

Incidental Urinary Bladder Leiomyoma: A Successful Long Term Conservative Treatment Based on Pre-operative Magnetic Resonance Imaging Findings

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Abstract

Background: Leiomyomas are benign mesenchymal neoplasms which rarely occur in the urinary bladder, accounting for just 0.43% of all bladder tumours. Due to the paucity of data, very little is known about diagnosis, treatment and follow-up. Thus, despite their non-malignant nature, they may be considered a true therapeutic challenge.

Objective: Conservative management is paramount when assessing and managing benign neoplasms. It is the responsibility of the surgeon to tailor the most appropriate surgery for each patient, finding the best balance between oncologic and functional outcomes and future quality of life.

Case report: We present a case report of a patient who was incidentally diagnosed with a large, asymptomatic intramural leiomyoma of the urinary bladder. Following abdominal imaging, biopsy specimens were obtained through cystoscopy, and a transurethral resection of the bladder (TURB) was eventually performed. Imaging findings including Ultrasonography (US), triple-phase Computed Tomography Urography (CTU) and Magnetic Resonance Urography (MRU) are reported, and the most representative images are shown. The patient has been successfully managed with staged TURB and then close outpatient follow-up, and she is currently recurrence-free 8 years after the last endoscopic treatment.

Conclusion: Despite the benign nature of leiomyomas, the surgical options for these tumours range from TURB to radical cystectomy. Here, we underline how a conservative approach may be successful regardless of the size and site of the lesion, thus preserving the bladder and the patient's quality of life without affecting the oncologic outcomes.

Keywords

Bladder cancer; Leiomyoma; Transurethral resection; Magnetic resonance; Urography

Introduction

Benign mesenchymal tumors of the urinary bladder account for 1%-5% of all bladder cancers. Primary leiomyomas are the most common histotype, accounting for about one third of all benign mesenchymal tumors of the urinary bladder and 0.43% of all bladder tumours overall [1]. Symptoms may vary, as they are related to the site and size of the tumour. Ultrasonography (US), triple-phase Computed Tomography Urography (CTU), and Magnetic Resonance Imaging (MRI) or Magnetic Resonance Urography (MRU) are commonly used in the diagnostic setting for the initial assessment; cystoscopy with biopsy or TURB usually follows, whenever a suspicious mass is found and/or hematuria is reported.

Case Report

A 32-year-old Caucasian woman was referred for a routine pelvic ultrasound scan. No abdominal pain, urinary or gynaecological symptoms were reported at that moment. Laboratory tests, including serum creatinine and urine analysis, were within the normal reference range as well. The patient underwent an abdominal gray-scale US (Esaote MyLab25, Esaote, Genoa, Italy); images were acquired with a commercial 2.5 MHz convex transducer. US revealed a 60 × 50 mm hypoechoic and well-defined nodule on the left posterolateral bladder wall, with inhomogeneous and partially cystic echotexture and poor intralesional arterial vascularization. Ureteric jet was detected bilaterally, though it appeared to be in close proximity to the lesion on the left side (Figure 1). No hydronephrosis was reported.

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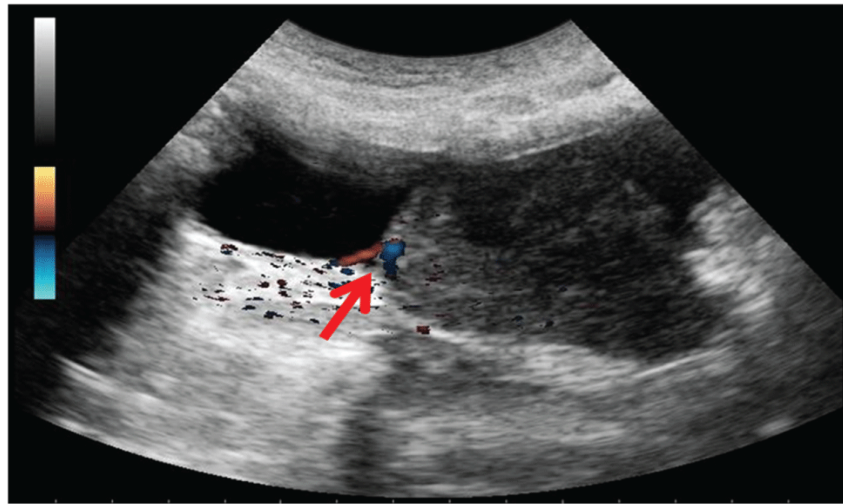


