

# Primary malignant peripheral nerve sheath tumor of the vagina: a rare case report

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## Case Report

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# Abstract

Malignant peripheral nerve sheath tumor (MPNST) is an aggressive sarcoma typically arising from major nerve trunks in the trunk or extremities. Primary MPNST of the vagina is exceptionally rare, with very few cases reported in the literature to date. Herein, we report a rare case of a 67-year-old woman presenting with an 8-month history of vaginal bleeding and fluid discharge. Transvaginal ultrasonography revealed a solid mass (50\*40\*36 mm) on the posterior vaginal wall. The tumor was completely removed via radical surgical intervention, and the diagnosis of vaginal MPNST was confirmed through pathological examination and immunohistochemical analysis. Although adjuvant radiotherapy was recommended postoperatively based on clinical guidelines, the patient did not undergo this treatment. At the 3-month follow-up, gynecological examination and ultrasonography showed no signs of recurrence. However, one year after surgery, the patient presented with anal pain and discomfort. Pelvic MRI and CT demonstrated extensive recurrent masses in the pelvis and perineum, involving the rectum and anal canal with suspected anal fistula. Systemic evaluation indicated recurrence involving the posterior bladder wall and distal left ureter, resulting in mild left hydronephrosis, along with suspected metastasis to the right hepatic lobe. This case highlights the highly aggressive nature of primary vaginal MPNST and underscores the critical importance of adjuvant therapy and rigorous long-term surveillance for this extremely rare malignancy.

## What does this study add to the clinical work?

1. Malignant peripheral nerve sheath tumors (MPNSTs) typically arise from major nerve trunks of the extremities, making their primary presentation in the vagina exceptionally rare, with very few cases reported worldwide.
2. This case reports a rapid progression from initial clinical remission to multi-organ pelvic recurrence (involving the rectum, anal canal, and bladder) and distant hepatic metastasis within one year, particularly in a patient who did not undergo recommended adjuvant radiotherapy.
3. The extensive recurrence involving the distal ureter and the formation of a suspected anal fistula underscore the highly aggressive and invasive nature of this rare malignancy.
4. Clinicians should maintain high vigilance and consider intensive multi-modal follow-up and the essential role of adjuvant therapy for vaginal MPNST, even after achieving apparent radical surgical resection.

## Presentation

A 67-year-old woman with a history of hypertension and diabetes presented with an 8-month history of vaginal bleeding and fluid discharge. Gynecological examination revealed a hard, deep-seated 5 \* 4 cm mass on the left lower-mid vaginal wall, located 1 cm from the hymenal ring. Tumor markers, including CA125 (12.1 U/mL) and SCC (1.12 ng/mL), were within normal limits. Cervical screening revealed a negative human papillomavirus test, but cytology indicated atypical squamous cells, cannot exclude high-grade squamous intraepithelial lesion (ASC-H) with abnormal DNA ploidy. Pelvic magnetic

resonance imaging (MRI) demonstrated an ill-defined mass with spiculated enhancement on the left vaginal wall, indicating suspected invasion into the mesorectal fat and left levator ani muscle (Fig. 2). Preoperative MRI and CT of the head, neck, chest, abdomen, and pelvis indicated: multiple cerebral infarctions and leukoaraiosis; bilateral pulmonary inflammation and multiple bilateral pulmonary nodules; calcification of the coronary artery and aortic walls; fatty liver; and a small splenic cyst. A further PET-CT was performed to assist in determining the nature of the multiple bilateral pulmonary nodules. PET-CT confirmed a hypermetabolic vaginal-cervical mass consistent with a malignant peripheral nerve sheath tumor, with an unclear boundary between the tumor and the rectum, and no other obvious metastatic lesions were observed.

