

Primary retroperitoneal squamous cell carcinoma: A case report

FANG ZHANG^{1,2}, YUAN GUI¹ and JING ZHANG¹

¹Department of Radiology, The Fifth Affiliated Hospital of Zunyi Medical University, Zhuhai, Guangdong 519100, P.R. China;

²School of Nursing, Zunyi Medical University, Zunyi, Guizhou 563000, P.R. China

Received April 7, 2025; Accepted August 15, 2025

DOI: 10.3892/ol.2025.15320

Abstract. Retroperitoneal squamous cell carcinoma (SCC) is an extremely rare tumor originating from the retroperitoneum, with an unclear etiology and origin. Imaging studies are the preferred diagnostic modality for retroperitoneal tumors. The present study reports a case of retroperitoneal SCC and assesses its imaging characteristics. A 49-year-old female patient presented to the outpatient department of The Fifth Affiliated Hospital of Zunyi Medical University with a palpable abdominal mass detected 2 years ago. Ultrasound examination revealed two abnormal solid masses in the left adnexal region, suggesting a pelvic mass of undetermined origin. The patient was admitted to the hospital for further evaluation and treatment. Abdominal computed tomography (CT) and pelvic magnetic resonance imaging (MRI) revealed a retroperitoneal mass in the left pelvis. The patient subsequently underwent resection of the lesion and regional lymphadenectomy. Postoperative pathology confirmed poorly differentiated retroperitoneal SCC. After discharge, the patient received 6 months adjuvant chemotherapy and remained recurrence-free during the follow-up. Due to its deep location, proximity to several organs and non-specific clinical manifestations, retroperitoneal SCC is difficult to differentiate from other retroperitoneal tumors preoperatively using CT or MRI. Moreover, its treatment differs from that of common retroperitoneal tumors, such as leiomyosarcoma. Thus, summarizing the imaging features of retroperitoneal SCC is essential for guiding treatment selection and improving patient outcomes.

Introduction

The retroperitoneal space is located in the posterior abdomen, between the parietal peritoneum and the transversalis fascia, and is divided into the pre-renal space, pararenal posterior space, perirenal space and midline great vessel area (1).

Retroperitoneal tumors originate from the retroperitoneal space, rather than from the organs within it. They account for 0.1-0.2% of all tumors, with malignant tumors being more common (2). The primary types of retroperitoneal tumors include lymphoproliferative, soft tissue and extragonadal germ cell tumors (3). Primary retroperitoneal SCC is extremely rare with an unclear incidence rate and a higher prevalence in female compared with men (4). The etiology of retroperitoneal SCC remains unknown. Previous cases have mostly been associated with human papillomavirus (HPV) infection or hysterectomy (3,5-10). Surgical treatment is the optimal therapeutic approach for retroperitoneal tumors. However, owing to the complex anatomical location of the retroperitoneum, tumors often metastasize to surrounding vessels and tissues. Moreover, there are differences in treatment approaches between pathological types, such as retroperitoneal squamous cell carcinoma and other retroperitoneal tumors. Therefore, accurate preoperative tumor classification is crucial for formulating effective surgical plans (11). Imaging studies, including CT and MRI, are the preferred diagnostic modality for retroperitoneal tumors. However, existing literature has predominantly focused on therapeutic aspects, with relatively limited exploration of imaging characteristics. Thus, the present article reports a case of primary retroperitoneal SCC and provides an in-depth analysis of its imaging features, aiming to provide valuable references and guidance for clinical diagnosis and treatment.

Case report

Clinical presentation and examination. A 49-year-old female patient was admitted to The Fifth Affiliated Hospital of Zunyi Medical University (Zhuhai, China) in July 2023 after presenting to the outpatient department with an abdominal mass. An ultrasound examination revealed two abnormal solid masses in the left adnexal region. The mass had been detected 2 years earlier but was not given attention and the patient did not seek medical consultation. The patient had a good past health status, with an obstetric history of three pregnancies and two deliveries. The patient had no history of tumors, no family history of diseases, and no surgical history. The external genitalia were normally developed, with a mature and parous appearance. The vagina was patent, with a small amount of white discharge visible inside. The cervix was smooth and of normal size, with a closed cervical os. The uterus was reduced in size, soft in consistency and without tenderness. No cervical

