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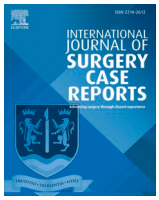

Case report

Combination of laparoscopy and open technique in management of large extravesical urinary bladder leiomyoma; a case report

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ABSTRACT

Introduction and importance: Leiomyoma is a rare benign bladder tumor, classified into intravesical, intramural and extravesical types according to the location. Because of the difficulty of accurate preoperative diagnosis, resection is performed in the majority of the cases.

Case presentation: A 37-year-old Japanese man presented to the hospital with a chief complaint of abdominal swelling. Abdominal computed tomography (CT) revealed a large solid mass (20 cm in size) from the abdominal wall to bladder. The tumor was successfully removed by a combination of laparoscopic and open surgery. The histological diagnosis was compatible with leiomyoma, and the patient remained free from recurrence at 3 years after surgery.

Clinical discussion: The possibility of urachal carcinoma could not be ruled out preoperatively because of the location and internal heterogeneous findings by contrast CT. Although imaging is useful in the diagnosis of leiomyoma, the need for histological examination for a conclusive diagnosis has been noted. Therefore, surgical intervention is reported as a major treatment option. In the present case, laparoscopic approach was performed in accordance with partial cystectomy. The procedure was useful for observation of the positional relationship between the tumor and adjacent intestinal organs, and antegrade resection was performed without incident.

Conclusion: Laparoscopic approach may be a useful and safe procedure for the resection of extravesical bladder leiomyoma.

1. Introduction

In the urinary tract, leiomyoma commonly occurs in urinary bladder, ureter and urethra [1]. The tumor has been reported to occur predominantly in females, and with a wide age range (however, mainly in middle-aged adults) [2]. Bladder leiomyoma is a rare bladder tumor accounting for 0.43 % of all bladder tumors; however, the tumor is the most common benign mesenchymal tumor of the bladder [2].

Surgical resection has been performed for leiomyoma of the bladder in the majority of the cases. Small intravesical leiomyoma can be removed by transurethral resection (TUR); however, partial cystectomy is performed for larger tumors in laparoscopic or open surgery [4–8]. Here, we report a case of giant extravesical leiomyoma in a middle-aged male. The tumor was successfully removed by a combination of laparoscopic and open surgery.

2. Case presentation

A 37-year-old Japanese man presented to his family doctor with a chief complaint of abdominal swelling to the umbilical region without gastrointestinal and urinary symptoms. He had no past medical history or comorbidity, including medication, surgery or trauma. He also reported no history of history, and there was no family history of urogenital malignancies, including similar tumor with current case. Physical examination suggested large elastic mass at the lower abdominal portion without tenderness. Abdominal computed tomography (CT) revealed a large solid mass in the internal layer of the rectus abdominis measuring 20 cm in size. The mass was contiguous from the dorsal umbilicus to the bladder. No apparent lymph nodes swelling were observed. The mass was diffusely enhanced on contrast CT, suggesting high vascularity (Fig. 1A-C). Magnetic resonance imaging (MRI) showed heterogeneous signal intensity (mainly low; however, high intensity was

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shown in part) on T2 weighted image (T2WI, Fig. 1D). Leiomyomatous tumor was suspected; however, urachal carcinoma could not be ruled out because it was contiguous with the umbilicus. Cystoscopy showed neither mucosal abnormality nor elevation of bladder wall. Laboratory examination results were within normal limits (serum creatinine showed 0.86 mg/dL, the normal range is 0.65–1.07 mg/dL), and urine cytology was negative. The patient was then referred to our urology department for surgical intervention. As a preoperative diagnosis, urachal carcinoma was considered due to contiguous appearance to umbilicus as well as observation of internal heterogeneous findings in part of the tumor by imaging. However, no apparent origin of the tumor was observed and the giant tumor was extensively contacted with intestinal organs, suggesting adhesion or only a very narrow space between the tumor and intestinal tract. Laparoscopy was chosen as an initial approach because the procedure is suitable for observation in narrow spaces and is minimally invasive. The plan was for laparoscopic surgery to be initiated to remove the tumor from cranial side, and then, open conversion was to follow for partial cystectomy.