A preoperative colposcopy-directed biopsy was performed. Colposcopy revealed a faint acetowhite reaction in the cervical transformation zone after the application of acetic acid, along with uneven staining after iodine application. A distinct protruding mass, approximately 3 \* 2 cm and firm in texture, was visible on the left vaginal wall, showing no obvious acetowhite reaction after acetic acid application (Fig. 1). Colposcopic biopsy results: Pathology combined with immunohistochemical results of the vaginal mass biopsy suggested a malignant peripheral nerve sheath tumor (MPNST), and subspecialty consultation was recommended. Immunohistochemistry showed: CK-, Vimentin+, S-100+, SOX10+, INI-1+, H3K27me+, NF-1 occasional+, CK8/18 focal+, SMA-, Desmin-, CD34 partial+, MelanA-, CD99 focal+, ER-, PR-, P16 focal+, GFAP-, and a Ki-67 proliferation index of approximately 40%+ (Fig. 4)..

Following a multidisciplinary team (MDT) consultation, the patient underwent a laparoscopic extrafascial hysterectomy, bilateral salpingo-oophorectomy, and total vaginectomy (Fig. 3). Postoperative pathology results: (Vaginal mass) Combined with the clinical history and H&E staining findings, the tumor was consistent with an MPNST, measuring 4.5 \* 4 \* 2 cm. It was positive for lymphovascular space invasion (+) but negative for perineural invasion (-). The vaginal margin (-), bilateral parametria (-), cervix (-), left fallopian tube (-), and bilateral ovaries (-) were all negative. Additionally, an atrophic endometrium and a right fallopian tube mesosalpingeal cyst were noted. Although adjuvant radiotherapy was recommended according to clinical guidelines to improve local control, the patient did not undergo this treatment. At the 3-month postoperative follow-up in our outpatient clinic, both gynecological examination and ultrasonography showed no evidence of local tumor recurrence. However, one year after the surgery, the patient presented with a 1-month history of anal pain and discomfort. Follow-up pelvic MRI revealed extensive recurrent masses in the pelvis and perineum with poorly defined boundaries involving the rectum and anal canal, suggesting the possibility of an anal fistula. Systemic CT imaging indicated multiple abnormal density lesions on the left pelvic wall and a low-density lesion under the capsule of the right hepatic lobe, consistent with recurrence and distant metastasis (Fig. 5). Additionally, soft tissue involvement of the posterior bladder wall was noted, leading to obstruction of the distal left ureter and mild left hydronephrosis.

## Discussion

Malignant peripheral nerve sheath tumors (MPNSTs) are aggressive soft tissue sarcomas originating from peripheral nerves or their sheath cells[3]. While they predominantly occur in the extremities and trunk, primary vaginal MPNSTs are exceptionally rare[2]. These tumors often present with non-specific symptoms, and in this case, the preoperative cytology suggesting ASC-H further complicated the clinical picture, potentially masking the mesenchymal nature of the underlying tumor.

The diagnosis of MPNST remains a challenge and relies heavily on a comprehensive immunohistochemical (IHC) panel to differentiate it from other spindle cell mimics. MPNST typically shows a "marble-like" growth pattern with alternating hypercellular and hypocellular areas. Crucially, it must be distinguished from malignant melanoma (via S-100 and SOX10, although MPNST shows patchy rather than diffuse expression, and our case further excluded this via negative MelanA), leiomyosarcoma (via SMA and Desmin, both negative in this patient), and monophasic synovial sarcoma (via TLE1 or SS18 rearrangement). In our patient, the diagnosis was supported by the loss of H3K27me3—a highly specific marker for high-grade MPNST (although it is worth noting our case actually demonstrated retained H3K27me3 expression, a variant still observed in some MPNSTs)—and the negativity of myogenic and epithelial markers (such as CK-), along with the positivity of neural markers S-100 and SOX10. For cases with diagnostic ambiguity, molecular testing for NF1 gene mutations or SUZ12/EED deletions can provide definitive evidence.

