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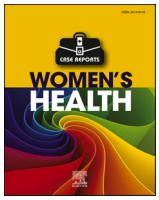

Dedifferentiated recurrent liposarcoma of the uterine corpus: A case report and literature review

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ABSTRACT

Liposarcoma of the uterine corpus represents an exceptionally rare tumor, with few cases documented in the literature, underscoring its unique histopathologic characteristics and management challenges. This case describes the clinical management of a 57-year-old patient with well-differentiated liposarcoma of the uterine corpus who presented with a three-month history of abdominal pain and distension. She underwent an abdominal hysterectomy followed by chemotherapy but experienced local recurrence in the mesentery and retroperitoneum after 21 months. Tumor resection was performed again, followed by chemotherapy, but the patient experienced a second recurrence 15 months later, involving the small intestine, vaginal stump, and ureter, with evidence of dedifferentiated liposarcoma. A third surgical resection was carried out without administering chemotherapy and the patient remained asymptomatic at follow-up appointments every 3 months for a year. This case highlights the importance of acknowledging the aggressive nature of recurrent liposarcoma, especially its transition into dedifferentiated liposarcoma, and the need for tailored management strategies.

1. Introduction

Liposarcomas (LPSs) originating in the uterus are extremely rare, accounting for only 0.03 % to 0.2 % of all uterine tumors, making their diagnosis and management a clinical challenge [1]. The World Health Organization (WHO) has classified liposarcomas into four histological subtypes—well-differentiated (WDL), dedifferentiated (DDL), myxoid/round cell (MRCL), and pleomorphic (PLS) [2]. Primary LPS of the uterus is uncommon and may arise from a lipoleiomyoma that has undergone malignant transformation, although this progression is poorly understood and rarely reported [3].

WDL typically has a more favorable prognosis, while dedifferentiation, which is observed in up to 10 % of cases, increases the risk of local recurrence and metastasis [4]. In the uterine corpus, this rare occurrence further complicates accurate preoperative diagnosis, as differentiating between WDL and benign lipomatous tumors remains particularly challenging.

The significance of this case report lies in its contribution to the limited knowledge of primary uterine LPS. To the best of current knowledge, this case represents the first instance of uterine WDL progressing to a pleomorphic subtype upon recurrence. This article emphasizes the diagnostic complexity and aggressive potential of such tumors by describing the clinical, radiologic, and histopathological characteristics that separate these tumors from benign entities.

2. Case Presentation

A 54-year-old woman, gravida 8 para 3, presented with a three-month history of persistent lower abdominal pain and distension. She underwent natural menopause at the age of 49 years and had a complex medical history. This included managing hypertension with candesartan and metoprolol tartrate, treating coronary artery disease with percutaneous coronary intervention (PCI), and placement of a stent in the left anterior descending artery. Additionally, she had a history of cerebral

Abbreviations: LPS, liposarcoma (a type of cancer); WHO, World Health Organization; WDL, well-differentiated liposarcoma; DDL, dedifferentiated liposarcoma; MRCL, myxoid and round cell liposarcoma; PLS, pleomorphic liposarcoma; PCI, percutaneous coronary intervention; CT, computed tomography; MDM2, mouse double minute 2; CDK4, cyclin-dependent kinase 4; SMA, smooth muscle actin; p16, protein 16 (also known as CDKN2A); TAH-BSO, total abdominal hysterectomy with bilateral salpingo-oophorectomy.

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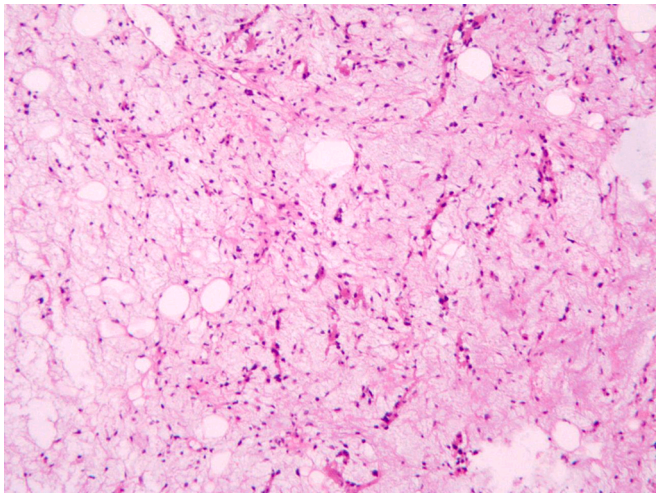

Fig. 1. The mature adipocytes are intermixed with scattered atypical spindle cells, and the stroma exhibits a myxoid appearance with nuclear atypia and hyperchromatic nuclei, indicative of WDL.

embolism and multiple prior surgical interventions, including three cesarean sections, tubal ligation, atrial septal defect repair, and spontaneous abortion. Her family history was unremarkable. No known familial or genetic predispositions to cancer were identified.

