

Leiomyoma of the Urinary Bladder Causing Outlet Obstruction and Presenting with Urinary Retention: A Case Report

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ABSTRACT

Bladder Outlet Obstruction (BOO) in females remains a poorly understood and rare condition compared to males. An objective diagnosis of this condition is often challenging. Women more commonly present with irritative symptoms such as urinary frequency, urgency, urge incontinence, and recurrent urinary tract infections. Leiomyoma of the bladder wall is one of the rarest causes of BOO. The present case report includes a 39-year-old female with obstructive Lower Urinary Tract Symptoms (LUTS) due to a large right anterolateral bladder wall leiomyoma, for which she underwent laparoscopic partial cystectomy. Leiomyoma of the urinary bladder is a rare condition, and its presentation with symptoms of BOO and urinary retention, as seen in this case, is even rarer. Laparoscopic resection is feasible in advanced surgical set-ups with the availability of requisite expertise.

Keywords: Acute urinary retention, Benign tumour, Bladder, Laparoscopic, Partial cystectomy

CASE REPORT

A 39-year-old female presented to the Urology clinic with a three-month history of intermittent obstructive LUTS. The symptoms developed gradually and remained consistent over the last two months. Initially, she consulted a local medical practitioner and was prescribed a long course of Tamsulosin 0.4 mg at night (an alpha-blocker). She did not respond well, and her symptoms persisted. Physical examination revealed no abnormalities, such as pelvic organ prolapse or mass. Routine laboratory investigations were within normal limits. Urine analysis showed two pus cells per high-power field, and urine cytology was negative for malignant cells. Serum creatinine and Blood Urea Nitrogen (BUN) levels were normal.

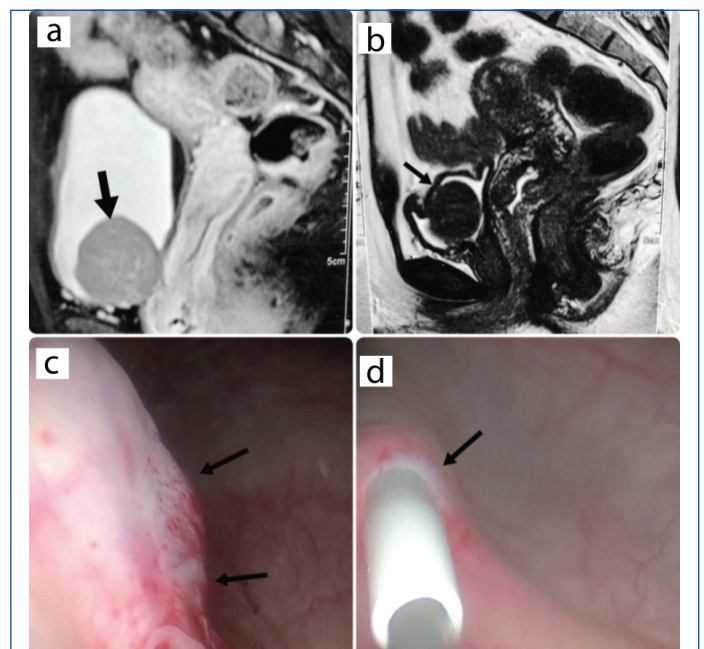
Urodynamic Studies (UDS) demonstrated an obstructive pattern, with an initial urge to void at 50 mL and a severe urge at 250 mL. The patient voided with a maximum flow rate of 8 mL/sec and a detrusor contractile pressure of 80 cm H₂O.

Ultrasound of the lower urinary tract revealed a smooth endovesical lesion in the right anterolateral bladder wall with peripheral hyperechogenicity. A Contrast-Enhanced Computed Tomography (CECT) scan confirmed a solid, well-delineated mass measuring 5×4.5×3.9 cm, arising from the right anteroinferior wall of the urinary bladder, with intra- and extravesical components [Table/Fig-1a]. Magnetic Resonance Imaging (MRI) showed the lesion to be isointense on T1-weighted images and hypointense on T2-weighted images, with no diffusion restriction [Table/Fig-1b]. Mild homogeneous enhancement was noted. The lesion formed an obtuse angle with the bladder wall. The extravesical component had a smooth convex margin with no fat stranding and was causing a mass effect on the proximal urethra.

