contrast-enhanced pelvic MRI. The exam was conducted following a standard protocol, utilizing T1, T2, STIR, and DWI/ADC sequences, both with and without contrast (Gadovist).

MRI results showed that the ovaries were not enlarged and contained follicles; a hemorrhagic cyst was identified in the right ovary (Figs. 2 and 3).

A tubular structure with high fluid signal intensity and an irregular lumen, measuring up to 17 mm, was located adjacent to the anterior and outer contours of the right ovary. This structure had multiple hypervascular solid nodules on the walls and showed signs of restricted diffusion in the DWI sequence (Fig. 4). A smaller structure with similar MRI characteristics was observed on the left (Fig. 5).

The remaining pelvic organs appeared normal, with a small amount of free fluid present in the pelvic cavity. No signs of peritoneal carcinomatosis were detected on MRI.

The final conclusions from the MRI findings were as follows: a fallopian tube lesion (O-RADS 5), right ovarian

endometrioma, simple cyst of the left ovary, and a small amount of fluid in the pelvic cavity.

Differential diagnosis

Diagnosing primary fallopian tube tumors before surgery is difficult due to the nonspecific nature of both clinical symptoms and imaging findings. The differential diagnosis typically includes the following conditions:

- Primary ovarian cancer with involvement of the fallopian tube
- Tubal ectopic pregnancy
- Adnexitis, including tubo-ovarian abscess

Treatment

After the examination, the patient was admitted to the gynecologic oncology department. An elective surgery was performed, which included radical hysterectomy,

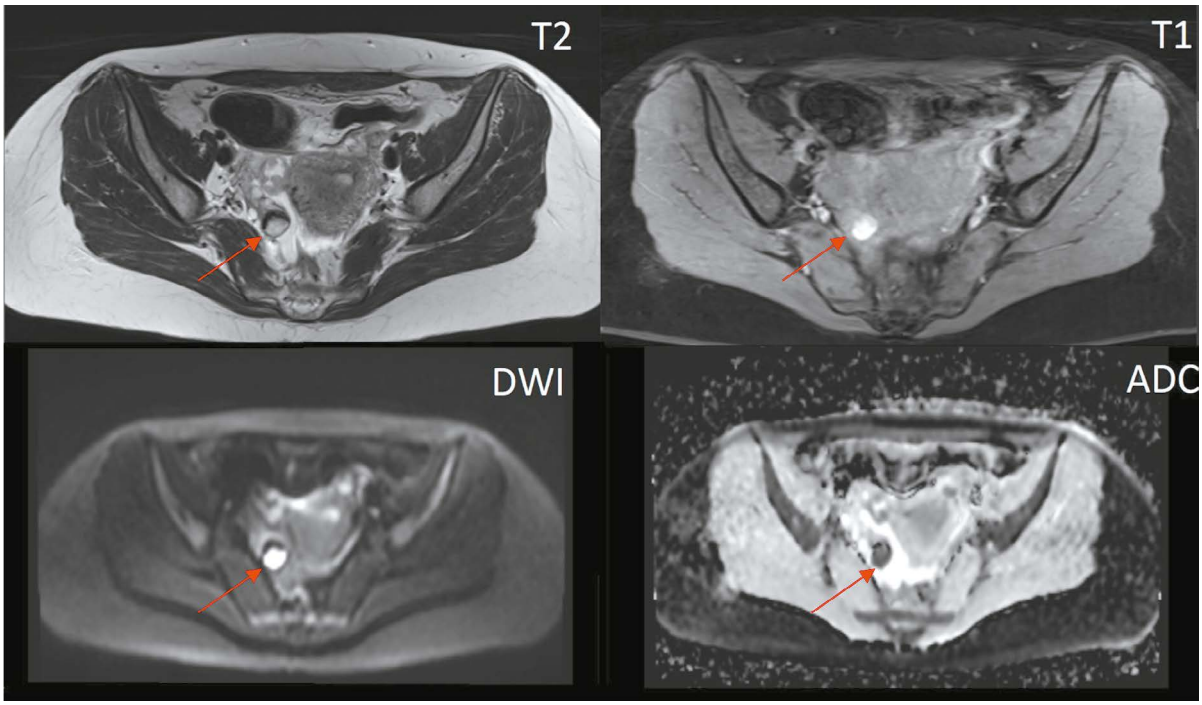

Fig. 2. Pelvic magnetic resonance imaging (axial view). A single hemorrhagic cyst is observed in the stroma of the right ovary (O-RADS 1, red arrow).

