Rare symptomatic bladder leiomyoma: case report and literature review

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Abstract
Bladder leiomyoma is a rare, benign tumour of the bladder. We present a clinical case of a 47-year-old asymptomatic woman with symptomatic bladder leiomyoma. Computed tomography showed well-defined bladder leiomyoma in the right posterior bladder wall. After partial cystectomy, pathology findings confirmed leiomyoma of bladder, and the patient achieved clinical recovery in 8 months. We discuss the relevant recent literature of bladder leiomyoma.

Keywords
Bladder, leiomyoma, cystectomy, tumour, middle age, immunohistochemistry

Date received: 29 July 2017; accepted: 18 December 2017

Introduction
Bladder leiomyoma is a rare, benign, mesenchymal tumour of the bladder, with an incidence rate lower than 0.5% among all types of bladder tumours. There have been fewer than 250 reports on bladder leiomyoma.1 Occurrence of this tumour is attributed to abnormal endocrine alterations.2 Although the clinical treatments are different for this type of disease, the prognosis is generally optimistic.

We report here a middle-aged woman with symptomatic bladder leiomyoma. Computed tomography (CT) and biopsy results confirmed bladder leiomyoma.

Case report
A 47-year-old woman with frequent pain while urinating after intestinal obstruction surgery was admitted to our urology department.
department. Pelvic CT results showed a soft tissue lesion in the right posterior bladder wall (Figure 1).

The patient then underwent open partial cystectomy. A biopsy after cystectomy showed a urinary bladder benign leiomyoma that was 4 cm in diameter. Histopathology using haematoxylin and eosin staining also showed bladder leiomyoma (Figure 2). An immunohistochemical examination showed abnormal hyperplasia with smooth muscle actin in the spindle cells that formed the tumour.

After partial cystectomy, no recurrence or adverse complications were found in 8 months. The patient achieved a clinical recovery and experienced relief of painful urination.

The patient provided verbal informed consent.

Discussion

We report a rare case of asymptomatic bladder leiomyoma. Bladder leiomyoma is a rare submucosal tumour with an occurrence rate of less than 0.5% among all bladder neoplasms. Fewer than 250 cases of bladder leiomyoma have been reported.

Figure 1. Enhanced coronal computed tomography results of bladder leiomyoma
A: Arterial phase. B: Venous phase

Figure 2. Haematoxylin and eosin staining results of bladder leiomyoma
A: 100× magnification. B: 200× magnification.
Table 1. Data from case reports of bladder leiomyomas in the most recent 5 years.

| Author          | Age, years | Sex  | Tumour location                  | Tumour size   | Treatment                                      | Related antecedent diseases                  | Reference |
|-----------------|------------|------|----------------------------------|---------------|-----------------------------------------------|---------------------------------------------|-----------|
| Ortiz et al.    | 71         | Female | Right anterolateral             | ~4.0 cm       | Laparoscopic partial cystectomy               | No                                         | 2         |
| Goel et al.     | 76         | Female | Bladder lumen                   | ~4.3 cm       | Partial cystectomy                            | No                                         | 3         |
| Al-Othman et al.| 35         | Male  | Bladder wall                    | NA            | Robotic extramucosal excision                 | LUTs                                       | 7         |
| Jain et al.     | 42         | Female | Left lateral bladder wall       | 6.0 × 4.0 cm  | Open local excision                           | Suprapubic discomfort                       | 8         |
| Jain et al.     | 46         | Female | Posterior bladder wall          | 4.0 × 3.0 cm  | TUR                                          | LUTs, haematuria, pyuria, uterine leiomyoma | 8         |
| Khater et al.   | 41         | Female | Left posterolateral bladder wall | 6.0 × 4.0 cm  | TUR                                          | Left flank pain, haematuria, pyuria, left hydrenephrosis | 9         |
| Muoka et al.    | 68         | Female | Bladder neck                    | ~4.0 cm       | TUR                                          | LUTs, haematuria                            | 10        |
| Dodia et al.    | 35         | Female | Right posterolateral bladder wall | 4.0 × 3.0 cm  | Open transvesical enucleation                 | Painless haematuria, dysuria, irritative symptoms | 11        |
| Haddad et al.   | 37         | Male  | Right bladder wall              | 5.5 × 4.3 cm  | TURBT                                        | Febrile, bacteria and white blood cells elevated in urinalysis | 5         |
| Kanno et al.    | 45         | Female | NA                              | ~4.0 cm       | Laparoscopic cystotomy                        | Hypermenorrhoea, dysmenorrhea, urinary frequency | 11        |
| Goktug et al.   | 27         | Male  | Bladder neck                    | 7.0 × 8.0 cm  | TUR                                          | Dysuria, urinary tract infections           | 12        |
| Almouhissen et al.| 64        | Male  | NA                              | 15.5 × 14.0 cm | Right radical nephrectomy and pelvic mass excision | Renal oncocytoma, dysuria                    | 13        |
| Kansal et al.   | 49         | Female | Bladder neck                    | 3.0 × 3.0 cm  | Vaginal excision                              | No                                         | 14        |
| Xin et al.      | 44         | Female | Trigone of urinary bladder      | 6.6 × 5.8 cm  | Open surgical excision                        | Dyspareunia                                 | 15        |