Management and long-term surveillance are critical given the high risk of local recurrence and distant metastasis. According to current NCCN and ESMO guidelines[1, 4] for soft tissue sarcomas, radical surgical excision with negative margins (R0 resection) is the cornerstone of treatment. Given the tumor size (> 5 cm), the presence of lymphovascular invasion (+), and high Ki-67 index (40%), adjuvant radiotherapy should be strongly considered to improve local control, even following radical surgery. Long-term management requires a rigorous follow-up schedule: physical examination and pelvic imaging (MRI preferred) every 3–6 months for the first 2–3 years, then every 6–12 months up to 5 years, and annually thereafter. Chest CT is also recommended periodically to monitor for pulmonary metastasis, which is the most common site of systemic spread, which is particularly essential for this patient to continuously monitor the nature of her pre-existing bilateral pulmonary nodules.

Furthermore, analyzing the rapid and extensive recurrence observed in this patient within one year—progressing from local clinical remission to multi-organ pelvic involvement and distant hepatic metastasis—highlights several critical prognostic factors associated with primary vaginal MPNST. First, the intrinsic biology of the tumor was highly aggressive, as evidenced by the high Ki-67 proliferation index and the confirmed lymphovascular space invasion (+), which is a universally recognized high-risk factor for local relapse and distant hematogenous spread. Second, unlike extremity sarcomas where wide en bloc resection is more feasible, the female pelvis is anatomically confined, making it profoundly challenging to achieve truly "wide" margins in the rectovaginal septum and paravaginal spaces without primary pelvic exenteration. Finally, the omission of adjuvant radiotherapy was arguably a pivotal modifiable factor. For high-grade, deep-seated soft tissue sarcomas, postoperative adjuvant radiotherapy is the standard of care to eradicate subclinical microscopic disease. The patient's decision to decline

this recommended treatment undoubtedly created a vulnerable environment for local recurrence. This rapid progression powerfully illustrates that while radical surgery is foundational, it is often insufficient as a monotherapy, underscoring the absolute necessity of a multimodal approach and strict adherence to adjuvant therapies.

## Declarations

### **Ethics approval and consent to participate:**

Not applicable. This case report describes routine clinical care, and no experimental intervention or research procedure was performed.

### **Consent for publication:**

Written informed consent for publication of this case report and the accompanying images was obtained from the patient. The patient consented to the publication of the case details and the accompanying images under a Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided that the original author and source are credited. A copy of the signed consent form will be made available for review by the Editor-in-Chief of this journal on request.

## Competing interests:

The authors have no relevant financial or non-financial interests to disclose.

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## Author Contribution

All authors contributed to the study conception and design. Material preparation, data collection, and the first draft of the manuscript were performed by Zhenwei Gao and Nana Yin. Fangli Wei and Chujun Zhan contributed to the acquisition of clinical data and image analysis. Siyuan Sun and JiangYing Zhu supervised the study and critically revised the manuscript. All authors read and approved the final manuscript.

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The authors have no acknowledgements to declare.

# Availability of data and materials:

Data sharing is available upon reasonable request from the corresponding author.

