

Primary Leiomyosarcoma of the Urinary Bladder in a Middle-Aged Woman: A Case Report with Review of Previously Published Cases

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Case Report

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Abstract

Background

Primary leiomyosarcoma (LMS) of the urinary bladder is a rare non-urothelial malignancy, comprising well under 1% of bladder tumors, with fewer than 200 cases reported worldwide. Reported series place the median age of onset between the fifth and sixth decades (49–65 years).^{1–4} A reproductive-age presentation with a synchronous, radiologically indeterminate uterine enlargement — as in this case — has only one closely comparable precedent in the literature.

Case Presentation:

A 43-year-old Indian woman with type 2 diabetes presented with hematuria, dysuria, abdominal pain, vomiting, and fever following TURBT for a bladder mass elsewhere. Cross-sectional imaging showed a heterogeneously enhancing polypoidal bladder mass (5.5 × 8 × 4.2 cm) directly abutting a bulky uterus, raising concern for a synchronous gynecologic process. TURBT histology showed a malignant spindle cell neoplasm. She underwent single-stage radical cystectomy with urethrectomy, bilateral pelvic lymphadenectomy, hysterectomy with bilateral salpingo-oophorectomy, and ileal conduit diversion. Final histopathology confirmed a unifocal FNCLCC Grade 3 leiomyosarcoma (6.4 × 5.2 × 7 cm) with clear margins and 0/28 nodes involved (pT1N0) — a favorable stage atypical for a grade 3, size-discordant sarcoma. Immunohistochemistry was positive for desmin, SMA, and vimentin, and negative for pan-cytokeratin, S100, SOX10, myogenin, and MyoD1, excluding carcinoma, melanoma/nerve sheath tumor, and rhabdomyosarcoma. The uterus, tubes, and ovaries were histologically benign. Patient is currently on adjuvant chemotherapy and regular follow up.

Conclusion

This case is notable for three co-occurring features: an age below the typical reporting median, a synchronous bulky uterus that mimicked a gynecologic primary and was managed with prospectively planned combined urologic–gynecologic surgery to a favorable outcome, and a grade–stage discordance. We also summarize the clinical and radiological features separating bladder leiomyosarcoma from urothelial carcinoma, rhabdomyosarcoma, and leiomyoma.

Introduction

Non-urothelial mesenchymal tumors account for less than 1% of bladder malignancies, and leiomyosarcoma is the most common sarcoma subtype arising in the adult bladder, most often from the muscularis propria.¹ It shares its principal symptoms — hematuria, dysuria, and pelvic pain — with the far more common urothelial carcinoma; imaging and cystoscopy cannot reliably separate the two, and diagnosis rests on histopathology directed by an immunohistochemical panel.²

The largest population-based cohort (SEER, 183 cases, 1973–2010) reported a median age of 65 years (IQR 47–78).² A frequently cited 15-case surgical series described a wider range (16–72 years, median 49; male:female 9:6).³ A later case-based summary places the median closer to 52 years (range 16–83) and notes a

disproportionate representation of reproductive-age women among younger cases, prompting unproven speculation about a hormonal contribution.⁴ Our patient, at 43 years, is below the median in every series cited.

We report a case managed with single-stage radical urologic and gynecologic surgery, outline the features that aided and complicated its distinction from other bladder pathologies, and compare it with previously published cases.

Case Presentation

A 43-year-old Indian woman with type 2 diabetes presented with a two-week history of lower abdominal pain, gross hematuria, dysuria, vomiting, and fever. Ultrasonography showed a 71 × 62 mm lobulated polypoidal bladder lesion arising from the left lateral wall, with a bulky uterus and normal ovaries. Contrast-enhanced CT (CECT) confirmed a heterogeneously enhancing endoluminal mass (5.5 × 8 × 4.2 cm) involving the anterior wall, left lateral wall, and dome, with subtle left perivesical fat haziness and small-volume pelvic/para-aortic lymph nodes (≤ 6.4 mm); the bladder neck and vesicoureteric junctions were tumor-free, and the uterus was separately enlarged but architecturally distinct from the mass. CECT thorax was normal. TURBT chips showed a malignant spindle cell neoplasm.

