Scientific Research Publishing

Open Journal of Clinical Diagnostics, 2025, 15(4), 138-144
https://www.scirp.org/journal/ojcd
ISSN Online: 2162-5824
ISSN Print: 2162-5816

Uterine Smooth Muscle Tumor of Uncertain Malignant Potential (Stump): Diagnostic Challenges and Management

—A Case Report and Literature Review

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How to cite this paper: Bonga, B., Ifuta, R., Irangabiye, E., Tshibola Nkashama, M., Jalal, M., Mahdaoui, S., Boufettal, H. and Samouh, N. (2025) Uterine Smooth Muscle Tumor of Uncertain Malignant Potential (Stump): Diagnostic Challenges and Management. *Open Journal of Clinical Diagnostics*, **15**, 138-144.
https://doi.org/10.4236/ojcd.2025.154011

Received: August 30, 2025
Accepted: November 30, 2025
Published: December 3, 2025

Abstract

Uterine smooth muscle tumors of uncertain malignant potential (STUMP) are rare neoplasms that are challenging to distinguish from leiomyomas and leiomyosarcomas. Imaging alone does not allow reliable differentiation of these tumors, and the diagnosis relies on histopathological examination, while immunohistochemical markers may help to stratify recurrence risk. We report the case of a 50-year-old patient presenting with a vascularized abdominopelvic mass, pedunculated from the uterus, associated with peritoneal effusion. Total hysterectomy confirmed the diagnosis of STUMP with moderate nuclear atypia and a borderline mitotic index. Clinical and radiological follow-up after one year showed no recurrence. Long-term surveillance remains mandatory, and further research is required to standardize management.

Keywords

Uterine Smooth Muscle Tumor of Uncertain Malignant Potential (STUMP), Leiomyosarcoma, Magnetic Resonance Imaging (MRI), Histopathology, Immunohistochemical Markers, Mitotic Index, Tumor Necrosis, Differential Diagnosis, Prognosis, Tumor Recurrence, Hysterectomy

1. Introduction

In 1973, Langley first introduced the concept of "smooth muscle tumor of uncertain malignant potential" (STUMP), describing what is now recognized as a distinct subgroup of uterine smooth muscle tumors [1]. STUMP is a poorly defined

category of uterine smooth muscle neoplasms that cannot be unequivocally classified as benign or malignant. Pathologists often face diagnostic challenges, and the clinical behavior of these tumors remains poorly understood [2].

According to the Stanford criteria established in 1994, STUMP is characterized histopathologically by features such as cytological atypia, mitotic activity, and tumor cell necrosis [3]. Clinically, patients with uterine STUMP may present with symptoms similar to those of leiomyomas and leiomyosarcomas, including abnormal uterine bleeding, abdominal heaviness, anemia, chronic pelvic pain, pelvic mass, or infertility. Some patients, however, remain asymptomatic, leading to delayed diagnosis and potentially poorer prognosis [4] [5].

Given the unreliability of preoperative imaging in differentiating leiomyomas, STUMP, and leiomyosarcomas, careful histopathological evaluation is essential [4]. We report here a case report of STUMP and review relevant literature..

2. Case Report

We report the case of a 50-year-old patient, gravida I para I, with no significant past medical history, presenting with a 7-month history of pelvic heaviness. Clinical examination revealed a large abdominopelvic mass extending three fingerbreadths above the umbilicus.

Abdominopelvic ultrasonography showed a large, well-circumscribed, heterogeneous echogenic right latero-uterine mass with regular contours, measuring 14.7 × 10.73 × 10.26 cm, highly vascularized on color Doppler, and associated with abundant intraperitoneal effusion.

Pelvic MRI revealed a central abdominopelvic mass, pedunculated from the posterior uterine wall, traversed by serpiginous tubular structures with flow voids suggestive of vascular channels. The mass appeared oval, well-defined, lobulated in some areas, isointense on T1, heterogeneously hyperintense on T2, with mild restricted diffusion and intermediate ADC values. After gadolinium injection, it showed intense and heterogeneous enhancement. The lesion measured 120 × 81 mm, extending over 111 mm, and was associated with moderate to abundant ascites in all peritoneal recesses, as indicated in **Figure 1** and **Figure 2**. Imaging suggested an atypical degenerating myoma, although sarcomatous transformation could not be excluded.