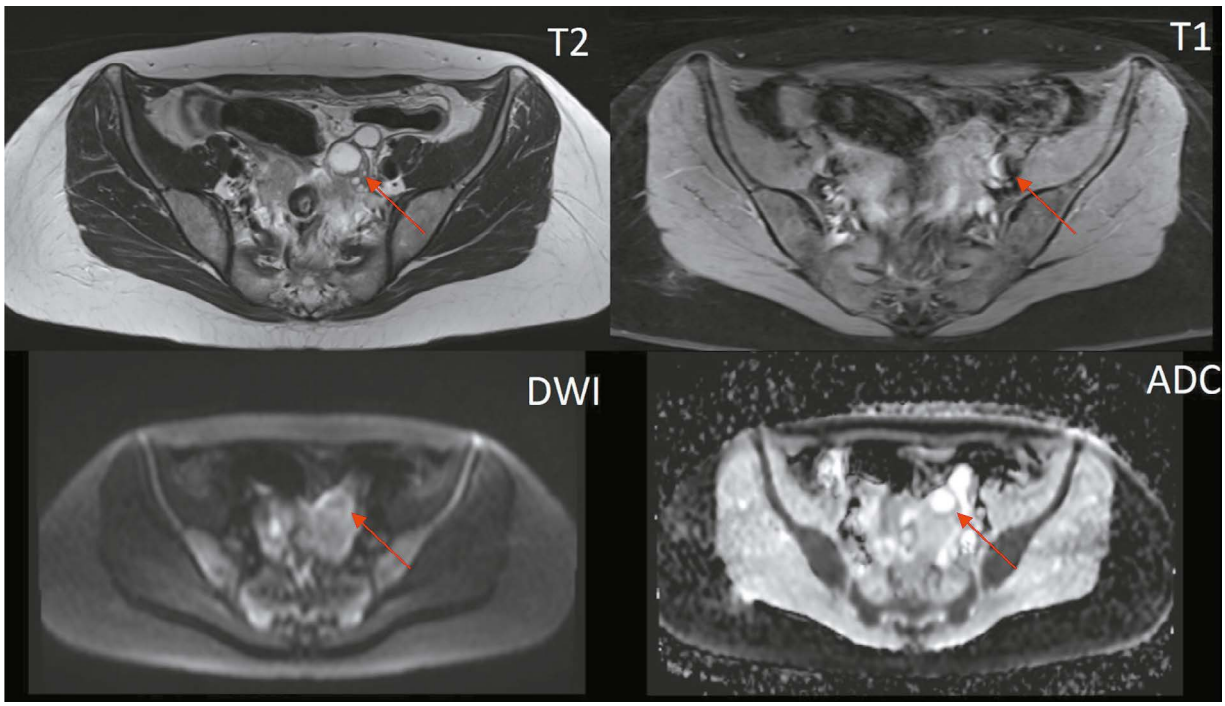

Fig. 3. Pelvic magnetic resonance imaging (axial view). The left ovary shows follicles and a simple cyst (O-RADS 1, red arrow).