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## Figures

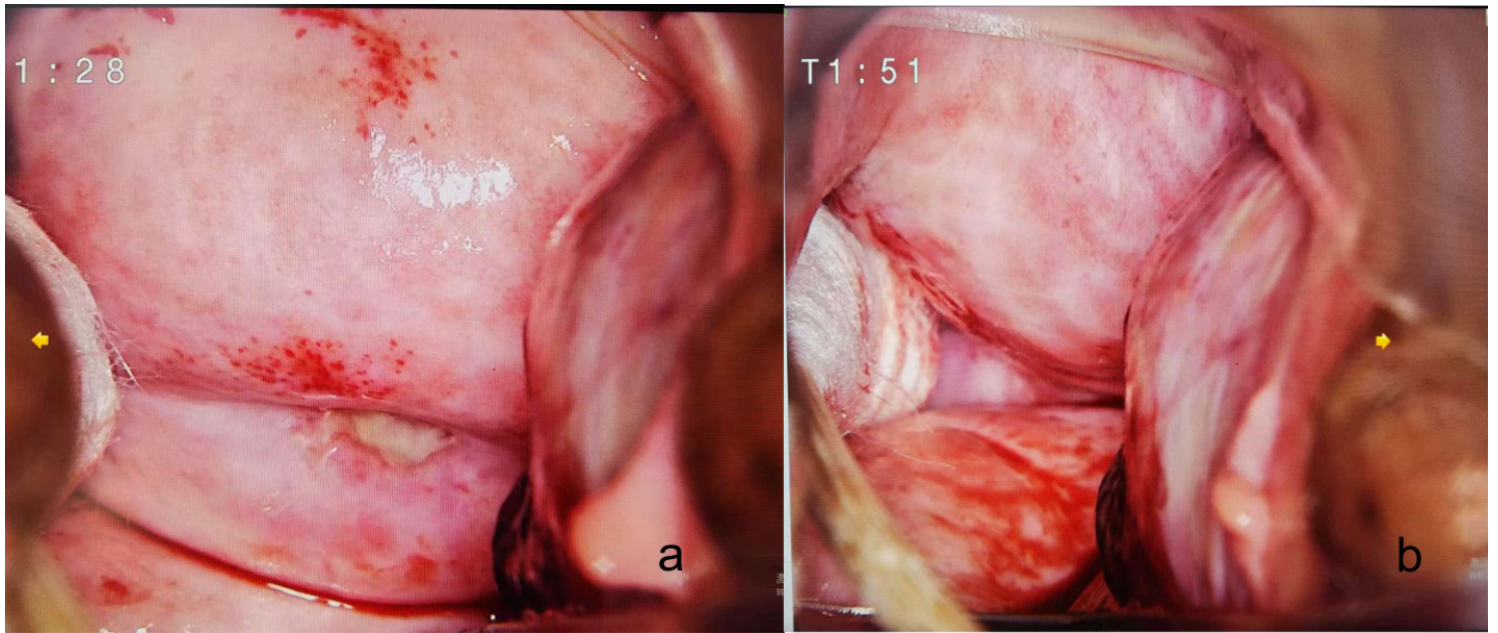


**Figure 1**

**Colposcopic findings of the vaginal mass and cervix** a Colposcopic view of the cervix following the application of 5% acetic acid, revealing a faint acetowhite reaction in the transformation zone b Full exposure of the left vaginal wall showing a distinct protruding mass (approximately 3\*2 cm) with a firm texture and no obvious acetowhite reaction after acetic acid application. the timestamp in the upper left corner indicates the procedure time.