The right Vesicoureteric Junction (VUJ) was near the lesion but did not involve the ureteric orifice, and no hydroureter was observed. Both kidneys and the upper urinary tracts appeared normal. There was no radiological evidence of distant metastasis. Urine cytology revealed unremarkable squamous and urothelial cells and was negative for malignancy. The patient and her family were counselled regarding surgical excision of the tumour.

After completion of the investigational work-up and confirmation of fitness for surgery, the patient was taken to the operating room. Following the induction of general anaesthesia, cystoscopy was performed. No strictures were observed. A mass was identified in

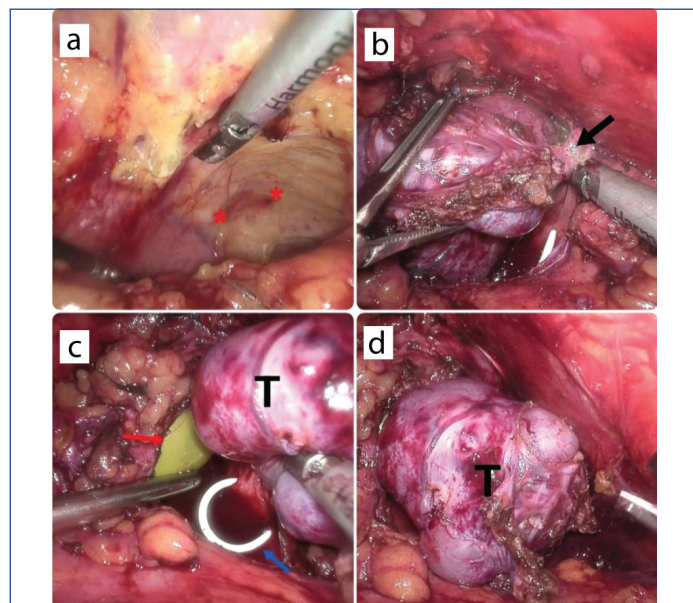
the right anterolateral bladder wall near the bladder neck, obstructing urinary flow [Table/Fig-1c]. The overlying mucosa was intact. Both ureteric orifices were normal, and the trigone was not involved. No biopsy was performed, as the tumour was not endovesical and the mucosa was intact, in order to prevent potential dissemination in case of malignancy. A right Double-J (DJ) stent was placed during cystoscopy to visualise and protect the Vesicoureteric Junction (VUJ) during surgery [Table/Fig-1d].



[Table/Fig-1]: a) Sagittal view of CECT pelvis with the tumour (black arrow) within the contrast-filled urinary bladder close to the outlet; b) Sagittal view of MRI pelvis showing the same; c) Cystoscopic view of tumour (black arrows) with normal overlying mucosa; d) Right D-J stent insertion during pre-op cystoscopy.