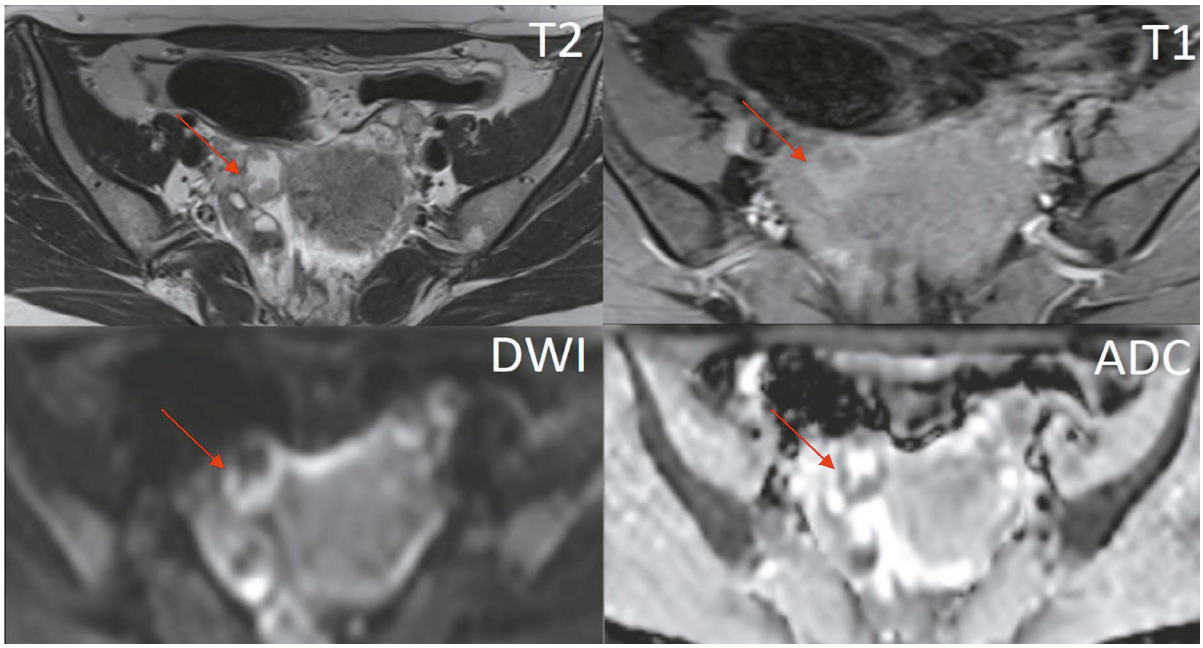

Fig. 4. Pelvic magnetic resonance imaging (axial view). The right fallopian tube contains fluid and solid nodules, with signs of restricted diffusion on DWI mode (red arrow).