Imaging Findings and Differential Considerations

The large, heterogeneously enhancing bladder mass abutting a bulky uterus broadened rather than narrowed the initial differential — a primary bladder sarcoma with secondary uterine involvement, a primary uterine sarcoma or leiomyoma extending toward the bladder, or two unrelated synchronous processes were all considered. An endoluminal, mucosal-based epicenter and an intact tumor–myometrium plane favored a primary bladder origin, while the uterine bulk and its direct apposition to the tumor kept a gynecologic contribution on the differential. Because imaging could not resolve this, combined urologic and gynecologic resection was planned up front, with the uterus, tubes, and ovaries submitted for histopathology rather than presumed benign. Figure 1 illustrates the key preoperative imaging findings.

1. Axial contrast-enhanced CT image at the level of the bladder, showing the heterogeneously enhancing, lobulated, endoluminal polypoidal mass (5.5 × 8 × 4.2 cm) distending the bladder lumen. **(B)** Volume-rendered CT-urogram showing bilaterally normal, symmetrically opacifying kidneys and collecting systems; the bladder outline is distorted by the mass.

She underwent radical cystectomy with urethrectomy, bilateral pelvic lymphadenectomy, hysterectomy with bilateral salpingo-oophorectomy (undertaken because of the bulky uterus adjacent to the tumor and the inability to exclude gynecologic involvement on imaging), and ileal conduit diversion on 04 June 2026. Patient is currently on adjuvant chemotherapy and regular follow up. The key pathological findings are summarized in Table 1. The gross and histopathological features are shown in Fig. 2.

Key Pathological Findings

Table 1
Key pathological findings.

Parameter	Finding
Tumor site / laterality / focality	Urinary bladder, left lateral wall, unifocal
Tumor size	6.4 × 5.2 × 7 cm
Histologic type / grade	Leiomyosarcoma; FNCLCC Grade 3 (differentiation 2 + mitotic count 3 + necrosis 1 = 6)
Mitotic activity / necrosis	Brisk (6–7 per 10 HPF at hotspots); necrosis 15–20%
Margins / lymphovascular invasion	All margins free of tumor; no lymphovascular invasion
Nodes / stage	0/28 involved (15 left, 13 right pelvic); pT1N0 (AJCC 8th ed. ¹⁰)
IHC positive / negative	Positive: desmin, SMA, vimentin. Negative: pan-cytokeratin, S100, SOX10, myogenin, MyoD1
Uterus, tubes, ovaries	Benign — adenomyosis, cervicitis, physiological ovarian changes; no malignancy

1. Gross specimen showing a mass arising from the left lateral wall and filling the bladder cavity, with a greyish-white, whorled cut surface. **(B)** H&E, 10×: neoplastic spindle cells in short, intersecting fascicles with eosinophilic cytoplasm and club-shaped nuclei. **(C)** H&E, 10×: area showing rhabdomyosarcoma-like differentiation. **(D)** SMA, 10×: diffuse positivity in tumor cells; negative in large pleomorphic cells. **(E)** Desmin, 10×: diffuse positivity in tumor cells; negative in large pleomorphic cells. **(F)** Vimentin, 10×: positivity in large pleomorphic cells. **(G)** Myo D1, 10×: negative in tumor cells. **(H)** S-100, 10×: negative in tumor cells.

Discussion

Age-Group and Epidemiologic Context

Bladder leiomyosarcoma is classically a disease of late adulthood: the SEER analysis of 183 cases reported a median age of 65 years, an annual incidence of 0.23 per million, and 5-/10-year cancer-specific survival of 47%/35%.² Smaller series show a broader, younger distribution — median 49 years (range 16–72)³ with reproductive-age women disproportionately represented among younger cases.⁴ Reported risk factors include prior pelvic radiotherapy and cyclophosphamide exposure, though most cases, including ours, have none identified. Our patient's age (43 years) is below the median in every series cited, and her young onset combined with a synchronous, radiologically confounding uterine enlargement is the distinctive aspect of this case, discussed further below.