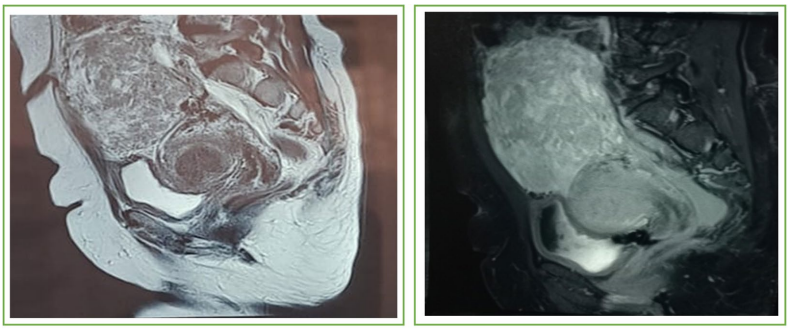

Figure 1. Pelvic MRI—T2-weighted sagittal section.

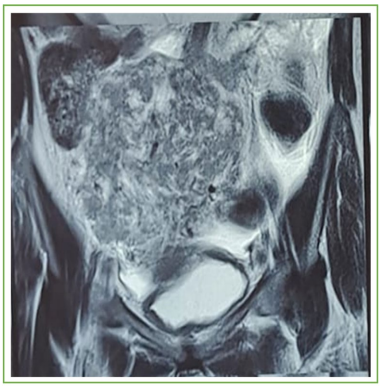

Figure 2. Pelvic MRI—T2-weighted coronal section.

Surgical exploration revealed abundant peritoneal effusion, aspirated and sampled for cytology, and a 15 cm supravesical, highly vascularized mass adherent to the omentum, with a globally enlarged uterus. A total hysterectomy with bilateral salpingo-oophorectomy was performed, and the surgical specimens are presented in **Figure 3**.

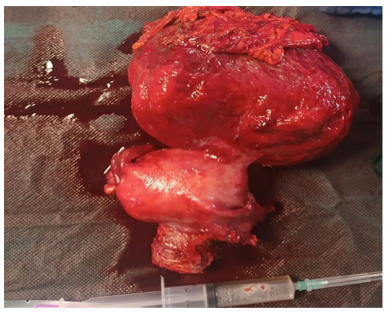

Figure 3. Macroscopic image showing the surgical specimens, including the mass, the uterus with adnexa, and the collected peritoneal fluid.

Histopathological analysis revealed a smooth muscle tumor composed of spindle cells with moderate to severe nuclear atypia and a mitotic index of 9 mitoses/10 high-power fields, consistent with STUMP as showed in **Figure 4**; and the peritoneal fluid sample was reported as reactive fluid with no evidence of malignancy.

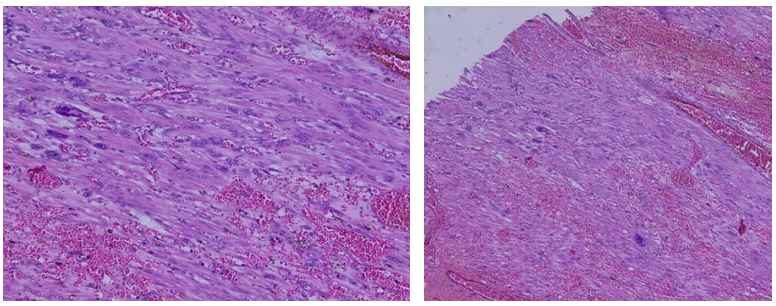

Figure 4. Microscopic images of a histological section stained with hematoxylin and eosin. The cells display elongated, vesicular nuclei and poorly defined eosinophilic cytoplasm, with multifocal moderate-to-severe atypia characterized by nuclear enlargement and hyperchromasia.

The case was reviewed at a multidisciplinary tumor board involving oncologists, radiotherapists, and radiologists, and a decision was made for clinical and radiological surveillance every 6 months. Two follow-ups with ultrasound and one CT scan at one year showed no evidence of recurrence.

3. Discussion

Smooth muscle tumors are the most common mesenchymal neoplasms of the uterus and include leiomyomas, their histological variants, STUMP, and leiomyosarcomas [6]. STUMP represents a rare and heterogeneous group, both histologically and clinically. Owing to their rarity, available data remain limited, and no clear consensus exists regarding diagnostic criteria, malignant potential, therapeutic strategies, or follow-up recommendations [2] [3] [7]-[9].