Correspondence to: Dr Jing Zhang, Department of Radiology, The Fifth Affiliated Hospital of Zunyi Medical University, 1439 Zhufeng Avenue, Doumen, Zhuhai, Guangdong 519100, P.R. China
E-mail: zymu2022@163.com

Key words: retroperitoneal tumor, retroperitoneal squamous cell carcinoma, computed tomography, magnetic resonance imaging

motion tenderness was observed. A solid mass, ~10.0x7.0 cm in size, could be palpated in the left adnexal region. The mass was closely associated with the surrounding tissues, with indistinct margins and poor mobility; no tenderness was noted. No obvious abnormalities were palpable in the right adnexal region. The rectal and anal examination was normal, as was the colonoscopy.

Laboratory tests. The levels of tumor markers carcinoembryonic antigen (CEA) and cancer antigen 125 (CA125) were 14.3 ng/ml (normal range, ≤ 5 ng/ml) and 65.8 U/ml (normal range, < 35 U/ml), respectively. Other routine blood tests, including liver and kidney function and electrolyte levels, were normal.

Imaging studies. Contrast-enhanced spiral computed tomography (CT; Fig. 1) revealed an irregular soft tissue mass (81x59x105 mm) in the left pelvic retroperitoneum (Fig. 1A), with inhomogeneous density and moderate heterogeneous enhancement (Fig. 1D-F). Multiple enlarged lymph nodes were observed around the abdominal aorta and left common iliac artery (Fig. 1B), with the largest measuring ~27x30 mm. These lymph nodes also exhibited heterogeneous moderate enhancement on contrast-enhanced scanning (Fig. 1C). The bowel loops appeared normal in morphology, with no evidence of mass lesions. No definite signs of tumor recurrence were observed immediately following surgery, at 1 month postoperatively, and at 2 months postoperatively (Fig. 1G-I).

Pelvic magnetic resonance imaging (MRI; Fig. 2) revealed a mixed signal mass (107x67x78 mm) in the left pelvic retroperitoneum, primarily iso-intense on T1-weighted imaging (WI) (Fig. 2A, E) and iso-hyperintense on T2WI (Fig. 2B), with restricted diffusion (Fig. 2C-D) and marked heterogeneous enhancement (Fig. 2F-I) in solid parts. An enlarged lymph node was visible above the lesion (Fig. 2I), measuring ~20x12 mm, with restricted diffusion and mild to moderate enhancement. CT and MRI suggested a left pelvic retroperitoneal mass, likely a malignant schwannoma or leiomyosarcoma, with multiple lymph node metastases.

Surgery and pathology. The patient underwent resection of the retroperitoneal lesion and regional lymphadenectomy. Intraoperatively, the tumor was found in the left pelvic retroperitoneum, adhering to the left pelvic wall and iliopsoas muscle (12x10 cm), compressing the left adnexa, sigmoid colon and rectum. The left internal and external iliac vessels, fallopian tube, femoral nerve and obturator nerve were infiltrated.

Gross pathological examination. A single grayish-white mass measuring 11.5x9x5 cm with a multinodular appearance was observed (Fig. 3A). The cut surface was grayish-white to pale yellow with multiple nodules. The cystic spaces contained purulent fluid and pale yellow necrotic foci. The texture was finely textured, resembling fish flesh. Postoperative pathology confirmed poorly differentiated retroperitoneal SCC (Fig. 3B). Following surgical resection, tissue specimens were fixed in 10% neutral buffered formalin at room temperature for 24 h, subjected to routine dehydration and paraffin embedding, and sectioned at 4 μ m thickness. After mounting on Leica Bond Plus slides, all immunohistochemical staining