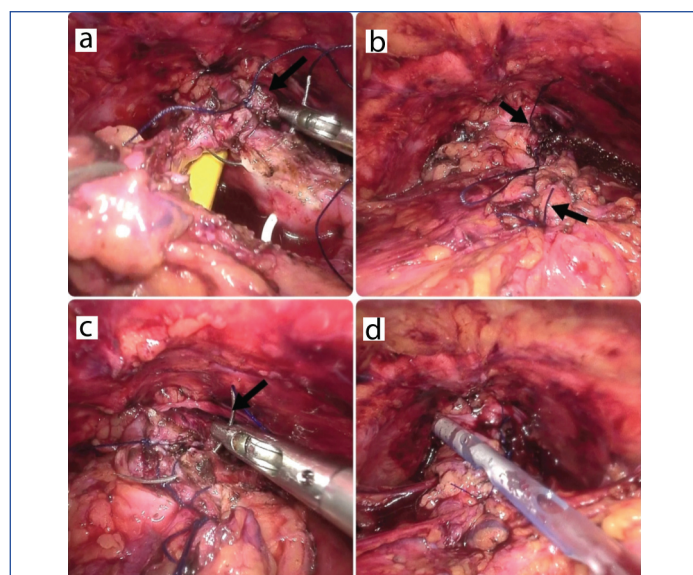
A transperitoneal laparoscopic approach using three trocars was then adopted. The peritoneal flap was reflected to access the extraperitoneal space, which was developed using both blunt and sharp dissection [Table/Fig-2a]. A harmonic scalpel was used as the energy source. The tumour site was identified, and the first entry into the bladder lumen was made at a relatively safe anterior point [Table/Fig-2b]. Dissection was continued circumferentially around

the tumour by incising a thin cuff of the bladder wall, while carefully monitoring the Per-Urethral Catheter (PUC) and the DJ stent to avoid iatrogenic trauma to the VUJ and urethrovesical junctions [Table/Fig-2c,d].



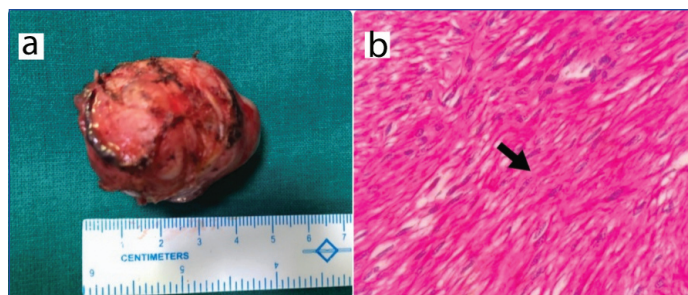
[Table/Fig-2]: a) Development of extraperitoneal space (red asterisks) after reflection of the peritoneal flap, at laparoscopy; b) Tumour along with a cuff of the bladder wall being excised using the harmonic scalpel (black arrow) after entry into the bladder lumen; c) Foley's catheter (red arrow) & D-J stent (blue arrow) in situ helping to keep away from the right U-V junction and the internal urethral meatus during resection of the tumour (black 'T'); d) Completely resected tumour (black 'T').

After excision of the tumour, the resulting bladder defect was closed in two layers [Table/Fig-3a-c]. A 32-French tube drain was placed through the right lateral trocar site [Table/Fig-3d]. The tumour was retrieved in an extraction bag after dilating the 10 mm trocar site [Table/Fig-4a]. Intraoperative frozen section analysis confirmed a leiomyoma with negative resection margins.



[Table/Fig-3]: a) Initiation of suture-closure of the bladder wall defect (black arrow); b) Completed suture line (black arrows); c) 2nd layer of peri-vesical fat burying the 1st suture line (black arrow); d) Tube drain in situ.

The drain was removed on postoperative day (POD) 3, and the patient was discharged on the same day with the PUC in situ. At her POD 10 outpatient follow-up, all wounds had healed well. The PUC was removed on POD 15. Histopathological examination confirmed a benign submucosal leiomyoma with intact margins, composed of interlacing fascicles of spindle-shaped cells [Table/Fig-4b]. Immunohistochemical analysis demonstrated cytoplasmic expression of Smooth Muscle Actin (SMA). The DJ stent was removed six weeks postoperatively.



[Table/Fig-4]: a) The specimen; b) High power view of the specimen histopathological examination showing interlacing fascicles of spindle shaped cells (black arrow). (Stain: Hematoxylin - Eosin, Magnification 100X)

Postoperative repeat urodynamic studies showed a urinary flow rate of 20 mL/sec, with complete resolution of obstructive symptoms. Follow-up ultrasonography at six and twelve months postoperatively revealed no recurrence. Fifteen months after surgery, the patient remains asymptomatic and disease-free.