The patient reported worsening abdominal pain and fullness, which prompted further evaluation. Initial imaging with transvaginal ultrasonography revealed a markedly myomatous uterus. Computerized tomography (CT) revealed multiple well-defined, heterogeneous, fatty masses suggestive of myomas with varying echogenicity. These findings were instrumental in establishing a preoperative diagnosis of uterine lipoleiomyoma. Given the large and symptomatic nature of the mass, the patient underwent total abdominal hysterectomy. Intraoperative assessment revealed an irregularly enlarged uterus with an 11.5 cm tumor within the myometrium of the uterine corpus. The tumor had a soft, elastic consistency with a yellowish surface. The pathological mass revealed mature adipocytes with scattered atypical spindle cells and hyperchromatic nuclei, often displaying minimal mitotic activity (Fig. 1). Pathological examination revealed a WDL on the basis of immunohistochemical markers that were strongly positive for mouse double minute 2 (MDM2) and cyclin-dependent kinase 4 (CDK4). These markers confirmed the lipomatous nature of the tumor. Postoperative imaging ruled out metastatic disease, although the diagnosis raised concerns about residual tumor cells increasing the risk of recurrence. Chemotherapy with cyclophosphamide and doxorubicin was initiated postoperatively owing to the aggressive biological behavior often associated with liposarcoma and the increased risk of recurrence.

Despite this regimen, the patient experienced her first recurrence at 21 months post-hysterectomy. On physical examination, a firm, immobile abdominal mass was palpable. CT revealed heterogeneous soft-tissue masses distributed across the mesentery, along with a well-circumscribed, fat-containing retroperitoneal implant and mild ascites, which are characteristic of recurrent liposarcoma (Fig. 2). Significant lymphadenopathy or direct invasion of surrounding organs was absent. Owing to her prior PCI, the patient could not undergo magnetic resonance imaging (MRI), limiting further staging options. After providing informed consent, the patient underwent a second resection, which involved transabdominal mass removal, extensive adhesiolysis, and drainage. A mesenteric tumor contained a 3 cm gray-yellow nodule and