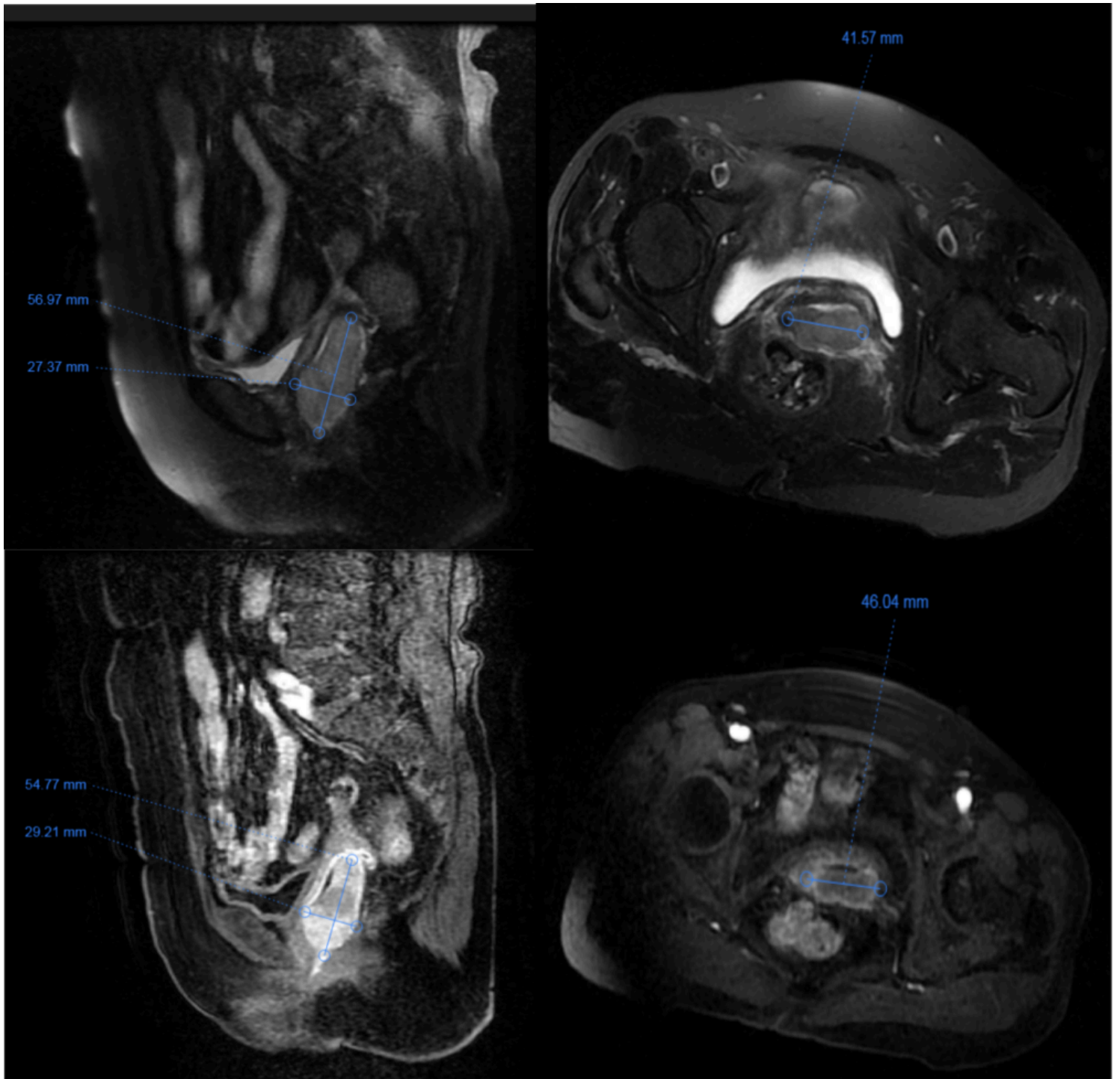


**Figure 2**

**Pelvic magnetic resonance imaging (MRI) findings of the vaginal mass.** Plain and contrast-enhanced pelvic MRI suggests a vaginal mass of undetermined nature, with an initial consideration of vaginal carcinoma . The left vaginal wall shows ill-defined boundaries with spiculated enhancement, indicating suspected invasion into the surrounding mesorectal fat. The numbers in the figure denote the dimensions of the lesion.