Clinical Presentation Compared with Other Bladder Pathologies

Bladder leiomyosarcoma cannot be distinguished from its principal mimics on symptoms alone, but the tendencies below are useful when building a differential for hematuria with a bladder mass. The principal clinical differences are summarized in Table 2.

Table 2
Clinical presentation compared with other bladder pathologies.

Feature	Bladder LMS	Conventional urothelial carcinoma	Rhabdomyosarcoma	Bladder leiomyoma (benign)
Typical age	Wide (teens–eighties); median 49–65	Older adults (> 55 y in most)	Children/young adults (embryonal type)	Reproductive-age adults
Sex predilection	Near-even; slight female skew in younger cases	Male predominant	Male predominant	Female predominant
Hematuria	Common, often with a palpable/bulky component	Most common presenting sign, often painless	Hematuria plus obstructive symptoms	Often incidental or mild
Growth pattern	Bulky, intramural/extravesical, can be large at diagnosis	Usually papillary/mucosal; muscle-invasive disease a subset	Botryoid, polypoid clusters in children	Well-circumscribed, slow-growing
Risk factors	None in most cases; radiotherapy/cyclophosphamide in a minority	Smoking, aromatic amines, chronic irritation	None specific; rare germline syndromes	None established

Radiological Differentiation

Cross-sectional imaging narrows the differential but does not replace histology. The following features are useful before biopsy, though overlap is substantial — our case still required IHC to exclude sarcomatoid urothelial carcinoma and rhabdomyosarcoma. Key radiological differentiating features are summarized in Table 3.

Table 3
Radiological differentiation of bladder leiomyosarcoma from its principal mimics.

Feature	Bladder LMS	Conventional / sarcomatoid UC	Rhabdomyosarcoma	Leiomyoma
Epicenter	Intramural, often bulky/exophytic; mucosa may be intact rather than ulcerated	Mucosal/papillary (conventional) or bulky infiltrative with ulceration (sarcomatoid)	Submucosal, polypoid, multilobulated	Intramural, submucosal, well-defined
Margin / interface	Can be smooth despite high grade	Sarcomatoid UC: more irregular, infiltrative interface than conventional UC	Irregular, infiltrative if invasive	Smooth, well-circumscribed
Enhancement	Heterogeneous, related to necrosis in higher-grade tumors	Sarcomatoid UC: more heterogeneous, larger size than conventional UC	Heterogeneous, variable	Low–moderate, homogeneous
Necrosis / hemorrhage	Common in high-grade tumors (15–20% here)	More frequent in sarcomatoid than conventional UC	Can occur in bulky tumors	Uncommon
Perivesical / nodal spread	Variable; can be extensive at small size or minimal at large size (as here)	Sarcomatoid UC: more local invasion, higher stage	Can be locally aggressive	Absent by definition

Two points from our imaging merit emphasis. First, only subtle perivesical fat haziness was seen despite the tumor's size and eventual Grade 3 histology, and final pathology confirmed disease confined to the bladder wall (pT1N0) — tumor size and grade did not predict local stage, and adequate nodal sampling (28 nodes) remained necessary despite low imaging-suggested nodal burden. Second, the adjacent uterine enlargement had no feature confidently excluding gynecologic involvement, a scenario paralleled by one prior report⁵, discussed further below.

Immunohistochemical Diagnosis

The diagnostic pathway typically begins with a TURBT suggesting a spindle cell malignancy, requiring IHC to distinguish leiomyosarcoma (desmin/SMA-positive) from sarcomatoid urothelial carcinoma (cytokeratin-positive), rhabdomyosarcoma (myogenin/MyoD1-positive), and melanoma or nerve sheath tumor (S100/SOX10-positive) — a distinction that mattered here given morphology initially raising concern for rhabdomyosarcomatous differentiation. The FNCLCC system, though developed for soft-tissue sarcoma generally, is widely applied to bladder leiomyosarcoma and correlates with prognosis⁶; our patient's Grade 3 tumor was balanced by clear margins and node-negative status.