procedures were conducted on the Leica BOND-MAX fully automated system. Heat-induced epitope retrieval was performed at 100°C for 20 min using the instrument's proprietary EDTA-based alkaline retrieval solution (BOND Epitope Retrieval Solution 2, AR9640; Leica Biosystems). Subsequently, Leica BOND™ Primary Antibody Diluent (DS9800; Leica Biosystems) was used as a blocking reagent; this ready-to-use reagent was incubated at room temperature according to the instrument's preset protocol. Then, the following ready-to-use primary antibodies from Anbiping (China) were applied directly and incubated at room temperature for 30 min: Pan-Cytokeratin (clone AE1/AE3; Catalog No. IM067-4), CK5/6 (clone D5/16B4; Catalog No. IM060-4), p40 (clone BC28; Catalog No. IM257-4), and Ki-67 (clone MIB-1; Catalog No. IM098-4). Detection was performed using the Leica BOND™ Polymer Refine Detection System (HRP-based system; catalog No. DS9800, Leica Biosystems) at 25°C for 8 min. Finally, chromogenic development was performed with the Leica BOND DAB Refine kit (DS9800; Leica Biosystems), and all stained sections were examined and imaged using an Olympus BX53 light microscope. The quantification of Ki-67-positive cells was performed using the Mshot Microscope Digital Measurement Analysis System (Guangzhou Micro-shot Technology Co., Ltd.). At least five representative fields of view were randomly selected from each sample and a 40x objective lens (total magnification 400x) was used. A total of two pathologists blinded to the grouping, independently counted the number of positive nuclei among all tumor cells. The final results were expressed as the percentage of positive cells (Ki-67 index). The final immunohistochemical results (Fig. 3C-F) showed Pan-Cytokeratin (+), CK5/6 (+), p40 (+) and Ki-67 (+, 70%).

The patient received adjuvant chemotherapy (167 mg/m² paclitaxel + 0.3 g/m² carboplatin) every 4 weeks for six cycles. The patient was followed up via telephone every 2 months for a total of 12 months. During the follow-up period, the patient was in good condition without any signs of recurrence.

Discussion

SCC is a malignant tumor that often occurs in areas covered by squamous epithelium, such as the skin, esophagus, cervix and vagina (12). However, retroperitoneal SCC is extremely rare, with only nine articles and 16 cases reported globally, and its etiology remains unclear. SCC may be associated with metaplasia as a result of chronic irritation during the embryonic dormancy period (13). SCC has also been linked to endometriosis (7) and HPV infection (14). Currently, studies on retroperitoneal SCC are lacking, and primarily rely on individual case reports that focus on treatment options, with little description or summary of its imaging features. Therefore, the present article reports a case of primary retroperitoneal SCC and analyzes its imaging manifestations to provide a reference for future diagnosis and treatment.

CT and MRI are the primary imaging modalities for retroperitoneal tumors. Distinguishing whether a lesion is retroperitoneal or organ-derived is crucial for accurate diagnosis and treatment. In the present case, imaging demonstrated that the adjacent uterus was displaced to the right, the tumor

