A 37-year-old female presented with difficulty in passing urine for 2 years. Magnetic resonance imaging (MRI) on various pulse sequences revealed a globular mass lesion suggestive of leiomyoma in the urinary bladder. Leiomyoma of bladder is a very rare entity. Only about 300–350 cases are reported worldwide. On 3T MRI leiomyoma of the bladder may give varying appearance as compared with previously reported cases on 1.5 T possibly due to higher magnetic field strength. Leiomyoma of bladder is a benign condition, and the prognosis is excellent. Partial cystectomy was done, and histopathology examination confirmed the bladder leiomyoma.

Key words: 3T magnetic resonance imaging, benign neoplasm, leiomyoma, urinary bladder

INTRODUCTION

Leiomyoma of bladder is the most common nonepithelial (mesenchymal) benign neoplasm of the urinary bladder, but incidence rate is only 0.43% worldwide. They may arise throughout the genitourinary system, but the kidney capsule is the most common location.[1] Leiomyomas of the urinary bladder can be suspected on computed tomography (CT), ultrasound, and even excretory urography. Unquestionably, however, magnetic resonance imaging (MRI) adds a new dimension to their recognition and overall assessment. There is a paucity of data regarding appearance of Leiomyoma of bladder until now on 3T MRI. We present here the clinico-3T MR profile of the bladder leiomyoma with histological correlation in middle-aged female with difficulty in passing urine.

CASE REPORT

A 37-year-old woman came to our hospital with complaints of difficulty in passing urine for 2 years. Clinically, per abdominal examination was normal. On digital rectal examination a lemon sized bimanually palpable, nontender, firm lump noted in hypogastrium.

Blood counts, urine analysis and renal function test were within normal limits.

On the ultrasound, 4 cm × 3 cm globular solid mass with homogenous echoes within the lesion was detected near the bladder neck area without any well-defined anechoic cystic area. The margin of the lesion was smooth. The other pelvic organs (uterus, ovaries) showed normal echogenicity without any invasion or mass lesion. Bilateral kidneys were normal.

Magnetic resonance imaging confirmed a 4.5 cm × 4.3 cm focal globular mass which was smoothly marginated heterogeneous signal intensity on T2-weighted MR and homogenously intermediate signal intensity on T1-weighted sequence noted in the bladder neck area in contrast to hyperintense signal intensity on T1-weighted sequence found in paraganglioma. No multicluar pattern or calcification was noted in the well-defined lesion as found in hemangioma. The overlying mucosa was intact. There was no infiltration of mass in the bladder cavity or perivesical structures. No cystic area suggestive of degeneration noted within it. The uterus, bilateral ovaries were normal in appearance. The rest of the entire bladder cavity and wall was otherwise normal in appearance. No lymphadenopathy or any other mass lesion was present [Figures 1].
Panwala, et al.: Urinary bladder Leiomyoma on 3T MRI

T1-weighted coronal image showing a homogenously intermediate signal intensity mass arising from the bladder neck (3T MRI Magnetom Verio, Siemens, Munich, Germany. Protocol: TR 621 ms; TE 10 ms, slice thickness 3 mm. Noncontrast MRI).

On cystoscopy examination, a large pedunculated mass attached to the bladder neck at 11–12 O’clock position was seen [Figure 2].

Partial cystectomy was done [Figures 3].

The patient had an uneventful recovery after the procedure.

Histopathological examination confirmed the diagnosis of leiomyoma [Figure 4]. The patient is asymptomatic and no recurrence so far.

**DISCUSSION**

Leiomyoma has its origin from the smooth muscle bundles and contains connective tissue surrounding it. The most common localizations are in the skin, womb, retroperitoneum, genitourinary and gastrointestinal tract. In the genitourinary tract, it is most frequent in the kidney and bladder, especially at the trigone and bladder neck. It is most common in females, with a female/male ratio 5:2 and its peak incidence between fourth and fifth decades of life.[2,3]

Grossly, the tumors are typically small, well-circumscribed, white, and fleshy without hemorrhage or necrosis. Goluboff et al. have reported tumor sizes ranging from 1.5 to 25 cm with an average of 5.8 cm.[4]

Microscopically, leiomyomas consist of intersecting fascicles of smooth muscle cells with moderate to abundant eosinophilic cytoplasm. Nuclei are devoid of significant atypical changes such as hyperchromias that is, pleomorphism, or individual cell necrosis. Mitotic figures are absent.

Leiomyoma of the bladder can be totally asymptomatic or can present with obstructive symptoms (49%), irritative symptoms (38%), hematuria (11%), and flank pain (13%). Our patient came with difficulty in passing urine. Bladder leiomyomas have been described according to location as endovesical (63%, most common), extravesical (30%), and intramural (7%, least common) locations.[10] Pedunculated endovesical leiomyomas tend to present with irritative or outlet obstructive symptoms to a greater degree than do leiomyomas in other bladder locations as in our case. In leiomyoma, the overlying urothelium remains intact, although ulceration may occur. Intramural and subserosal tumors are usually asymptomatic, and they are diagnosed incidentally. Mesenchymal tumors arise from submucosal portion of the bladder wall and on imaging appear as smooth intramural lesions, in counterpart, the epithelial masses derive from the superficial layer of the bladder, on imaging they appear as irregular, intraluminal filling defects.