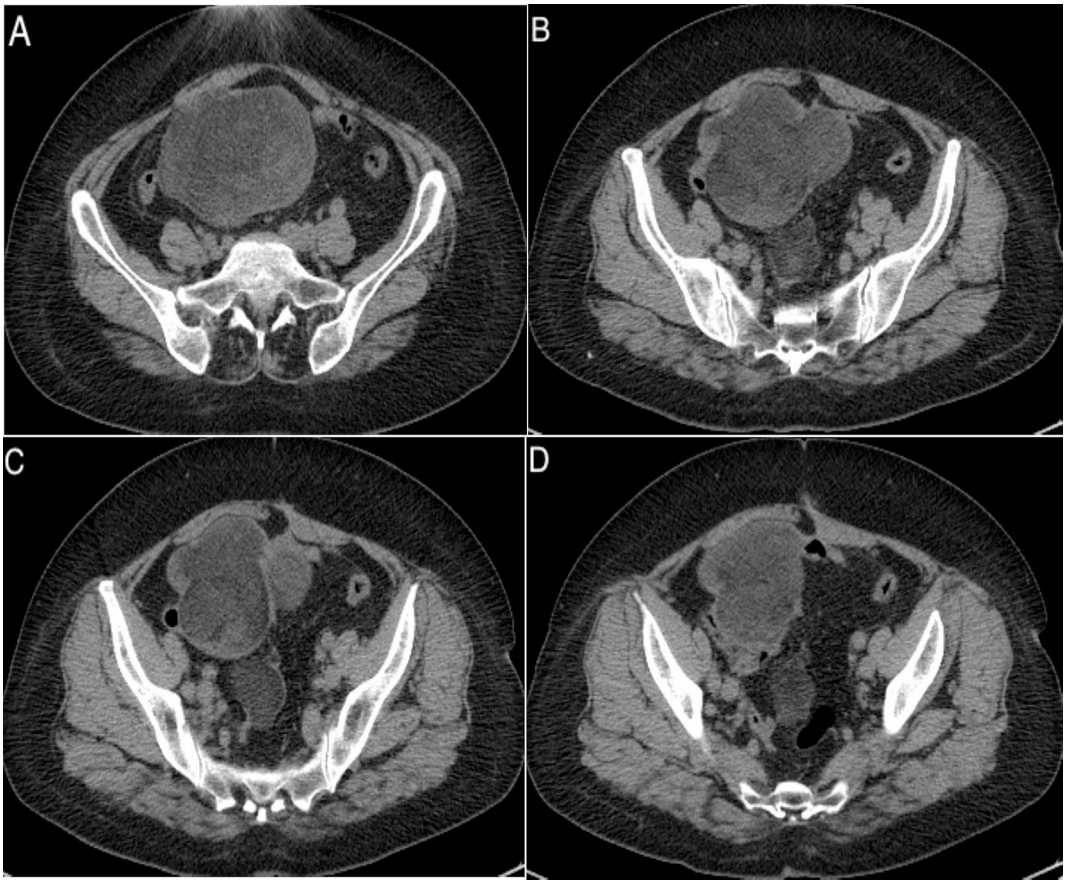

Fig. 2. CT axial images showing the heterogeneous density of the tumor arising from retroperitoneal adipose tissue, involving the mesentery and displacing the small intestine.