DISCUSSION

Bladder outlet obstruction (BOO) in females remains a poorly understood and relatively rare condition compared to males. Objective diagnosis is challenging. Women more commonly present with irritative urinary symptoms, including frequency, urgency, urge incontinence, and recurrent urinary tract infections. Leiomyoma of the bladder wall is one of the rarest causes of BOO. Bladder leiomyoma is a rare condition, and its presentation with BOO and urinary retention, as seen in this case, is even rarer. Laparoscopic resection is feasible in a well-equipped set-up with the requisite surgical expertise.

A wide spectrum of presentations is observed in BOO, ranging from mild and stable to severe and progressive obstruction. Bowel involvement is not typical, but the hallmark of BOO is high bladder pressures associated with a weak urinary stream, frequently producing LUTS. The incidence of BOO is higher among individuals aged 60-69 years. In males, the most common cause is benign prostatic hyperplasia (BPH), whereas bladder neck stenosis is the major etiological factor in females [1].

BOO is relatively uncommon in women. Etiological factors are more diverse, and no universally accepted urodynamic criteria exist for diagnosing BOO in females, unlike in males. Voiding dynamics differ in women, as many void with low detrusor pressure or by relaxing the pelvic floor muscles [2].

Bladder leiomyomas are rare tumours, with an incidence of approximately 0.43% among all bladder tumours [3,4]. They are mostly benign and may present with BOO. Symptoms depend on tumour size and location. Women are affected approximately twice as often as men, and obstructive symptoms are more common. Surgical treatment is the preferred option and is associated with a low recurrence rate [3]. A summary of BOO etiologies is presented in [Table/Fig-5] [5].

These tumours may mimic other bladder masses, presenting either asymptotically or with obstructive or irritative symptoms

Anatomical	
Extrinsic	Pelvic organ prolapse, uterine fibroid or tumour, and complications from anti-incontinence procedures.
Urethral	Strictures, meatal stenosis, urethral caruncle, diverticulum, Skene's gland cyst
Luminal	Bladder or urethral tumours, stones, ureterocele, and foreign bodies.
Impaired detrusor contractility	Senile bladder changes, neurological diseases (e.g., diabetes mellitus, peripheral neuropathy).
Functional	Fowler's syndrome and dysfunctional voiding.

[Table/Fig-5]: Causes of Bladder Outlet Obstruction (BOO) [5].

[6]. Patients with bladder leiomyomas can be asymptomatic, but the majority present with obstructive symptoms (49%), irritative symptoms (38%), and haematuria (11%) [7]. Obstructive symptoms may include intermittent urinary retention, likely due to a ball-valve mechanism when the tumour obstructs the urethra and impedes urinary flow in the erect position.

The aetiology of bladder leiomyomas remains unclear, with several proposed theories:

- 1. Blum's Irritative Theory suggests that chronic irritation or trauma to the bladder wall may trigger tumour development, with repeated injury or inflammation stimulating abnormal smooth muscle growth.
- 2. Piegel's Dysontogenic Theory proposes that these tumours may result from abnormal embryonic development of smooth muscle cells, with developmental defects during fetal life potentially leading to tumour formation.
- 3. Lips-Chutz's Endocrine Theory postulates that hormonal factors, particularly during periods of hormonal fluctuation such as pregnancy or menopause, may stimulate bladder smooth muscle cells, promoting tumour growth [7-9].

Leiomyomas are classified based on their location within the bladder: predominantly endoluminal (51.1%), intramural (30%), and extravesical (16.7%) [10]. In our case, the tumour had both intramural and extramural components, with an intact overlying mucosa.

Investigations: Diagnostic modalities for bladder leiomyoma include ultrasound, CT, MRI, and cystoscopy. Ultrasound typically reveals homogeneous, smooth lesions with peripheral hyperechogenicity [11,12]. CT imaging helps assess tumour size and extent, often showing solid bladder wall lesions (~30 HU) causing bladder displacement. MRI is superior in detecting tumour origin and defining boundaries. Cystoscopy confirms tumour size, location, and relation to the trigone and ureteric orifices, and facilitates placement of ureteric DJ stents to protect the vesicoureteric junction during surgery [3,4,10].