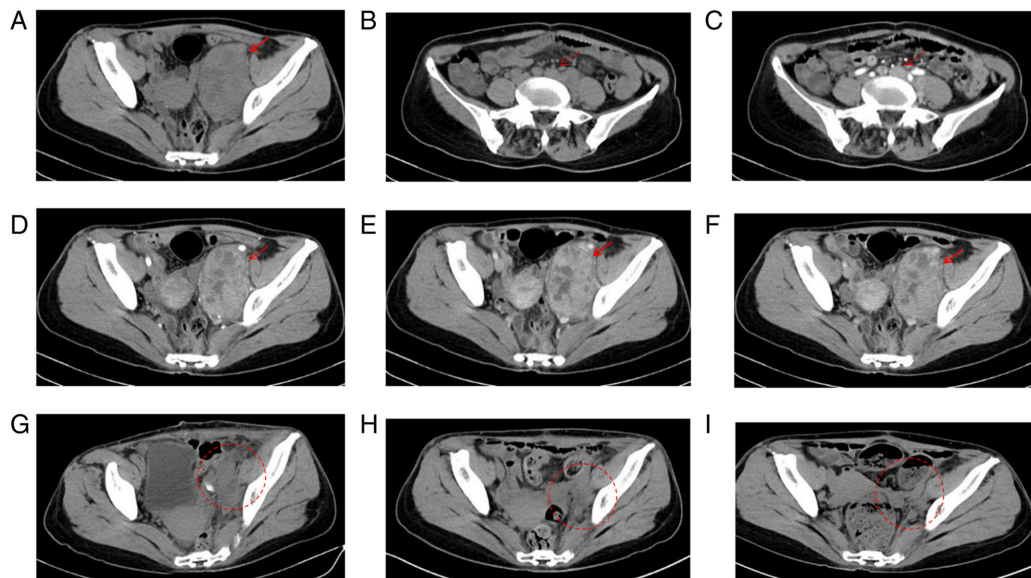


Figure 1. CT images. (A) Non-contrast enhanced image reveals an irregularly shaped, heterogeneous density soft tissue mass in the left pelvic cavity. (B) Non-contrast lymph node image shows enlarged lymph nodes in the retroperitoneal space. (C) Enhanced lymph node image demonstrates heterogeneous enhancement of the enlarged lymph nodes. (D) Arterial phase enhanced scan shows heterogeneous mild enhancement of the mass. (E) Venous phase image reveals an increase in the enhancement of the mass. (F) Delayed phase scan shows persistent heterogeneous delayed enhancement of the mass. (G) Immediate postoperative CT image shows that the original left pelvic mass has been resected, with a small amount of gas and exudate visible in the surgical area. (H) Follow-up CT 1 month after surgery shows that the exudate in the surgical area has been mostly absorbed, and the anatomical structures are becoming clearer. (I) Follow-up CT 2 months after surgery shows good recovery of the surgical area, with no clear signs of recurrence. Solid arrows indicate the tumor area; dashed arrows indicate enlarged lymph nodes; circles outline the postoperative tumor area, with no obvious signs of recurrence CT, computed tomography.

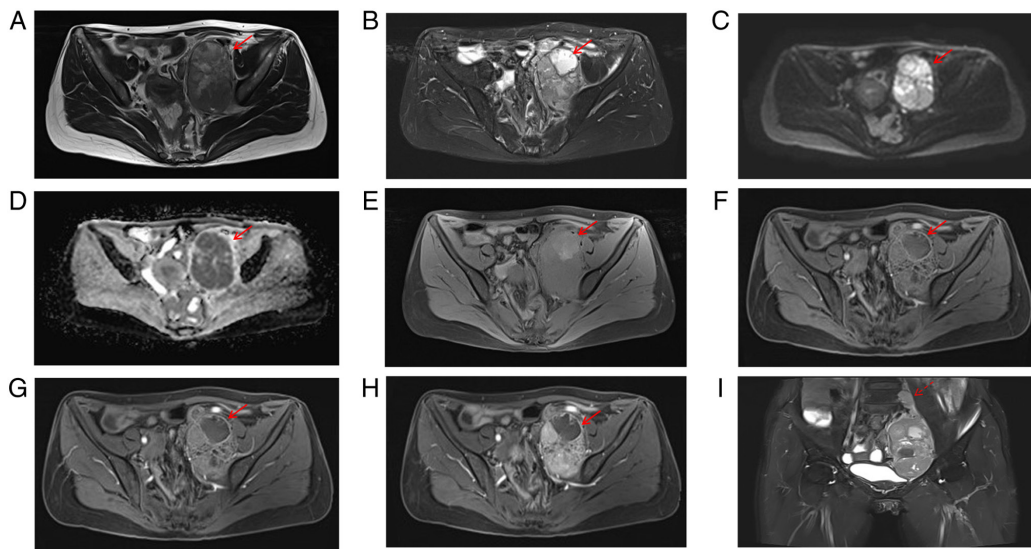


Figure 2. Magnetic resonance imaging features of the lesion. (A) Axial T1-weighted imaging (T1WI) demonstrates heterogeneous signal intensity, with small patchy hyperintense foci observed within the lesion, suggesting possible intratumoral hemorrhage. (B) Axial T2-weighted imaging with fat-suppression shows heterogeneous signal intensity, with small patchy hyperintense areas noted, indicating possible cystic degeneration or necrosis within the tumor. (C) Diffusion-weighted imaging (DWI) reveals hyperintense signal within the lesion. (D) The apparent diffusion coefficient (ADC) map shows corresponding hypointensity. (E) Axial T1-weighted imaging with fat-suppression displays heterogeneous signal intensity, with small patchy hyperintense foci visible within the tumor. (F) In the arterial phase, the tumor exhibits marked but heterogeneous enhancement. (G) In the venous phase, the tumor continues to show marked heterogeneous enhancement, which is more pronounced compared to the arterial phase. (H) In the delayed phase, the tumor demonstrates persistent heterogeneous enhancement, with small patchy hypointense areas indicating non-enhancing regions. (I) Coronal T2-weighted imaging with fat suppression reveals regional lymph nodes, which show heterogeneous enhancement on contrast-enhanced imaging. The adjacent bladder and uterus are compressed and displaced to the right. Solid arrows indicate the tumor area; dashed arrows indicate enlarged lymph nodes. DWI, diffusion-weighted imaging; ADC, apparent diffusion coefficient.