Figure 1: Bladder US with evidence of a mass arising from the left posterolateral wall. Color-Doppler US shows the preservation of the left ureteric jet (arrow head)

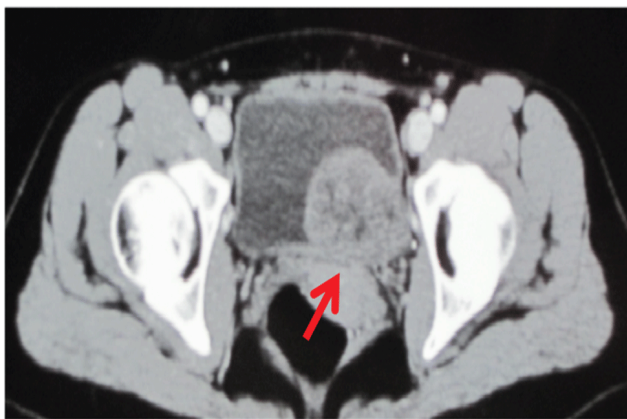


Figure 2: CT appearance of the bladder mass

Physical examination was remarkable for a firm, non-tender, smooth mass in the left adnexal region. Further imaging with CT and MRU was then requested.

Therefore, the patient underwent an abdominal CTU (Siemens Somatom Sensation 64, Siemens Healthcare, Erlangen, Germany). Image acquisition, performed with a 4 mm slice thickness, confirmed the presence of a well-circumscribed hypo-attenuating mass, arising from the left posterolateral bladder wall and extending to the left ureterovesical junction (Figure 2). No enlarged lymph nodes were reported. Although US and CTU were suspicious for a mesenchymal neoplasm, a conventional Magnetic Resonance Imaging (MRI) combined with static-fluid Magnetic Resonance Urography (MRU) was ordered to further characterize the mass, its pattern of growth and its relationship with the urothelial surface. The MR scan was performed on a 1.5 Tesla superconducting magnet (Siemens Magnetom Avanto, Siemens Healthcare, Erlangen Germany) using a phased-array body coil before and after intravenous administration of gadolinium-DPTA (diethylenetriamine penta-acetic acid). Images were acquired and post-processed using standardized protocols, as previously described [2]. The MR appearance of the lesion was again heterogeneous: although the mass appeared mainly hypo-intense on T1-weighted images, the central area showed high signal intensity on T2-weighted images due to a cluster of numerous small cysts (Figure 3). The inhomogeneous vascularization, especially in the central portion of the lesion was evident in axial post-contrast sequences (Figure 4). The preservation of the overlying urothelium confirmed the intramural pattern of growth of the mass (Figure 3 and 4). The adjacent bladder wall was unremarkable, without evidence of

upper urinary tract obstruction (Figure 5). Overall, MR imaging was suggestive of a degenerated bladder intramural leiomyoma.

The patient eventually underwent a bladder cystoscopy, which revealed a 6 cm intraluminal mass arising from the left bladder wall and overlaying normal urothelium; the left ureteric orifice was identified at the lower edge of the lesion. A trans-urethral biopsy of the bladder lesion was then obtained. Biopsy specimen was paraffin embedded according to recommendations [3]; microscopic examination revealed the presence of a bladder leiomyoma. Therefore, a subsequent complete trans-urethral resection of the bladder lesion (TURB) was performed within 45 days. The postoperative recovery was uneventful and the patient was discharged after 72 hours. A two-staged TURB was performed after 3 months. The final pathology report was consistent with a non-invasive urinary bladder leiomyoma in both cases.

Following these initial endoscopic treatments, the patient was managed conservatively with periodic ultrasound evaluations and outpatient visits. 8 years after the first TURB, she is still alive and recurrence-free.

Discussion

Fewer than 250 cases of bladder leiomyoma have been reported in the literature so far [4]. Despite being rare, these neoplasms are the most common benign mesenchymal tumours of the urinary bladder, accounting for around one third of these kind of neoplasms. Leiomyomas of the urinary bladder always arise from the submucosa, but their pattern of growth may be either intramural, intravesical or extravesical, with a reported incidence of 7%, 63% and 30% respectively [5].