Management: Given the potential for tumour growth and symptom progression, surgical intervention is often necessary [13]. Since leiomyomas are benign, surgery should be conservative. Treatment options include transurethral resection (TUR/TURBT) for small endovesical tumours and open, laparoscopic, or robotic excision/enucleation, with or without partial cystectomy [7]. In our case, the patient experienced obstructive symptoms due to the tumour's large size and proximity to the urethrovesical junction; therefore, laparoscopic partial cystectomy was appropriate. Follow-up demonstrated a successful outcome. Recurrence after surgical excision is rare.

A review of English-language case reports of urinary bladder leiomyomas presenting with obstructive symptoms over the last 15 years is summarised in [Table/Fig-6] [11,14-24].

Serial no.	Authors	Country (Y of publication)	Age (y)/Sex	Presentation	Procedure performed
1	Saunders SE et al., [11]	Canada (2009)	56/F	Retention of urine- mass prolapsing as a ball valve into urethra	Trans-Urethral Resection (TUR)
2	Matsushima M et al., [14]	Japan (2010)	56/F	Acute urinary retention (AUR)	TUR
3	Sellaturay SV et al., [15]	UK (2011)	63/F	AUR, palpable mass, pelvic pain	TUR
4	Tupikowski K et al., [16]	Poland (2011)	29/F	AUR	TUR
5	Agrawal SK et al., [17]	India (2014)	45/F	AUR	TUR

6	Mehta N et al., [18]	India (2015)	63/F	AUR	TUR
			43/F	AUR, Hematuria	TUR
7	Itam S et al., [19]	UK (2016)	56/M	AUR, LUTS (voiding), Hematuria and Palpable Mass	TUR
8	Ganapathy VS et al., [20]	India (2017)	53/F	AUR, LUTS (storage), Hematuria	TUR
9	Matoos TA et al., [21]	Brazil (2018)	50/F	AUR, LUTS	Partial Cystectomy (Laparoscopic)
10	Kumar N et al., [22]	India (2019)	27/F	LUTS	TUR
			30/F	AUR, LUTS (voiding)	TUR
			35/F	AUR, LUTS (voiding)	TUR
11	Rey Valzacchi GM et al., [23]	Argentina (2021)	45/F	AUR, LUTS	Transvesical Laparoscopy
12	Kashkoush J and Park A [24]	US (2022)	38/F	AUR, LUTS (voiding), Suprapubic Pain, Nocturia	TUR

[Table/Fig-6]: Review of literature- Case reports in English literature on bladder leiomyoma presenting with retention of urine, over last 15 years [11,14-24].

CONCLUSION(S)

This case report demonstrates that laparoscopic partial cystectomy for a large bladder wall leiomyoma is a feasible, safe, and effective procedure in experienced hands with an advanced surgical set-up. When performed using appropriate energy sources, with prior DJ stenting and per-urethral catheterisation, there is minimal risk of scarring, distortion, or injury to the ureteric orifices. This report also underscores the importance of multidisciplinary evaluation and management, involving radiology, endourology, advanced laparoscopy, and pathology, to achieve optimal patient outcomes.

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PLAGIARISM CHECKING METHODS: [\[Jain H et al.\]](#)

- Plagiarism X-checker: Apr 06, 2025
- Manual Googling: Aug 04, 2025
- iThenticate Software: Aug 09, 2025 (14%)

ETYMOLOGY: Author Origin**EMENDATIONS:** 5**AUTHOR DECLARATION:**

- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Mar 12, 2025**Date of Peer Review: **Jul 15, 2025**Date of Acceptance: **Aug 11, 2025**Date of Publishing: **Sep 01, 2025**