encircled the left external iliac artery and its pedicle extended outward behind the ilium, suggesting a retroperitoneal origin. CT indicated that the tumor had an inhomogeneous density with mixed high and low densities, which may be caused by

abnormal vascular structures prone to hemorrhage, resulting in high densities, and tumor size-related uneven blood supply, vascular invasion and necrosis, leading to low densities. Enhanced scanning revealed heterogeneous marked

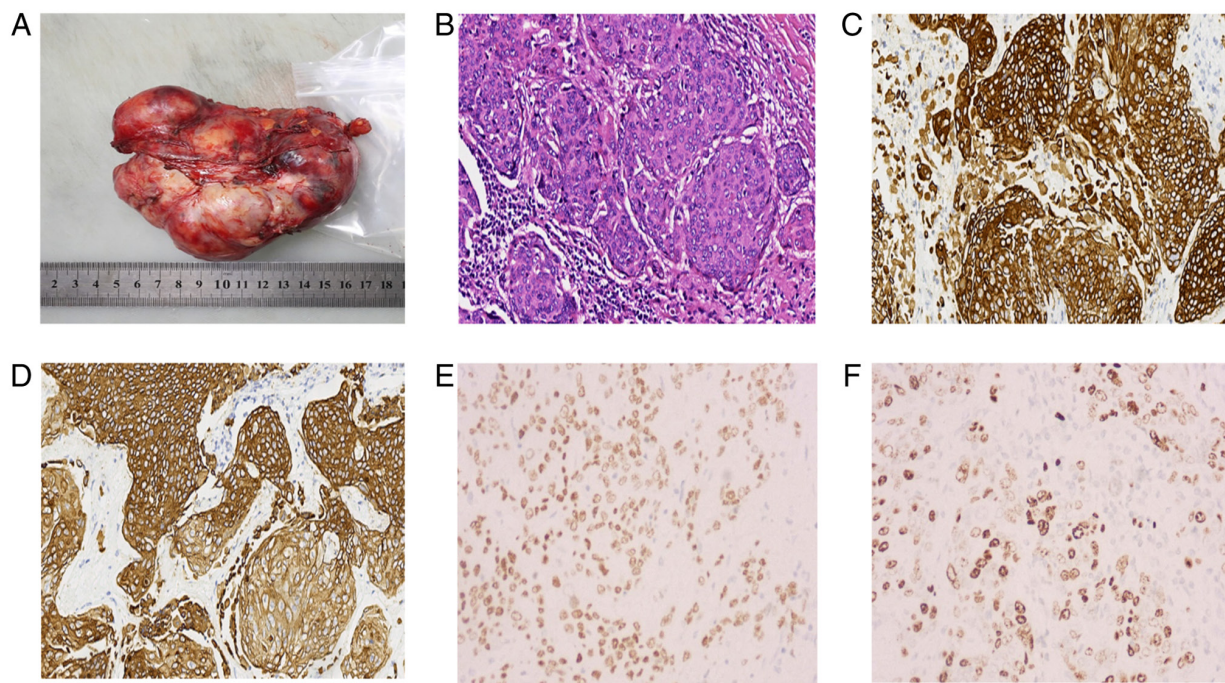


Figure 3. Histopathological and immunohistochemical images of poorly differentiated squamous cell carcinoma. (A) Gross appearance of the tumor. (B) Tumor cells are arranged in nests in some areas and in diffuse solid sheets in others, without evident keratin pearls. There is marked variation in cell size and shape, with an increased nuclear-to-cytoplasmic ratio, deep nuclear staining, coarse chromatin, and frequent mitotic figures, which are indicative of poorly differentiated squamous cell carcinoma. (H&E). Magnification, x40. (C) The tissue sample shows Pan-cytokeratin positivity. (D) Immunostaining for CK5/6 is positive in the displayed section. Magnification, x40. (E) Nuclear expression of p40 is observed in the tumor cells. (F) The Ki-67 proliferation index is approximately 70%.

enhancement, likely due to angiogenesis-promoting factors such as VEGF, but with unenhanced or weakly enhanced areas resulting from rapid tumor growth, hypoxia, necrosis or vascular compression/occlusion.