Ultrasonography (USG), MRI and cystoscopy are useful diagnostic tools. On US, leiomyoma appears usually as smooth, homogeneous, solid mass, although partially cystic-appearing leiomyomas have been reported. MRI has several advantages over CT and USG that it has...

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**Figure 1:** T2-weighted magnetic resonance imaging sagittal image showing a smoothly marginated heterogeneous signal intensity mass arising from the submucosa with an intact mucosa appearing hypointense (arrow) (3T magnetic resonance imaging [MRI] Magnetom Verio, Siemens, Munich, Germany. Protocol: TR 6660 ms; TE 97 ms, slice thickness 5 mm. Noncontrast MRI)

**Figures 3:** Partial cystectomy was performed. The mass was excised by partial cystectomy preserving both ureteric orifices

**Figure 2:** (a) A large pedunculated mass attached to the bladder neck at 11–12 O’clock position. (b) Ureteric orifices were covered by normal mucosa

**Figure 4:** Excised mass showed interlacing bundles of smooth muscle cells interspersed with connective tissue and hyaline material and absence of malignant cells
the multiplanar imaging capability and excellent tissue contrast. That allows improved evaluation of the location and extent of tumors as well as improved lesion characterization. In most instances, MRI can identify an intact rim of bladder muscle or epithelium overlying the tumor and separates the tumor from the bladder lumen as in our case.

Normal bladder wall gives intermediate signal intensity on T1-weighted images and as bands of low (inner) and intermediate (outer) signal intensity on T2-weighted images. The mucosa and lamina propria are not clearly seen in the normal bladder. On T1-weighted images are useful for delineation the bladder wall margins, adjacent perivesical structures, and tumor margins. T2-weighted fast spin echo images also help in depicting surrounding tissue infiltration and any lymphadenopathy, if present.\(^6\) MRI reveals a well-circumscribed, round, or oval mass that usually originates from the bladder base. Leiomyomas of the bladder typically appear as intermediate signal intensity on T1-weighted images in contrast to hypertense signal intensity on T1-weighted sequence found in paranganglioma and low signal intensity on T2-weighted images similar to leiomyomas arising at other locations such as the uterus. However in our case on 3T MRI, lesion showed heterogeneous signal intensity on T2-weighted-image and homogenous intermediate signal intensity on T1-weighted image because it has been found that the consequences of greater magnetic field strength on T2-weighted relaxation time are unpredictable.\(^5\) No multilocular pattern or calcification was noted in the well-defined lesion as found in hemangioma. Degenerated leiomyomas have more varying signal characteristics, with cystic areas having high signal intensity on T2-weighted images. After contrast administration, the enhancement pattern may vary.\(^5,6\) MRI is superior in demonstrating the submucosal origin of the tumor and the preservation of the muscle layer. Till now there is no available data on the appearance of leiomyoma of the bladder on 3T MRI. Unquestionably 3T MRI provided increased signal-noise ratio and increased spatial resolution. Here, we represent comparison of leiomyoma lesion on 1.5 T as in previously reported cases with 3T as in our case\(^1\). On imaging, leiomyoma can be differentiated from leiomyosarcoma by the poorly circumscribed nature, invasive character and necrosis in the latter. Leiomyosarcomas are more heterogeneous on T2-weighted images and demonstrate nonenhancing areas secondary to necrosis. Leiomyomas are benign tumors usually without malignant potential, but histologic evaluation is essential to distinguish them from a well-differentiated leiomyosarcoma. The treatment of these rare mesothelial bladder tumors is considered primarily by their size and anatomic location. The small endovesical tumors can be resected transurethrally. Large endovesical extravesical intraluminal tumors usually require open resection. Recently Holmium-Laser resection/inoculation of bladder tumors has been proven to be a safe and effective treatment modality. Laparoscopic approach for large transmural and extravesical bladder leiomyomas also gives good result.\(^8\) Prognosis is excellent, and malignant transformation has not been reported.

**CONCLUSION**

Leiomyoma of bladder is a very rare entity. On 3T MRI leiomyoma of the bladder may give varying appearance as compared with previously reported cases on 1.5 T due to possible consequences of greater magnetic field. 3T MRI also adds useful information regarding characterization of leiomyoma of the bladder with relation of the overlying mucosa, surrounding structures and lesion morphology. Leiomyoma of bladder is a benign condition, and the prognosis is excellent.

**REFERENCES**


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**Table 1: Leiomyoma of bladder appearance on 1.5 T and 3 T**

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<td>Homogenous</td>
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