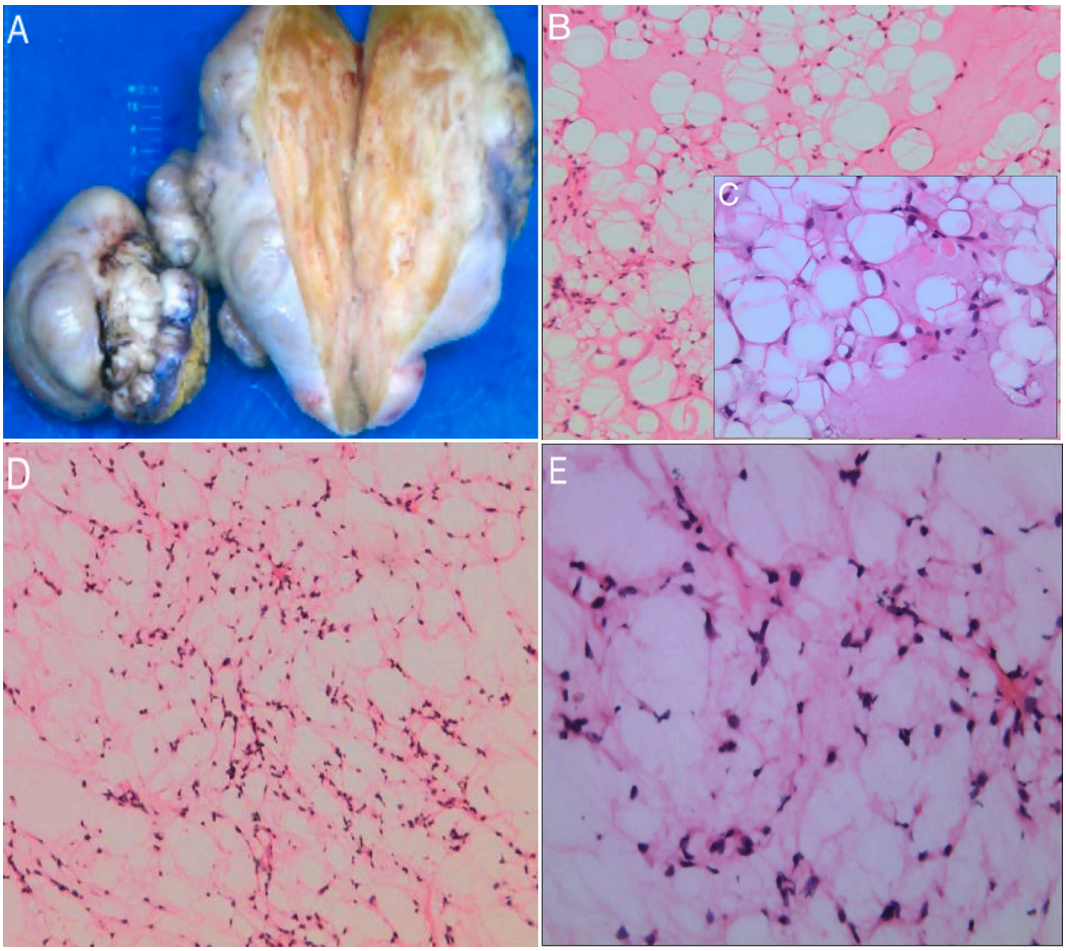

Fig. 3. (A) Macroscopic view: The mesenteric portion of the tumor contains a gray-yellow nodule 3 cm in diameter (red arrow). The retroperitoneal portion appears as a gray-white, soft, nodular mass with dimensions of 15 cm × 12 cm × 8 cm.
(B, C) Microscopic view of the mesenteric tumor section: Atypical cells resembling lipoblasts with foamy or vacuolated cytoplasm and relatively small, hyperchromatic nuclei are present. No necrosis, degeneration, or bleeding is observed (magnification 100×, 400×). (D) Microscopic view of the peritoneal tumor section: adipose tissue-derived tumor shows active cell growth, atypical nuclei, and fibrous tissue hyperplasia with myxoid changes (magnification 100×). (E) Higher magnification image showing uniform hypercellular tumor cells in a myxoid background (magnification 400×). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

a retroperitoneal mass (15 cm × 12 cm × 8 cm) was observed macroscopically. Microscopic examination of the mesenteric tumor revealed atypical cells resembling lipoblasts with a foamy cytoplasm and hyperchromatic nuclei, without necrosis or degeneration. A section from the retroperitoneal tumor revealed adipose tissue-derived tumors with active cell growth, atypical nuclei, fibrous tissue hyperplasia, and myxoid changes, with higher magnification revealing hypercellular tumor cells in a myxoid background (Fig. 3). Immunohistochemistry of mesenteric and retroperitoneal tissue confirmed recurrent DDL with robust positivity for MDM2 and CDK4 and negativity for Desmin and cluster of differentiation 34 (CD34), excluding myogenic neoplasms. The S100 marker showed varied positivity in adipose regions. To address recurrence and subsequent initial intolerance, the chemotherapy regimen was modified to ifosfamide and doxorubicin. Five cycles were administered, although chemotherapy was again poorly tolerated.

The second recurrence ensued after 15 months; the patient underwent a third resection, which revealed 12 tumor masses in the small intestine, vaginal stump, and ureter, totaling 6 kg. The predominant pelvic mass encroached on the left ureter, necessitating ureteral stent placement after excision. The macroscopic findings revealed a grayish-yellow tumor adjacent to the small intestine (11–15 cm), grayish-white nodular tissue originating from the abdominal wall (1.5–8 cm), and a solid ureteral mass (2.5 cm). Additionally, a congested appendix (5 cm) and a bilobular pelvic tumor (14–20 cm) were noted. Microscopic findings revealed adipose-derived tumor tissue with active cell growth, heteromorphic nuclei, a nuclear division rate of 4/10 high-power fields, fibrous tissue hyperplasia, and pleomorphic changes in some areas. Histological examination revealed nuclear pleomorphism with bizarre, non-lipogenic tumor invasion into adjacent adipose tissue, supporting a diagnosis of DDL (Fig. 4). Notably, the immunohistochemical results revealed the absence of smooth muscle actin (SMA), whereas positivity for protein 16 (p16), and CDK4 expression, vimentin S100 and a high Ki-67 index (50 %) indicated aggressive tumor behavior. Furthermore, the observation of a p53 mutation indicated increased malignancy. These findings confirmed the histological transformation from WDL to DDL. Given the negative margins after the third resection, no adjuvant therapy was prescribed.

The patient was discharged on the 13th postoperative day, on a surveillance plan, and given a control CT scan follow-up. The follow-up regimen was every 3–6 months for the first 2–3 years and then every 6–12 months for at least 5 years, with annual imaging and symptom monitoring for long-term follow-up. At the one-year follow-up, the patient was in excellent health and had not experienced any surgical complications or signs of tumor recurrence (Fig. 5).