MRI, with its superior soft tissue resolution, complements CT in assessing such tumors. Using T1WI, small high-signal areas suggested possible hemorrhage, whereas mixed signals on T2WI and fat-suppressed T2WI indicated possible cystic change and necrosis, corroborating the CT findings. Diffusion-weighted imaging revealed high signals, and apparent diffusion coefficient maps showed low signals, indicating restricted diffusion. This restricted diffusion may be attributed to high cell density, which reduces the extracellular space, and tumor stromal fibrosis, forming a meshwork that hinders water diffusion. The irregular shape of the tumor, caused by inconsistent growth rates in different directions, further suggested malignancy. Retroperitoneal SCC predominantly manifests as cystic lesions (3,8), differing from the present case. This variability highlights the non-specific imaging features of retroperitoneal SCC, likely due to the limited number of reported cases. Nonetheless, the present case provides a valuable reference for clinical practice, highlighting the importance of considering this rare tumor in the diagnosis of retroperitoneal tumors, given its distinct treatment and prognosis.

Retroperitoneal SCC should be differentiated from retroperitoneal schwannoma and leiomyosarcoma. retroperitoneal schwannoma typically has a complete capsule, often exhibits soft tissue density, is prone to cystic changes with possible calcification and demonstrates progressive delayed enhancement on imaging (15). On a T2WI sequence of MRI, it presents

with slightly high central signal and markedly high marginal signal, or multiple ring-shaped low signals in a high-signal background, which is characteristic of retroperitoneal schwannoma. By contrast, retroperitoneal leiomyosarcoma typically appears as an inhomogeneous mass, is prone to necrosis and cystic change, is richly vascularized and shows uneven and marked enhancement on imaging. Moreover, it tends to invade crucial structures, such as the inferior vena cava and renal veins (16).

The diagnosis of retroperitoneal SCC is challenging due to its low incidence and non-specific clinical manifestations. A comprehensive judgment integrating multiple sources of information is required. In addition to CT and MRI, PET/CT can be used to detect primary lesions and metastases, providing a reference for subsequent surgical and treatment plans. Percutaneous CT-guided biopsy is a crucial method for differentiating tumors. In the present case, this examination was not performed because the patient refused, and the relevant ethical implications were considered.

Most patients with retroperitoneal SCC lack typical clinical symptoms in the early stages. Symptoms such as abdominal masses, perineal pain, constipation, urinary retention and lower limb thrombosis may appear as the tumor grows and compresses surrounding tissues or organs. Some cases also present with symptoms of distant metastasis (14). In the present case, despite the large size of the tumor, the patient only presented with a palpable mass in the lower abdomen and did not experience other symptoms such as lower gastrointestinal discomfort, which may be attributed to the relatively spacious retroperitoneal space. Additionally, both the whole-abdomen spiral CT scan and colonoscopy

revealed no notable abnormalities, suggesting that the patient's intestines were likely not invaded. Therefore, lower gastrointestinal symptoms, such as hematochezia and changes in bowel habits, were absent.