Management, Grading, and Outcome in Context

Table 4 compares representative published cases with the present one, illustrating wide variability in age, stage, and outcome, and consistent reliance on radical surgery as the primary curative modality.

Table 4
Comparison with previously reported cases of bladder leiomyosarcoma.

Author, Year	Age/Sex	Size/Stage	Grade	Treatment	Outcome
Rodríguez et al. (SEER, 183 cases), 2014 ²	Median 65 y (IQR 47–78)	Variable	Mixed	92.9% cancer-directed surgery (34.4% radical/partial cystectomy)	Median CSS 46 mo; 5-/10-yr CSS 47%/35%
Slaoui et al., 2014 ⁷	73 y, M	4 cm	High-grade	Radical cystoprostatectomy + ileal conduit	No recurrence at 3 mo
Saidani et al. (4 cases), 2023 ⁸	35–73 y, all M	3/4 pT2	3 high-grade, 1 low-grade	3 radical cystoprostatectomy + lymphadenectomy; 1 endoscopic resection	2/4 recurred; 2/4 disease-free at 2 yr
Yamada et al., 2011 ⁹	83 y, M	4 × 3 cm, cT4N0M0	High-grade	TURBT only (poor performance status)	Died 17 days after TURBT
Ricciardi et al., 2010 ⁵	68 y, F	Locally advanced	High-grade	Delayed diagnosis (mimicked gynecologic mass); surgery re-directed intra-operatively	Poor prognosis; fatal outcome
Present case, 2026	43 y, F	6.4 × 5.2 × 7 cm, pT1N0	FNCLCC Grade 3	Radical cystectomy + urethrectomy + hysterectomy/BSO + ileal conduit + lymphadenectomy	Margins/nodes negative; anastomotic leak managed with re-exploration + diverting ileostomy; on adjuvant chemotherapy and regular follow up

Conclusion

Bladder leiomyosarcoma should be considered whenever a bladder biopsy shows spindle cell morphology, since imaging cannot reliably distinguish it from urothelial carcinoma, rhabdomyosarcoma, or leiomyoma; a desmin/SMA-based IHC panel confirms the diagnosis. This case adds a young-onset presentation with a synchronous, radiologically indeterminate uterine mass recognized prospectively and managed with combined urologic–gynecologic surgery to a favorable outcome — in contrast to the one comparable prior report, where the same imaging overlap contributed to delayed diagnosis and death — together with a grade–stage discordance in which a large, high-grade tumor remained confined to the bladder wall with negative nodes. Radical surgery with negative margins remains the mainstay of treatment, and awareness of major reconstructive complications is essential to postoperative care.

Abbreviations

LMS

Leiomyosarcoma

TURBT

Transurethral resection of bladder tumor

CT/CECT

(Contrast-enhanced) computed tomography

FNCLCC

Fédération Nationale des Centres de Lutte Contre le Cancer (grading system)

IHC

Immunohistochemistry

SMA

Smooth muscle actin

SEER

Surveillance, Epidemiology, and End Results

IQR

Interquartile range

AJCC

American Joint Committee on Cancer

H&E

Hematoxylin and eosin

pT/pN

Pathological tumor/node stage (AJCC TNM system).

Declarations

Ethics approval and consent to participate

Ethics approval was not required for this case report according to institutional policy.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available on request for review by the Editor-in-Chief of this journal.

Competing interests

The authors declare that they have no competing interests.