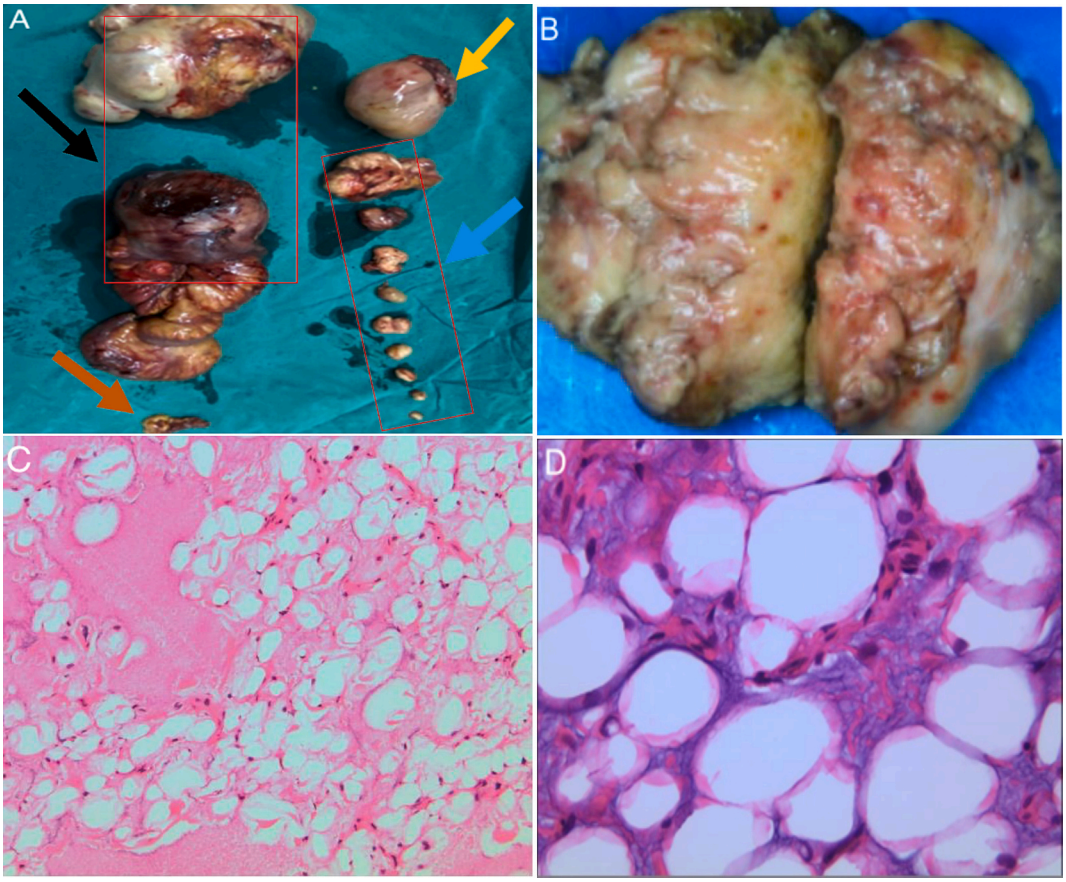

Fig. 4. Macroscopic findings: (A) A section of the small intestine, 40 cm in length and 2–4 cm in diameter, was removed. Adjacent to the intestinal wall, grayish-yellow soft tumor masses measuring 11 cm and 15 cm in diameter were observed (black arrow). Additionally, a cluster of grayish-white nodular soft tissue, 1.5–8 cm in diameter, with a solid, smooth cross-section, was found originating from the abdominal wall (blue arrow). Ureteral Mass: Grayish-white, solid mass, 4.5 cm in diameter, with a slightly tough cross-section (yellow arrows). Appendix: A gray-red appendix, 5 cm in length and 1 cm in maximum diameter, showing surface congestion (orange arrow). Pelvic Tumor (B) A grayish-white, bilobular, nodular soft mass, 14–20 cm in diameter, originating from the vaginal stump.
Microscopic Findings: (C) (D) Most of the adipose-derived tumor tissue shows active cell growth with heteromorphic nuclei, with a nuclear division rate of approximately 4/10 high-power fields (HPFs). Fibrous tissue hyperplasia and dedifferentiated changes are observed in some areas (magnification 100×, 400×). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