Although older reports have reported an equal occurrence between genders and no apparent association with age (age at onset: 22-78 years) [6], recent data has pointed out that the actual incidence of bladder leiomyoma may be twice as high in women than in men [4]. Symptoms are related to site and size of the lesion, and include urinary symptoms (hesitancy, frequency, dribbling), lower abdominal pain or discomfort and pregnancy complications (prematurity); gross hematuria may also be present [6,7]. Some authors have also suggested a direct correlation between tumour volume and symptoms [8,9], which was not confirmed in our case report despite the size of the mass (nearly 7 cm). This may be explained by the absence of both bladder outlet obstruction and upper tract obstruction. It is unclear why symptoms should be more common and more evident in middle-aged patients [6], but a small sample size is likely to be implied.

Several endocrine alterations and genomic mutations have been associated with an increased risk of bladder leiomyoma [10,11]; however, our patient did not screen positive for any of them.

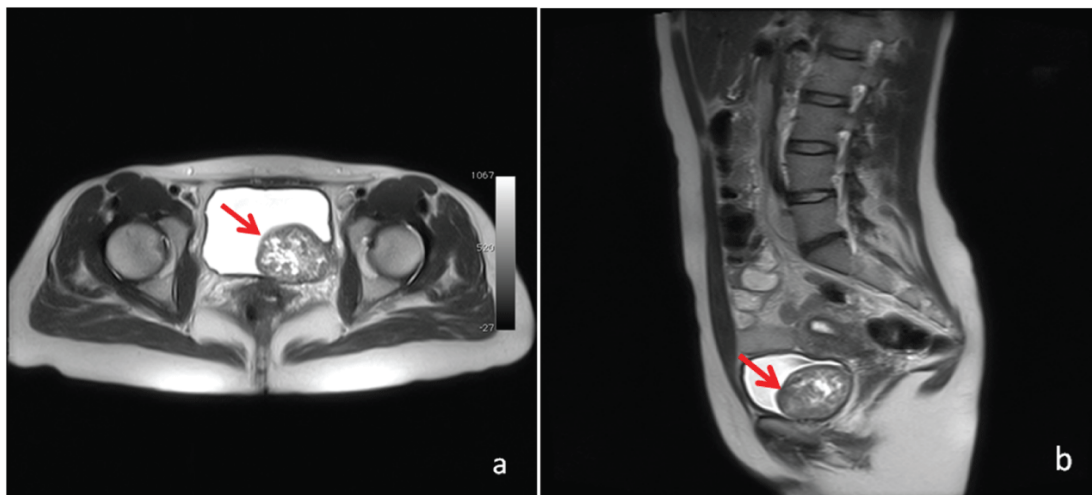


Figure 3: Axial (a) and sagittal (b) T2-weighted HASTE images showing the cystic appearance of the central area. The mucosal layer appears as a low signal intensity peripheral rim (arrow head)

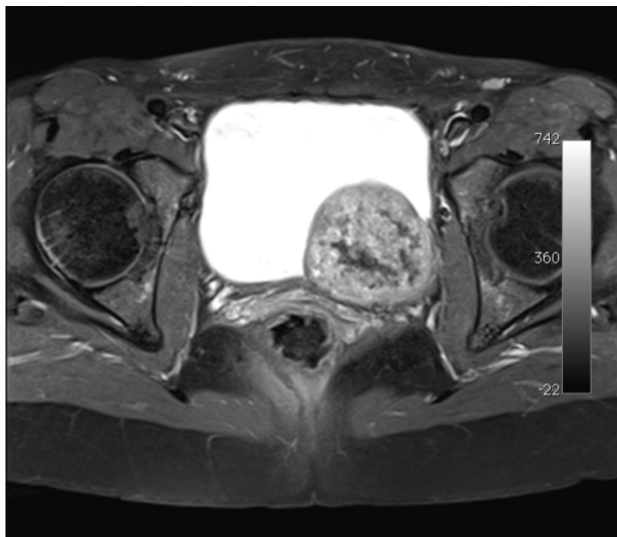


Figure 4: Axial post-contrast T1-weighted TSE MRI scan of the pelvis showing inhomogeneous vascularization of the bladder mass

The radiological aspect of leiomyomas is quite homogeneous regardless of the site of origin. In fact, they are usually well-defined solid masses with a whorled appearance of smooth muscle cells [12]. The remarkable radiologic resemblance between bladder leiomyomas and the more common uterine counterparts may be of utmost utility to fasten the clinical diagnosis [13–16].