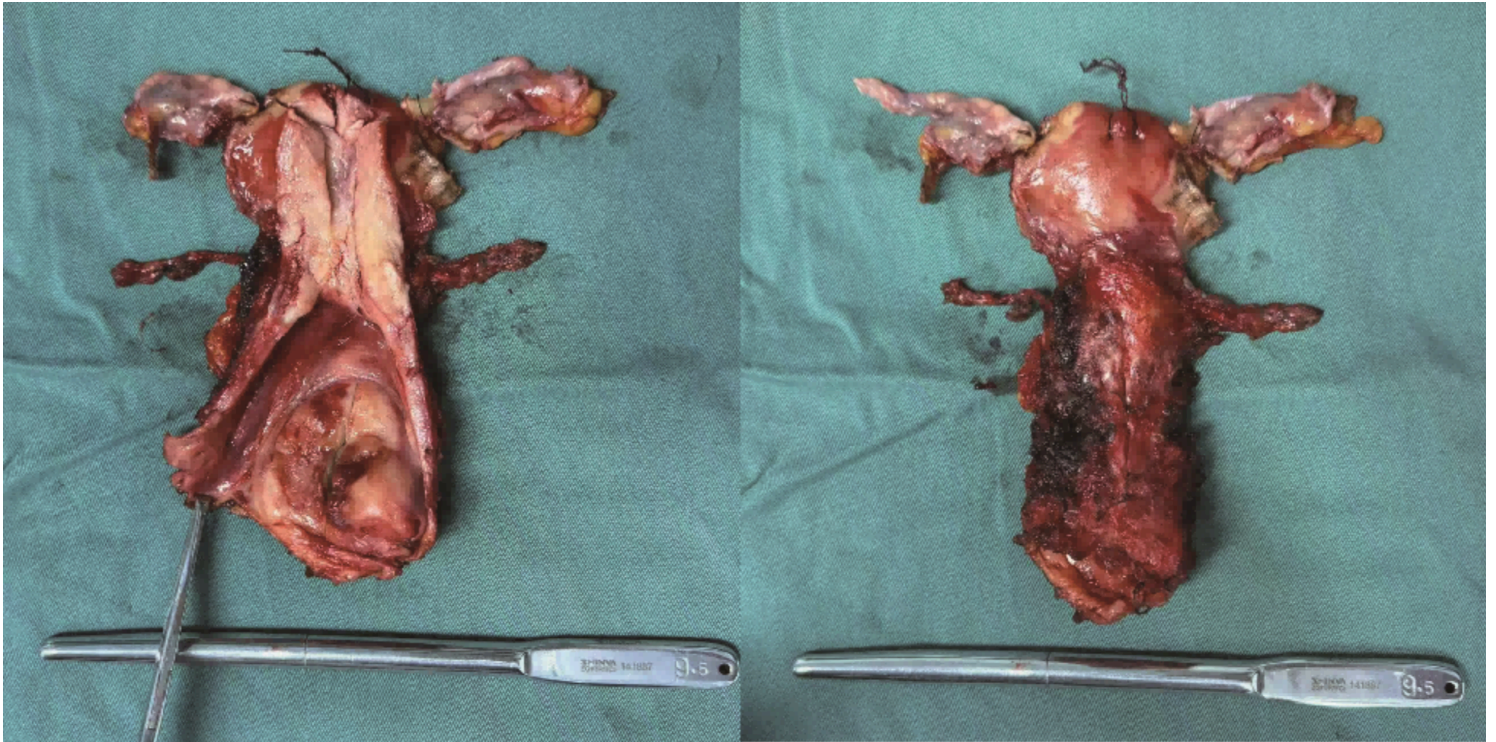


**Figure 3**

**Macroscopic appearance of the surgical specimen.** The resected specimen including the total uterus, bilateral salpingo-oophorectomy, and total vaginectomy. A firm mass measuring approximately 6 \* 5 \* 4 cm is visible on the left posterior vaginal wall. The cut surface of the tumor is solid, grayish-white, and friable. The specimen was subsequently submitted for histopathological examination.