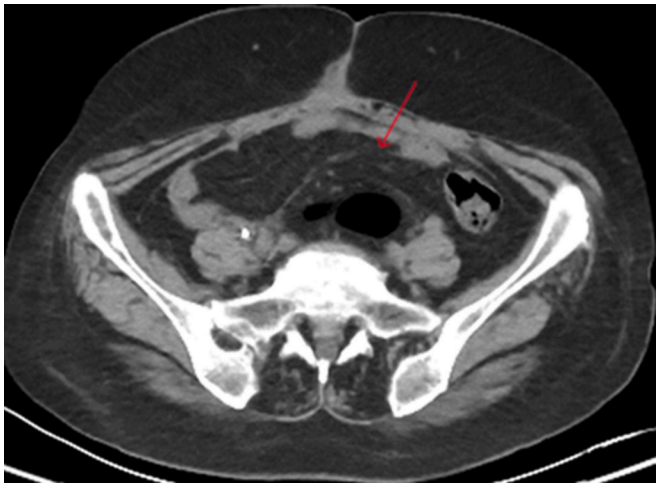

Fig. 5. This image shows a stable post-surgical state with no evidence of recurrence one year after treatment.

3. Discussion

The diagnosis of uterine LPS is challenging since it can be misdiagnosed as other benign or malignant uterine tumors, such as lipoleiomyoma, angiolipoma, leiomyosarcoma, or endometrial stromal sarcomas [5]. In this case, preoperative assessments suggested a benign lipomatous tumor; however, histopathological analysis post-surgery identified it as WDL. If MRI is not feasible, high-resolution, contrast-enhanced CT imaging of the abdomen and pelvis should be utilized to evaluate patients with heterogeneous masses. WDL can be similar to lipomas, with CT attenuation and MRI signal intensity comparable to those of adipose tissue. Compared with lipomas, fibrous septa may exhibit increased thickness, irregularity, or nodularity [6]. Expansile fat surrounding the solid abdominal organs is indicative of WDL, and the presence of septations or solid-enhancing components suggests dedifferentiation of the tumor [7]. It is essential to acknowledge that each tumor exhibits unique distribution patterns and specific characteristics. Appropriate imaging modalities are essential to avoid misdiagnosis resulting from the nonspecific characteristics of symptoms in LPS.

To the best of current knowledge, only 9 cases of uterine corpus LPS have been documented in the English literature, including the present case [3,5,6,8–11]. The histopathological analysis of the reviewed cases revealed the presence of PLS, MLS, and WDL originating from the uterine corpus, as well as mixed liposarcomas exhibiting both pleomorphic and myxoid features. This is the second case to exemplify WDL

Table 1
The characteristics of 10 patients with uterine corpus liposarcoma.

Author, Year	Age (year)	Presentation	Intervention	Primary Tumor size (cm)	Histology	Preoperative diagnosis	Follow up
Bapat, 1989[8]	55	Vaginal bleeding	TAH + BSO + PLN + PAN	12*7*6	Mixed (Pleomorphic + myxoid) + leiomyosarcoma	High grade spindle cell sarcoma	12 M ROC
Soœnik, 2006[9]	71	Vaginal bleeding	TAH + BSO	10.8*12.9	Pleomorphic	NA	8Y NED
Hong, 2008[10]	48	Dysmenorrhea Abdominal mass	TAH + BSO	21*18	Myxoid	Leiomyoma with secondary degeneration	2 M NED
	49	Abdominal distention	TAH + BSO	10.5	Pleomorphic	Lipoleiomyoma	24 M NED
McDonald, 2011[5]	58	Vaginal bleeding	TAH + BSO	18	Mixed (myxoid+pleomorphic)	Lipoleiomyoma	24 M NED
	70	Abdominal mass	TAH + BSO	10	Myxoid	Lipoleiomyoma	20Y NED
Fadare, 2011[3]	62	Abdominal pain	TAH + BSO	7*6.3*4.5	Pleomorphic	Leiomyoma	2 M ROC
Schoolmeester, 2016[11]	70	Dysuria and Urinary retention	MRH + BSO + PLN	9*8*7.5	Pleomorphic+leiomyosarcoma	Pleomorphic	3 M DOD
Kiuchi, 2018[6]	58	Abdominal distention	TAH + BSO	16*17	Well-differentiated	Unclear	12 M NED
Current Case, 2024	57	Abdominal pain and distention	TAH + BSO	11.5	Well-differentiated	Lipoleiomyoma	21 M ROC