Abdominal US is used as a first-line exam to identify bladder masses and to detect bladder outlet obstruction and hydronephrosis, because of its affordability and good sensitivity. Moreover, it may be helpful in specific settings to better characterise the relationship between the mass and the overlying urothelial layer or the vaginal wall [17]. CTU may be considered the current gold standard for local staging. Moreover, it may improve the differential diagnosis between cystic and solid lesions [18]. The role of MRI in the evaluation of the urinary tract is less established than CTU and still experimental to a certain extent [13]. The wider adoption of MR imaging has always been limited by its higher cost and need for specific expertise. However, it has several remarkable advantages: first of all, unlike CT, it does not utilize ionizing radiation, therefore it may be used freely in specific subsets such as pregnancy, childhood and in young patients needing periodic imaging. Moreover, it has been associated with a better tissue characterization of the primary tumor and with a more accurate local staging and definition of its pattern of growth [16,18-21]. MR imaging may be combined with static-fluid MRU

to better evaluate the internal anatomy of the excretory system. However, there is only limited evidence of non-inferiority of MRU as compared to CTU in the detection of urothelial neoplasms [22] and rigorous standardization of protocols for imaging acquisition and postprocessing is yet to come.

Although they may be associated with extremely severe symptoms [23,24], leiomyomas of the urinary bladder are benign mesenchymal neoplasms, whose oncologic outcomes are always excellent. The treatment, which is almost always surgical, is strongly associated with the tumour burden, and range from TURB for smaller tumours to open surgical excision or radical cystectomy for larger ones. Minimally invasive surgeries, such as laparoscopic surgery and robot-assisted excision, have been described as well [10,23-27]. Also given the young age of the patient, an extremely accurate preoperative diagnosis was of utmost importance to plan the most conservative treatment. In this setting, MRU was helpful to give further details about the pattern of growth of the mass, the depth of the bladder wall invasion and the relationship between the mass and the ureteric orifices. TURB achieved both diagnostic and curative goals: on the one



Figure 5: Excretory T1 sagittal FLAIR FS sequence showing the ureteric jet of Gd-DTPA contrast medium at the left uretero-vesical junction (arrow head)

hand, it obtained specimens for pathological examination (assessing histology and non-invasiveness), and on the other hand, it eradicated the tumour.

Oncologic outcomes following surgery are invariably excellent: less than 20% of patients recur following TURB, and no recurrence has been reported following radical surgery. In light of this data, we decided to follow the patient with an abdominal US every six months for the first year following surgery, then every year for at least 10 years. Abdominal US is an effective and well-tolerated first-line exam for the diagnosis of bladder mass, since it merges non-invasiveness, good sensitivity and affordability. Scheduled office cystoscopies were avoided, as they were considered inappropriate without the suspicion of a urothelial cancer. No recommendation is reported in literature about the optimal length of follow-up. Since an association between bladder and uterine leiomyomas is reported in literature [6], we opted for a long and comprehensive follow-up.

In the end, our therapeutic choice (staged TURB + close outpatient follow-up) has been successful after 8 years from the last transurethral resection: the patient is alive and without evidence of abnormality or recurrence. Although endoscopic management of leiomyoma has been described previously by several authors [27,28] no one has ever suggested the possibility of such a long (8 years) and successful endoscopic and outpatient management, especially for large (7 cm) neoplasms.

Conclusion

We reported the case of a young Caucasian woman, who was incidentally diagnosed with a large bladder leiomyoma in close proximity with the left ureteric orifice. Given the young age of the patient and the non-infiltrative appearance at repeated imaging, we opted for staged transurethral resections, which achieved excellent long-term oncologic and functional outcomes at an 8-year follow-up. Based on this report, we suggest that the size and site of bladder leiomyoma should not always drive the therapeutic choice. In fact, an aggressive endoscopic treatment followed by a close outpatient follow-up may be considered in carefully selected young patients, due to its excellent oncologic and functional outcomes and quality of life.

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