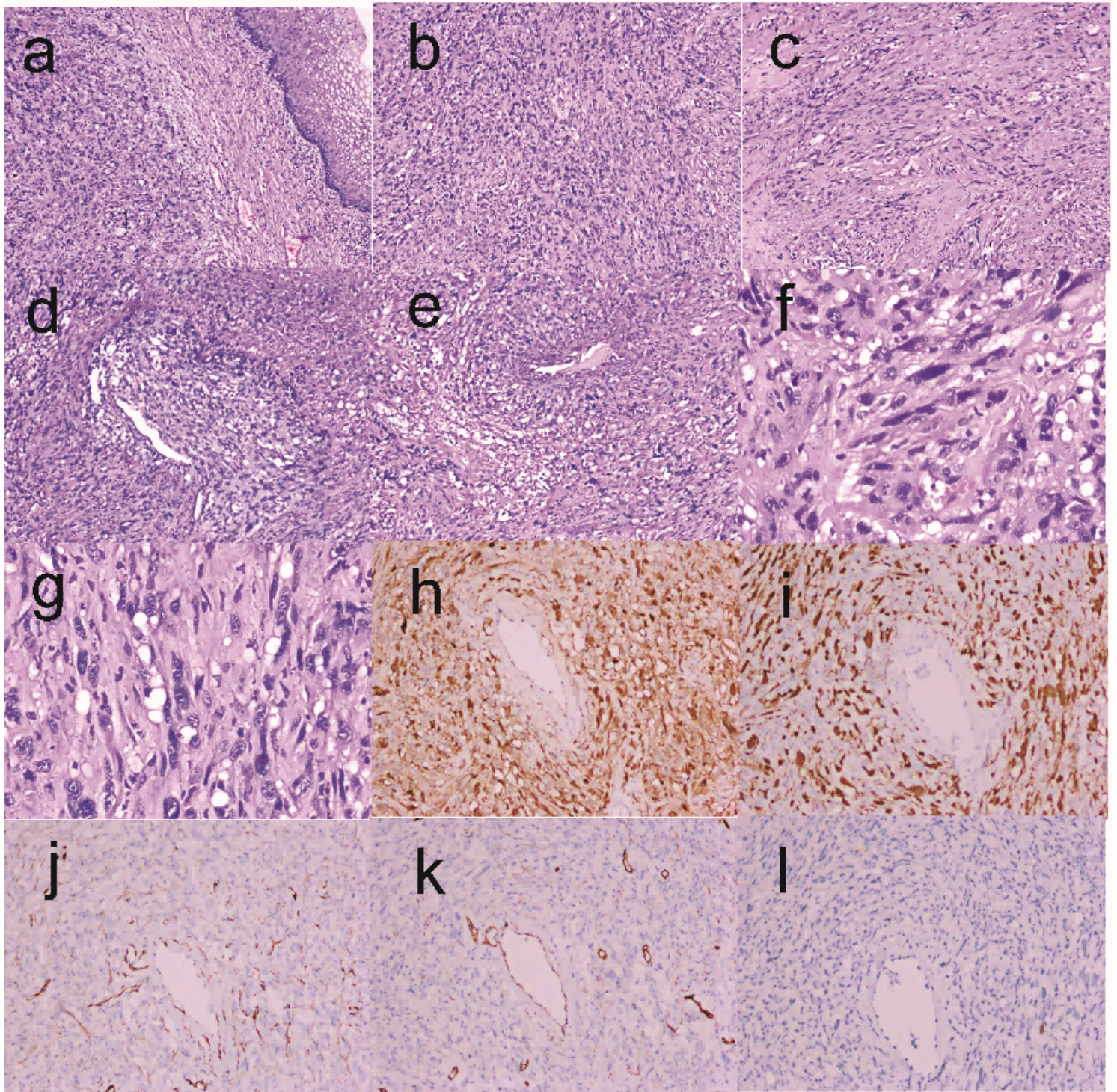


**Figure 4**

**Histopathological and immunohistochemical findings of the vaginal tumor.** a The tumor is located beneath the non-keratinized squamous epithelium, separated by a Grenz zone (HE stain, X50). b-c The tumor is composed of spindle cells with high density, showing alternating hypercellular and hypocellular areas; b represents a hypercellular area, while c shows a relatively hypocellular area (HE stain, X50). d-e Tumor cells frequently aggregate around blood vessels (HE stain, X50). f-g Tumor cells exhibit large, irregular, hyperchromatic nuclei with prominent atypia (HE stain, X200). h-l Immunohistochemical staining results: h Diffuse positive expression of S-100 (X100); i Diffuse positive expression of SOX10

(X100); j Negative expression of SMA (X100); k Negative expression of CD34 (X100); l Negative expression of Melan-A (X100).