The majority of reported patients are female, and most are HPV-positive or have a history of gynecological surgery. In patients with a history of gynecological surgery, retroperitoneal SCC may have resulted from contamination during the surgical procedure, leading to iatrogenic viral or tumor cell deposition, or as a result of microscopic lymphatic spread from the cervix, vaginal vault or anal canal to the retroperitoneal region. Retroperitoneal SCC is also associated with endometriosis; however, the exact pathological mechanisms remain unclear (14). Nonetheless, deep-infiltrating endometriosis is associated with somatic mutations in the phosphatidylinositol-4,5-bisphosphate 3-kinase catalytic subunit α , KRAS and AT-rich interactive domain-containing protein 1A genes (17). In HPV-positive cases, retroperitoneal SCC may be caused by the oncoprotein E6, which degrades p53 via the ubiquitin-proteasome pathway. This degradation disrupts DNA repair and apoptosis regulation, as well as E7 binding and inactivation of the retinoblastoma protein, thereby relieving its inhibition of the G₁/S phase transition in the cell cycle. This drives abnormal cell proliferation and genomic instability, ultimately leading to malignant transformation. When diagnosing retroperitoneal SCC in female patients, differentiating it from gynecological tumors is crucial. Tumor markers such as CA125 and CA19-9 can help distinguish ovarian masses from retroperitoneal tumors, whereas a positive SCC antigen is indicative of the diagnosis of retroperitoneal SCC (8).

The immunohistochemistry results of the present case showed positivity for Pan-Cytokeratin, CK5/6, Ki-67 and p40, which is similar to previous reports where Pan-Cytokeratin, CK5/6, p63, p40, and p16 were positive in retroperitoneal SCC (3,5,7-10,18). This finding suggests that Pan-Cytokeratin, CK5/6, Ki-67 and p40-positivity may be associated with retroperitoneal SCC. However, this finding is based on a limited number of cases and may not be representative of a broader population. Therefore, further research is needed to confirm this association.

The treatment strategy for retroperitoneal SCC is not well-defined. Surgery is the primary treatment, often followed by chemotherapy and radiotherapy. The extent of surgical resection depends on whether the tumor metastasized to or invaded adjacent organs. Surgical resection ranges from simple tumor removal to extensive surgery, including resection of nearby organs and affected segments, as well as regional lymph node dissection. In chemotherapy, taxanes and platinum-based drugs show some efficacy in SCC; however, no specific guidelines have been established for retroperitoneal SCC owing to its rarity. Neoadjuvant chemotherapy can be used to downstage the tumor for patients who cannot undergo surgical resection (14). Patients receiving concurrent chemoradiotherapy have improved clinical outcomes. In the present case, the patient underwent surgery and subsequently returned to the hospital regularly for 6 months of postoperative chemotherapy. As of August 2024, close follow-up has shown the patient to be stable with no signs of tumor recurrence.

There are several limitations to the present case. HPV testing was not performed. Future case studies should include HPV testing to clarify its role in the pathogenesis of retroperitoneal SCC. Squamous cell carcinoma antigen was not tested. Future cases should include this test to aid in accurate diagnosis. 3. Percutaneous CT-guided core biopsy was not conducted. Future cases should prioritize percutaneous CT-guided core biopsy and emphasize educating patients about the safety of the biopsy procedure to optimize the sequence of treatment.

In conclusion, retroperitoneal SCC is a rare disease lacking typical clinical and imaging features, making preoperative diagnosis particularly challenging. Thus, further analysis of the imaging features in the present case is crucial for future clinical practice, enabling the development of individualized treatment plans and ensuring maximum patient benefits.

Acknowledgements

Not applicable.

Funding

The authors thank the National Natural Science Foundation of China (grant no. 82260341) and the Technology Plan Fund of Guizhou Provincial [grant no. Qiankehe Foundation-ZK (2022) General 634] for their financial support of the present study.

Availability of data and materials

The data generated in the present study may be requested from the corresponding author.

Authors' contributions

FZ performed data acquisition, and drafted, reviewed and edited the manuscript. YG designed the methodology, validation and reviewing and editing the manuscript. JZ conceived and designed the study and was responsible for the acquisition of funding. FZ and YG confirm the authenticity of all the raw data. All authors have read and approved the final version of the manuscript.

Ethics approval and consent to participate

The present study was granted exemption by the ethics committee of The Fifth Affiliated Hospital of Zunyi Medical University. The study was performed in accordance with the 1964 Declaration of Helsinki and subsequent amendments.

Patient consent for publication

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

Competing interests

The authors declare that they have no competing interests.