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Author Contribution

KK conceived and designed the case report, contributed to the clinical management and interpretation of the case, performed the literature review, and drafted the manuscript. LM, LS, AP, SKS, MR, DKS, SS, PD, BB, ST, GB, and SSP contributed to the clinical management, investigation, pathological/radiological interpretation, and/or critical review of the manuscript. MR contributed to the pathological evaluation and interpretation of the histopathological and immunohistochemical findings. DKS contributed to the urological management and surgical aspects of the case. All authors contributed to the interpretation of the findings, critically reviewed and revised the manuscript, approved the final version, and agree to be accountable for all aspects of the work. Initials: KK – Kartik Kadia LM – Lalatendu

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Not applicable.

Availability of data and materials

The data supporting the findings of this case report are contained within the manuscript. Any additional information is available from the corresponding author on reasonable request, subject to patient confidentiality and institutional policies.

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Figures

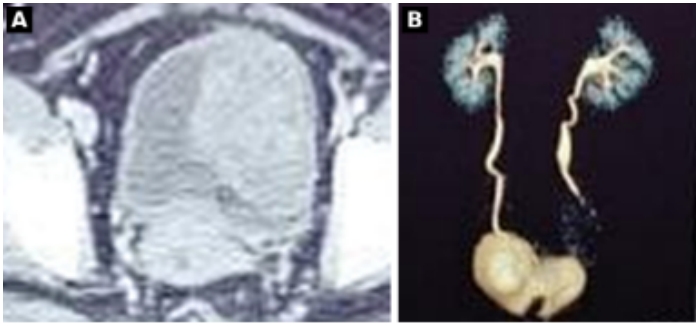


Figure 1

Key preoperative imaging findings.

(A) Axial contrast-enhanced CT image at the level of the bladder, showing the heterogeneously enhancing, lobulated, endoluminal polypoidal mass (5.5 × 8 × 4.2 cm) distending the bladder lumen. **(B)** Volume-rendered CT-urogram showing bilaterally normal, symmetrically opacifying kidneys and collecting systems; the bladder outline is distorted by the mass.

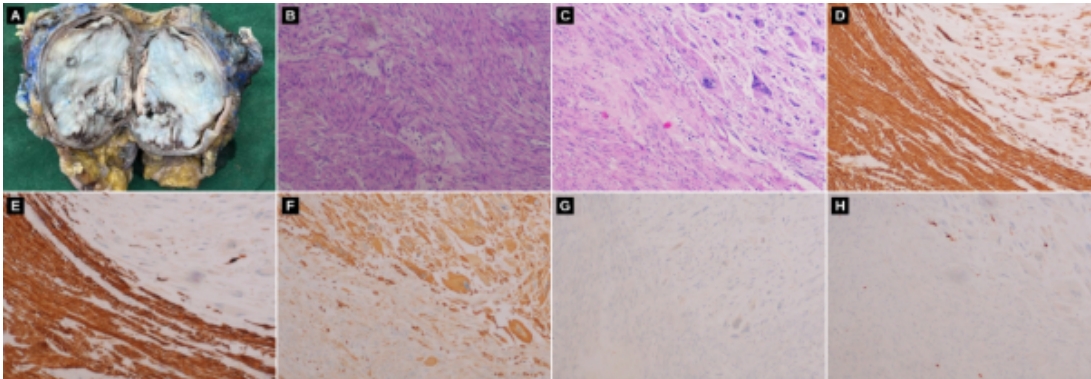


Figure 2

Gross and histopathological features of bladder leiomyosarcoma.

(A) Gross specimen showing a mass arising from the left lateral wall and filling the bladder cavity, with a greyish-white, whorled cut surface. **(B)** H&E, 10×: neoplastic spindle cells in short, intersecting fascicles with eosinophilic cytoplasm and club-shaped nuclei. **(C)** H&E, 10×: area showing rhabdomyosarcoma-like differentiation. **(D)** SMA, 10×: diffuse positivity in tumor cells; negative in large pleomorphic cells. **(E)** Desmin, 10×: diffuse positivity in tumor cells; negative in large pleomorphic cells. **(F)** Vimentin, 10×: positivity in large pleomorphic cells. **(G)** Myo D1, 10×: negative in tumor cells. **(H)** S-100, 10×: negative in tumor cells.