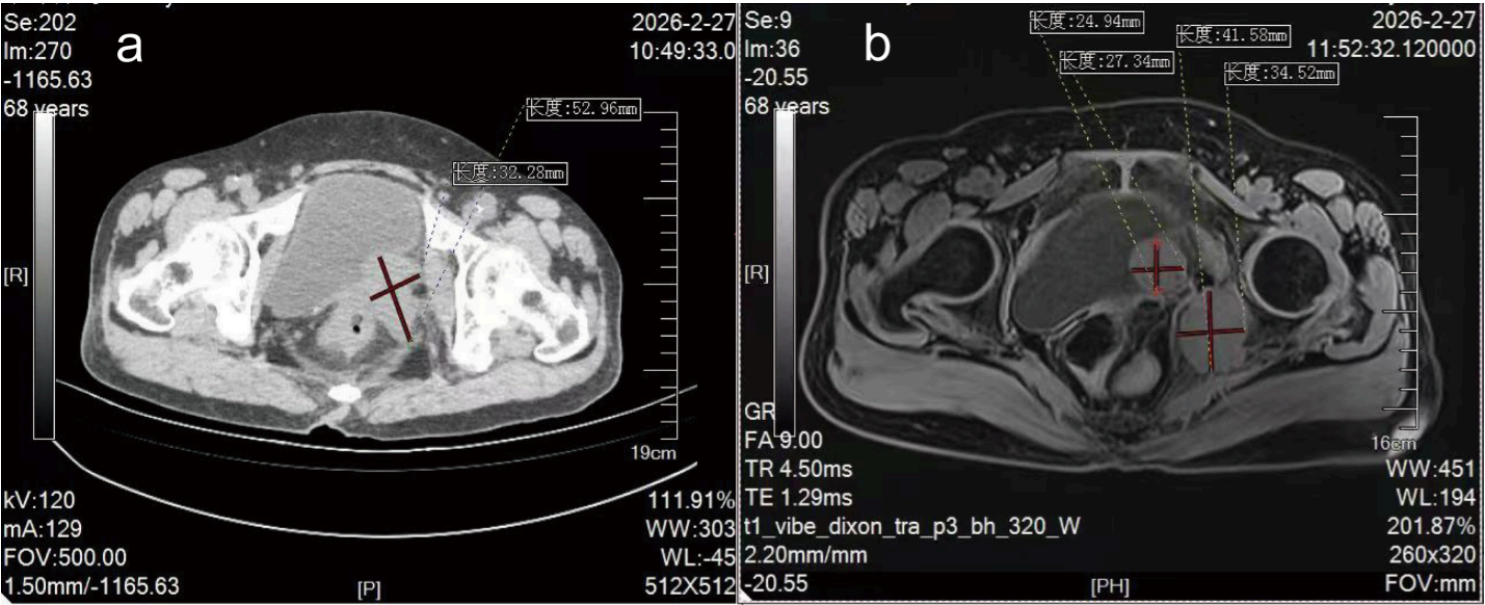


Figure 5

**Imaging findings of tumor recurrence one year postoperatively.** **a** Pelvic computed tomography (CT) scan demonstrating abnormal density lesions on the left pelvic wall, consistent with tumor recurrence. **b** Pelvic magnetic resonance imaging (MRI) revealing extensive recurrent masses in the pelvis with poorly defined boundaries.

## Supplementary Files

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- [CAREchecklistvaginalMPNSTcasereport.docx](#)