References

1. Mota MMDS, Bezerra ROF and Garcia MRT: Practical approach to primary retroperitoneal masses in adults. *Radiol Bras* 51: 391-400, 2018.
2. Yuqin D, Shi H and Ji Z: Imaging in diagnosis and treatment of retroperitoneal tumor: application and expert consensus interpretation. *J Surg Concepts Pract* 27: 511-516, 2022.
3. Oh HJ, Park EH, Lee YB, Hu J, Lee GJ, Chun SH, Lee MY, Lee DW, Kim J and Jin JY: HPV-related retroperitoneal squamous cell carcinoma of unknown primary: A case report. *Cancer Res Treat* 47: 954-957, 2015.
4. Yan H and Lin SD: Case report: HPV related pelvic retroperitoneal squamous cell cancer of unknown primary presenting as ovary neoplasm. *Int J Surg Case Rep* 125: 110528, 2024.
5. Matylevich OP, Kurchankou MA, Kopschaj PA and Schmeler KM: HPV-related metastatic retroperitoneal pelvic squamous cell carcinoma of unknown primary origin in a patient previously treated for endometrial cancer. *Int J Surg Case Rep* 118: 109624, 2024.
6. Yewedalsew SF, Abramowitz BR, Goswami S, Ahlawat S, Gupta TR and Yu Q: HPV-associated retroperitoneal squamous cell carcinoma of unknown origin: A case report. *Am J Gastroenterol* 118: S1992-S1993, 2023.
7. Cucinella G, Sozzi G, Di Donna MC, Unti E, Mariani A and Chiantera V: Retroperitoneal squamous cell carcinoma involving the pelvic side wall arising from endometriosis: A case report. *Gynecol Obstet Invest* 87: 159-164, 2022.
8. Matsuzaka Y, Yamaguchi K, Moriyoshi K, Takao Y, Takakura K and Konishi I: Primary retroperitoneal squamous cell carcinoma: A case report with review of the literature. *Int Cancer Conf J* 8: 61-65, 2019.
9. Isbell A and Fields EC: Three cases of women with HPV-related squamous cell carcinoma of unknown primary in the pelvis and retroperitoneum: A case series. *Gynecol Oncol Rep* 16: 5-8, 2016.
10. Clements A, Euscher E, Lacour R, Merritt W, Klopp A and Ramondetta L: The presence of human papillomavirus or p16 in six cases of retroperitoneal carcinoma. *Obstet Gynecol* 116: 1042-1046, 2010.
11. Wu Y, Ta N, Du Z, Qu X, Geng G, Wang S, Shi T, Feng X and Chen R: Pathological diagnosis of retroperitoneal mass—an analysis of 1 050 cases in a single center. *Acad J Naval Med Uni* 44: 272-277, 2023 (In Chinese).
12. Gliagias V, Wotman M, Herman SW, Costantino P, Kraus D and Tham T: Investigating the role of octamer binding transcription Factor-4 (Oct-4) in oral cavity squamous cell carcinoma: A systematic review and meta-analysis. *Am J Otolaryngol* 40: 282-288, 2019.
13. Schatz JE and Colgan TJ: Squamous metaplasia of the peritoneum. *Arch Pathol Lab Med* 115: 397-398, 1991.
14. Pandey A, Kumar D, Gupta P, Khosla D, Periasamy K and Kapoor R: Primary retroperitoneal squamous cell carcinoma: A literature review. *J Cancer Res Clin Oncol* 149: 12507-12512, 2023.
15. Yang S, Shang L, Zhong Y, Xing X, Xu H and Li T: Analysis on the image performances of CT and MR on retroperitoneal schwannomas. *China Med Equipment* 20: 44-48, 2023.
16. Shu Q, Shi H and Lu C: Case analysis: Typical imaging manifestations, pathological basis, and differential diagnosis of retroperitoneal Schwannoma. *China J Bases Clin Gen Surg* 32: 300-304, 2025 (In Chinese).
17. Anglesio MS, Papadopoulos N, Ayhan A, Nazeran TM, Noë M, Horlings HM, Lum A, Jones S, Senz J, Seckin T, *et al*: Cancer-associated mutations in endometriosis without cancer. *N Engl J Med* 376: 1835-1848, 2017.
18. Ahdallah R, Morse B, Hakam A and Shahzad MM: Pelvic squamous cell carcinoma of unknown primary: A case report and review of the literature. *Eur J Gynaecol Oncol* 37: 430-433, 2016.



Copyright © 2025 Zhang et al. This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0) License.