The biological mechanisms and risk factors leading to STUMP remain poorly understood, making clinical behavior unpredictable [2] [9]. Median age at diagnosis is similar to that observed in leiomyosarcoma and benign leiomyoma patients. Clinical manifestations are nonspecific and frequently overlap with those of leiomyomas, including abnormal bleeding, pelvic heaviness, pelvic pain, and compressive or anemia-related symptoms [10]. In our case, the main presenting symptom was pelvic heaviness.

Ultrasound imaging lacks specific criteria for differentiating STUMP from leiomyomas and leiomyosarcomas. Features suggestive of malignancy, such as hypervascularization, irregular contours, and heterogeneous echotexture due to necrotic areas, may be present but remain non-diagnostic [11]. A recent retrospective study of 14 patients with histologically confirmed STUMP reported no pathognomonic sonographic features [12]. The MUSA (Morphological Uterus Sonographic Assessment) classification is widely used to describe myometrial and uterine mass features. In cases of STUMP, marked Doppler signals with central and peripheral vascularity corresponding to a color score of 3 - 4 have been described [13].

MRI provides superior soft-tissue characterization and is useful for detecting features suggestive of malignancy, including necrosis (T1 hyperintensity, heterogeneous T2 signal), and loss of the "pseudocapsule" or cleavable plane seen in leiomyomas [14]. However, MRI alone cannot reliably distinguish leiomyomas, leiomyosarcomas, and STUMP [15]. In our case, MRI findings were consistent with an atypical myoma but could not rule out sarcoma.

Histologically, three key criteria distinguish benign from malignant smooth muscle tumors: nuclear atypia, mitotic index, and tumor cell necrosis. Leiomyosarcoma is diagnosed when at least two criteria are present: moderate-to-severe nuclear atypia, >10 mitoses/10 HPF, and coagulative tumor necrosis. STUMP is diagnosed when one criterion is present and the second is equivocal [16]. Our case met these features, with spindle-cell morphology, moderate-to-severe atypia, and a borderline mitotic index (9/10 HPF).

Distinguishing STUMP from leiomyosarcoma based solely on histology is difficult. Additional immunohistochemical markers may aid in differential diagnosis

and prognostication. Several small studies reported significantly higher progesterone receptor (PR) expression in STUMP compared to leiomyosarcomas [17] [18]. More recent studies suggest immunostaining for p16, p53, Ki-67 (MIB-1), Twist, and bcl-2 as useful for identifying STUMP at higher risk of recurrence. Ip et al. showed that diffuse p53 and p16 positivity correlated with unfavorable outcomes and higher recurrence rates [19]. However, current evidence remains limited by small sample sizes [15] [20]. In our case, immunohistochemistry was not performed.

There is no standardized treatment protocol for STUMP. When diagnosed following myomectomy, and given the risk of recurrence, hysterectomy is recommended for women who have completed childbearing. Fertility-sparing approaches may be considered, but patients must be counseled about recurrence risks and monitored closely [21]. In our case, total hysterectomy was indicated due to the large tumor size and the patient's perimenopausal status.

STUMP prognosis and surveillance remain controversial. Most recurrences occur more than 5 years after diagnosis, highlighting the need for long-term follow-up [22]. Guntupalli et al. recommended close monitoring, given the risk of unpredictable recurrence and potential progression to leiomyosarcoma [2]. Similarly, Ip et al. proposed follow-up every 6 months for 5 years, followed by annual surveillance for at least 5 additional years [15]. Our patient remains recurrence-free after one year of surveillance.

4. Conclusion

Uterine smooth muscle tumors of uncertain malignant potential (STUMP) represent a major diagnostic and therapeutic challenge due to their unpredictable clinical course and histopathological heterogeneity. While hysterectomy remains the gold standard in women who have completed childbearing, individualized management is necessary for younger patients desiring fertility preservation, combined with stringent follow-up. The risk of late recurrence, occasionally as leiomyosarcoma, underscores the importance of prolonged, structured surveillance. Future research should focus on identifying reliable prognostic biomarkers and conducting prospective multicenter studies to improve risk stratification, refine therapeutic strategies, and optimize patient outcomes.

Declaration of Consent (Oral)

Oral informed consent was obtained from the patient for the publication of this case.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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