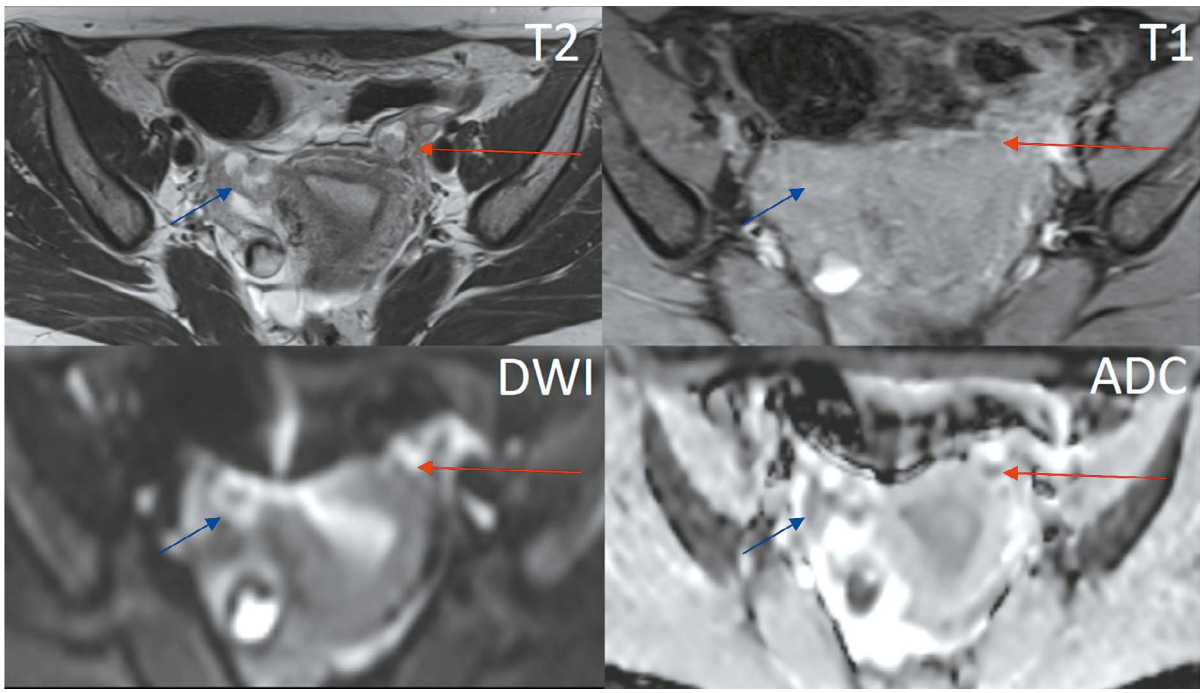

Fig. 5. Pelvic magnetic resonance imaging (axial view). Similar solid nodules are present in the left fallopian tube (red arrow). The right fallopian tube appears convoluted in this slice (blue arrow).

omentectomy, and adhesiolysis. Intraoperative and urgent histological examinations showed no evidence of peritoneal carcinomatosis.

The histology and immunohistochemistry results indicated the tumor was a high-grade SAFT.

Based on the disease stage, the surgical treatment performed, and the findings from histology and physical examinations, the oncology team decided to proceed with six cycles of adjuvant chemotherapy and genetic testing for *BRCA1* and *BRCA2* mutations.

Follow-up and outcomes

At the time of writing, the patient had completed a chemotherapy course with paclitaxel and carboplatin, which was well tolerated. No mutations in *BRCA1* or *BRCA2* were found.

DISCUSSION

Published data shows that the incidence of primary fallopian tube cancer ranges from 0.36 to 0.41 cases per 100,000 women

annually, or approximately 300–400 cases per year [3, 4]. Ulrich et al. reported 69 morphologically confirmed cases of SAFT between 1980 and 2005 at the pathology laboratory of the N.N. Petrov National Medical Research Center of Oncology and the Leningrad Region Cancer Center. As a result, Russian experts estimate that SAFT represents 0.14%–1.8% of all female genital cancers [5].

However, the actual incidence may be higher, as SAFT is often misdiagnosed as ovarian cancer. It is generally believed that primary fallopian tube cancer accounts for about 1% (0.2%–1.1%) of all gynecologic cancers, making it one of the rarest conditions in gynecologic oncology [6].

Statistically, this condition is more common in postmenopausal women aged 50–60 years. Primary fallopian tube cancer is 14% more prevalent in Caucasian women compared to other racial groups [7].

The main risk factors for fallopian tube cancer are similar to those for ovarian cancer and include the following [8]:

- Family history
- *BRCA1* or *BRCA2* mutations
- Other hereditary conditions, such as hereditary nonpolyposis colorectal cancer (Lynch syndrome)
- Endometriosis
- Hormone replacement therapy (including postmenopausal use)
- Obesity

In this clinical case, the patient was in premenopause at the time of disease onset and had no history of the risk factors mentioned earlier.

The disease is usually asymptomatic or presents with nonspecific symptoms. Latzko's triad, which includes serosanguineous vaginal discharge, colic-like lower abdominal pain, and a palpable or visualized pelvic mass, is seen in fewer than 15% of cases [9]. In this case, the patient exhibited all three components of Latzko's triad, highlighting its clinical importance.

Due to the nonspecific nature of symptoms, radiological findings are essential for detecting fallopian tube neoplasms. US remains the primary diagnostic tool for identifying adnexal lesions, though differentiating between ovarian and fallopian tube neoplasms is often difficult due to its limitations. CT imaging is particularly useful for cancer staging and detecting distant metastases, especially when combined with positron emission tomography [10]. However, among all imaging techniques, MRI provides the highest sensitivity and specificity in diagnosing fallopian tube neoplasms, as it most effectively distinguishes between the soft tissue structures of the pelvic organs [11, 12]. MRI findings are key in making the diagnosis, staging the tumor, planning treatment, and preparing for any necessary surgeries.