TAH: Total abdominal hysterectomy, **BSO**: Bilateral salpingo-oophorectomy, **PLN**: pelvic lymphadenectomy, **PAN**: Paraaortic lymphadenectomy, **MRH**: modified radical hysterectomy, **NA**: not applicable, **NED**: no evidence of disease, **DOD**: dead of disease, **ROC**: Recurrence, **M** month, **Y** year.

in the uterine corpus, which is consistent with the observations of Kiuchi et al., who identified this rare tumor in the same anatomical site [6]. The clinicopathologic findings for these 9 patients and the patient presented in this report are outlined in Table 1. Owing to the lack of clear guidelines, physicians take various approaches to management. CT is the most commonly used imaging technique, and laparotomy is the preferred surgical method [12]. In this review, only two cases of uterine sarcoma were accurately diagnosed prior to surgery. One of these patients was treated with a total abdominal hysterectomy with bilateral salpingo-oophorectomy, pelvic lymphadenectomy, and para-aortic lymphadenectomy. The other underwent a modified radical hysterectomy with bilateral salpingo-oophorectomy and pelvic lymphadenectomy [8,11]. The remaining 8 patients underwent total abdominal hysterectomy with bilateral salpingo-oophorectomy (TAH-BSO). Complete surgical resection with a negative margin is considered the primary treatment, as it improves local recurrence and is associated with a longer postoperative survival time. Studies have shown that patients who undergo complete resection have a median survival of 103 months, whereas those who undergo partial resection have median survival of 18 months [13,14].

The case reported here reveals that management difficulties arise from the accelerated growth of the tumor and its progression to a more aggressive dedifferentiated form. Chemotherapy has shown limited efficacy in this context. Previously, Kim et al. reported that, despite postoperative chemotherapy and radiation for retroperitoneal liposarcoma, three out of four patients developed metastatic tumors [12]. The limited response to chemotherapy observed in this case reinforces the need for further research to establish more effective adjuvant treatments for this aggressive and recurrent tumor.

Despite the aggressive recurrence of LPS, there is no definitive protocol regarding the timing and frequency of monitoring after resection. The longest follow-ups reported were 8 years and 20 years, by Soœnik [9] and Macdonald [5] respectively, two of the earliest case reports describing LPS of the uterine corpus. Most case reports do not specify the frequency of investigation during these follow-up years. A recent study demonstrated a good outcome at 1-year follow-up[6], but prior studies indicate the possibility of recurrence, suggesting that patients should undergo careful monitoring throughout the postoperative phase to establish the most effective follow-up regimen for improved outcomes. In the case reported here, the follow-up CT scan did not reveal any masses, and no complications were observed during the 1-year follow-up. To determine the most effective surveillance intervals for the prevention of malignant transformation and recurrence of these tumors, further research is necessary.

In summary, we report the clinical and imaging characteristics of a postmenopausal patient diagnosed with LPS. This highlights the management challenges posed by frequent recurrence and dedifferentiation into aggressive tumors. In this study, liposarcoma of the uterine corpus had both intraperitoneal and retroperitoneal involvement, indicating that it is not confined to a single anatomical compartment. For patients with liposarcoma, a multidisciplinary approach that integrates surgical and radiological expertise is vital for optimal outcomes. Complete resection combined with rigorous postoperative surveillance can significantly improve the management and long-term prognosis of these patients.

Contributors

Sana Mushtaq was involved in patient care, the conception of the case report, the acquisition and interpretation the data, the literature review, and the drafting of the manuscript.

Muhammad Arslan Ul Hassan was involved in critically revising the article for important intellectual content, conception and design of the study, and drafting the manuscript.

Yan Li was involved in patient care, conception and design of the study, and critically revised the article for important intellectual content.

Ikran Abdi was involved in acquiring and interpreting the data, assisting with the literature review, and revising the article critically for important intellectual content.

Aqsa Ahmad was involved in the conception of the case report, assisted with the literature review, and revised the article critically for important intellectual content.

HaiNing Li was involved in patient care, the conception of the case report and the critical revision of the article for important intellectual content.

All authors approved the final submitted manuscript.

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Patient consent

The patient gave detailed informed written consent for the incorporation of her medical history, images, laboratory reports, and personal information in this case report.

Provenance and peer review

This article was not commissioned and was peer reviewed.

Conflict of interest statement

The authors declare that they have no conflict of interest regarding the publication of this case report.

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