(continued)
| Author       | Age, years | Sex  | Tumour location                  | Tumour size | Treatment                          | Related antecedent diseases                  | Reference |
|-------------|------------|------|----------------------------------|-------------|------------------------------------|---------------------------------------------|-----------|
| Agrawal et al. | 45        | Female  | Bladder neck                      | ~1.4 cm   | Resected by standard resectoscope | Painful acute retention of urine             | 6          |
| Wu          | 49        | Male  | Bladder neck                      | 5.0 × 4.6 cm | TUR                               | Haematuria, dysuria, and pollakiuria         | 16        |
| Kalathia et al. | 55        | Female  | Posterior bladder wall            | 6.7 × 5.1 cm | TUR                               | Right lower quadrant abdominal pain          | 17        |
| Musayev et al. | 55       | Male  | Right anterolateral bladder wall | 3.0 × 2.5 cm | Open partial cystectomy            | No                                          | 18        |
| Gok et al.  | 46        | Female  | Near bladder neck                 | 9.0 × 6.0 cm | TURBT                             | Obstructive and irritative urinary complaints | 4         |
| Yin et al.  | 22        | Female  | Left posterior bladder wall        | 3.2 × 2.5 cm | Transvaginally resected           | Lower left abdominal pain for 2 months       | 19        |
| Itam et al. | 56        | Male  | NA                               | NA          | Laparoscopic cystotomy            | Acute urinary retention and haematuria       | 20        |

Transurethral resection, TUR; transurethral resection of bladder tumour, TURBT; lower urinary tract symptoms, LUTs; NA, not available.
To review the epidemiology, preventive measures, and therapy of bladder leiomyoma, we collected the latest (most recent 5 years) related literature from 2012 to 2017. We searched PubMed, Embase, and Google Scholar with the following search terms: bladder (all fields) or bladder (mesh term), and leiomyoma (all fields) or leiomyoma (mesh term). After careful filtration of duplicates and non-related results, data from 21 patients in 20 reports were collected and analysed (Table 1).

In our literature search, bladder leiomyoma showed obvious sex and age differences (Table 2). The incidence of bladder leiomyoma in women was twice as high as that in men. Additionally, middle-aged patients of approximately 50 years old showed the greatest adverse symptoms among all age groups.

Detection of bladder leiomyoma is mainly divided into two types of symptomatic and asymptomatic. Symptomatic bladder leiomyoma results in lower urinary tract symptoms (LUTs), haematuria, and pyuria. Other individual and specific symptoms, such as abdominal or back pain and urinary retention, mainly depend on the size and position of the leiomyoma. Additionally, bladder leiomyoma can result in special symptoms, such as radiating pain of the left leg or bacterial infection.

Generally, larger leiomyomas have more symptoms. However, as Agrawal et al. described, bladder leiomyoma smaller than 1.4 cm in diameter can cause pain and urinary retention. This phenomenon is mainly attributed to the location of the leiomyoma. A leiomyoma that is located in the bladder neck may cause more severe symptoms compared with a leiomyoma that is located in the bladder wall.

Differential diagnosis of bladder leiomyoma with other diseases is especially important. Traditional detection methods of bladder leiomyoma include ultrasound, CT, and magnetic resonance imaging. The detection methods that are applied for bladder leiomyoma are the same as those for other types of leiomyoma. Ultrasound can primarily show a homogenous mass. Abdominal CT demonstrates the location of leiomyoma in the bladder lumen, and enhanced CT can further show the variable degrees of the tumour. Magnetic resonance imaging is better than CT for detecting the origin and distinguishing the boundary of the tumour. However, although imaging detection can provide diagnostic evidence for bladder leiomyoma, the most effective diagnosis is based on immunohistochemistry and haematoxylin and eosin staining results.

At present, the most common treatments for bladder leiomyoma are transurethral resection and open surgical excision. Furthermore, other feasible minimally invasive surgeries, such as laparoscopic cystotomy and robotic extramucosal excision, are suitable for patients with bladder leiomyoma. In some special cases, specific operations were developed, such as vaginal resection for bladder leiomyoma. With regard to

| Table 2. Characteristics of reports on bladder leiomyoma from 2012 to 2017. |
|-----------------|---------|
| **Results**     |         |
| Mean age, years | 48      |
| Sex, n (%)      |         |
| Men: 7 (35%)    |         |
| Women: 13 (65%) |         |
| Size            |         |
| 1.4 to 15.5 × 14.0 cm |      |
| Treatment, n (%)|         |
| TUR or TURBT (including a standard resectoscope): 9 (45%) | |
| Open surgical excision: 5 (25%) | |
| Laparoscopic cystotomy: 3 (15%) | |
| Vaginal resection: 2 (10%) | |
| Robotic extramucosal excision: 1 (5%) | |
| Outcome         | All of the patients achieved clinical recovery |

Transurethral resection, TUR; transurethral resection of bladder tumour, TURBT.
patients with symptomatic bladder leiomyoma, minimally invasive surgeries, transurethral resection, or open cystotomy can result in a satisfying outcome with almost non-recurrence. In our case, the patient experienced frequent and painful urination. Therefore, open partial cystectomy was suitable and achieved a great outcome.

In the future, development of surgical techniques should lead to more methods to identify bladder leiomyoma, and to more advanced choices for treating bladder leiomyoma. Feasible, safe, and minimally invasive treatment with an excellent prognosis could gradually become the main trend in bladder leiomyoma treatment.

Conclusion
In summary, we present a rare case of symptomatic bladder leiomyoma and reviewed the latest literature of cases of bladder leiomyoma. We compared treatment strategies for bladder leiomyoma. Our results could be meaningful and beneficial for future clinical treatment of patients with bladder leiomyoma.

Declaration of conflicting interest
The authors declare that there is no conflict of interest.

Funding
This work was funded by the Graduate Innovation Fund of Jilin University (2017030) and by the Natural Science Foundation of China (No. 51773083).

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