In current clinical practice, MRI examinations of the uterine adnexa are typically performed using the O-RADS. The approach provided by the O-RADS authors takes into account various factors, including MRI signal, tumor size and structure, as well as signs of restricted diffusion and/or abnormal contrast uptake. These criteria can be applied to ovarian lesions, fallopian tube lesions (as in our case), and adjacent ligament lesions (round, broad, or utero-ovarian ligament) [13, 14]. The most common MRI findings that raise suspicions for fallopian tube cancer include the following [15]:

- Oblong or tubular lesions in the adnexal area, often with relatively uniform fluid signal intensity (low on T1WI and high on T2WI). In our case, the lesion contained several solid foci on the walls, clearly visible against the backdrop of the distended fallopian tube. These solid foci showed restricted diffusion on DWI/ADC and early contrast uptake in the dynamic contrast-enhanced sequence.
- Fluid in the fallopian tubes (hydrosalpinx): This condition results from tumor secretions that block the fallopian tube, causing colic-like pelvic pain due to stretching. The contents of the hydrosalpinx can vary, leading to different MRI signals. In our case, the fallopian tubes were distended with serous fluid, although a hemorrhagic component due to recurrent bleeding is also possible.
- If the fallopian tube is unobstructed, there may be fluid or serosanguineous contents in the uterine cavity or free fluid in the pelvic cavity.

Primary fallopian tube cancer is generally not considered a separate disease due to its rarity and nonspecific symptoms. For instance, the World Health Organization classifies primary cancers of the peritoneum, ovaries, and fallopian tubes as a single group because of their similar pathogenesis and treatment options [1]. The International Federation of Gynecology and Obstetrics follows a similar classification, including stromal and germ cell tumors in this group as well [16, 17]. According to the current guidelines from the Ministry of Health of Russia, ovarian cancer, fallopian tube cancer, and primary peritoneal cancer are also grouped together as malignant tumors because they originate from the epithelium of these organs and share similar clinical course and treatment strategies [18].

However, despite these classifications, several international and Russian studies suggest that many cases of ovarian cancer may actually be caused by fallopian tube lesions [18–21]. Although the two cancers share similar histological features, the 5-year survival rate for fallopian tube cancer is lower than that for ovarian cancer (50% vs. 77%) [22].

As mentioned earlier, the treatment approaches for ovarian and fallopian tube cancers are similar, regardless of histological type. These typically include surgical treatment, which is based on the tumor stage (usually radical hysterectomy), and adjuvant chemotherapy with carboplatin and paclitaxel [18, 23, 25].

The 5-year survival rate for fallopian tube cancer depends on the stage at diagnosis. According to the American Cancer Society and the Surveillance, Epidemiology, and End Results program, if fallopian tube cancer is diagnosed early, before it spreads beyond the ovaries and fallopian tubes, the 5-year survival rate can reach 93%. However, if surrounding tissues or organs are affected, the survival rate drops to 74%, and with distant metastases, it further decreases to 31% [24, 26].

Given these statistics, we urge the medical community to focus on providing additional educational materials and programs for medical imaging professionals to improve awareness of the diagnostic tools and clinical signs of SAFT [27, 28].

CONCLUSION

This paper presents a rare clinical case. While the clinical presentation was typical, it was the MRI findings that raised the suspicion of primary fallopian tube cancer before surgery. We believe primary fallopian tube cancer should be more routinely considered in the differential diagnosis of patients with suspected adnexal malignancies. Some studies suggest that this cancer could lead to other malignant tumors that are currently regarded as separate disease entities.

ADDITIONAL INFORMATION

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Competing interests. The authors declare that they have no competing interests.

Authors' contribution. All authors made a substantial contribution to the conception of the work, acquisition, analysis, interpretation of data for the work, drafting and revising the work, final approval of the version to be published and agree to be accountable for all aspects of the work. O.I. Mynko, A.P. Gonchar — work conception, collection, analysis and interpretation of data, writing and editing the manuscript; V.A. Nechaev — work conception, analysis and interpretation of data, writing and editing the manuscript; E.A. Kulikova, A.L. Yudin, E.A. Yumatova — writing and editing the manuscript.

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