During the surgery, intermittent pneumatic compression was initiated to prevent venous thromboembolism on postoperative day 1. The patient was placed in the supine position. A camera port was placed 4 cm cranial to the umbilicus with ordinary procedure followed for open laparotomy. As shown in Fig. 2A, the tumor was located in the extraperitoneal layer, and no apparent adhesion with intraabdominal organs was observed. We then placed two additional ports (both measuring 5 mm, on left side because the operator was located to the left side of the patient). We incised the surrounded peritoneum, and resected the median umbilical cord at 1 cm below the umbilicus (there was no appearance of invasion). The tumor was removed from abdominal wall (rectus abdominis, Fig. 2B) without incident, and we reached to the anterior Retzius space. Next, open surgery was initiated with lower abdominal incision. The bladder was filled with normal saline, and the surgical margin was confirmed by ultrasound. Since the tumor was firmly and extensively adhered to the bladder at the dome to the anterior wall, the tumor was removed en-bloc with bladder wall (partial cystectomy). The total tumor weight was 1600 g, operation time was 287 min and blood loss (including urine) was 1350 ml. The tumor measured 21 × 17 cm in size and appeared well circumscribed (Fig. 2C). Cutting surface showed a white to gray-colored heterogeneous appearance (Fig. 2D). No apparent necrosis or hemorrhage was observed. Histologically, spindle-shaped tumor cells with elongated nuclei proliferated in fascicular fashion (Fig. 2E). Immunohistochemically, the tumor cells were positive for smooth muscle actin and desmin (Fig. 2F); however, they were negative for S100. MIB-1 labeling index was 1.2 %. These findings were compatible with leiomyoma. The patient recovered without perioperative complications and was subsequently discharged with a urinary catheter on postoperative day 7. One month postoperatively, the catheter was removed after cystogram to rule out leakage. Although his bladder capacity was about 70 ml at this period, the capacity increased more than 200 ml at three months postoperatively. The patient remained free from recurrence at 3 years after surgery. The report has been reported in line with the SCARE criteria

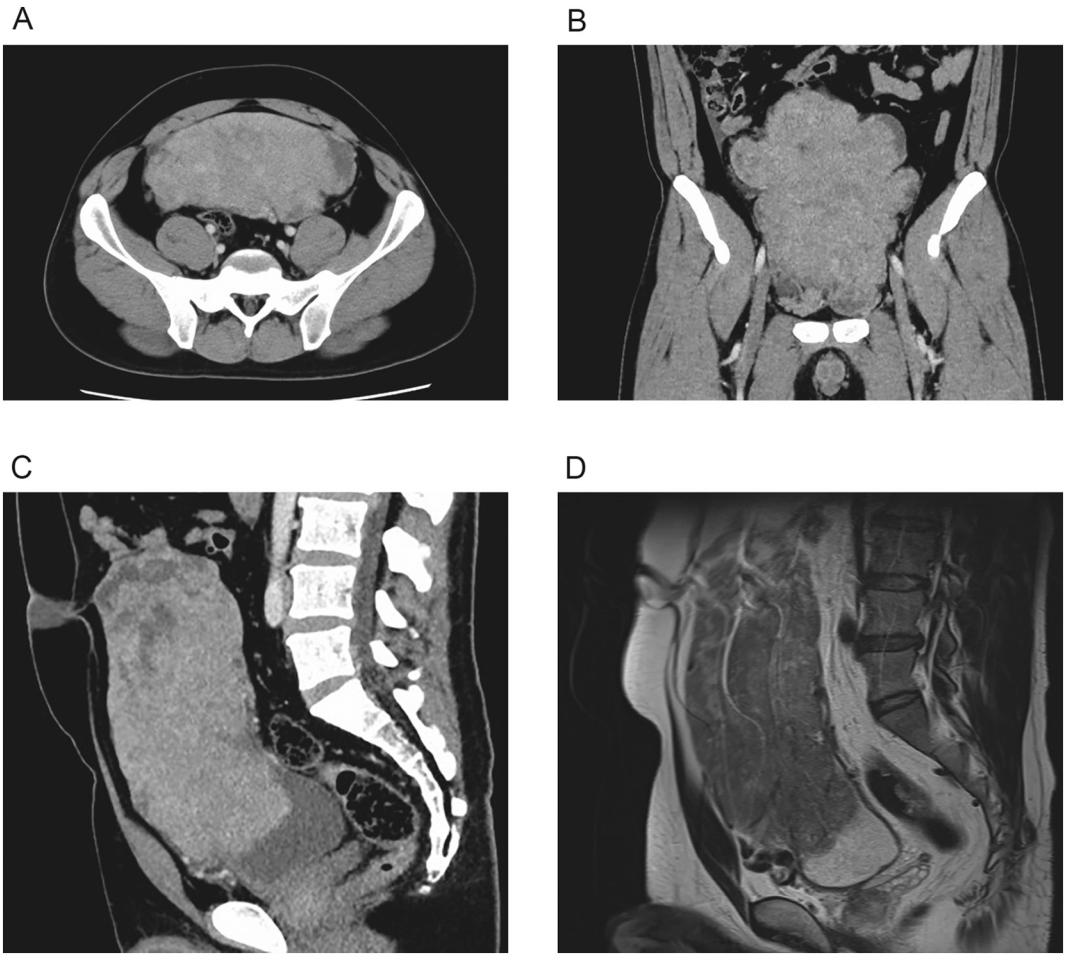

Fig. 1. Appearance of radiological examination (CT and MRI).
Contrast CT revealed large solid tumor 21 × 17 × 8 cm in size, at internal layer of rectus abdominis (A: axal, B: coronal, C: sagittal). The tumor is lobulated on the cranial side and enhanced heterogeneously. The tumor border with urinary bladder is unclear (C). No apparent lymph node swelling is observed. MRI (T2WI) revealed low-intensity heterogeneous mass continuing to the umbilicus (D).

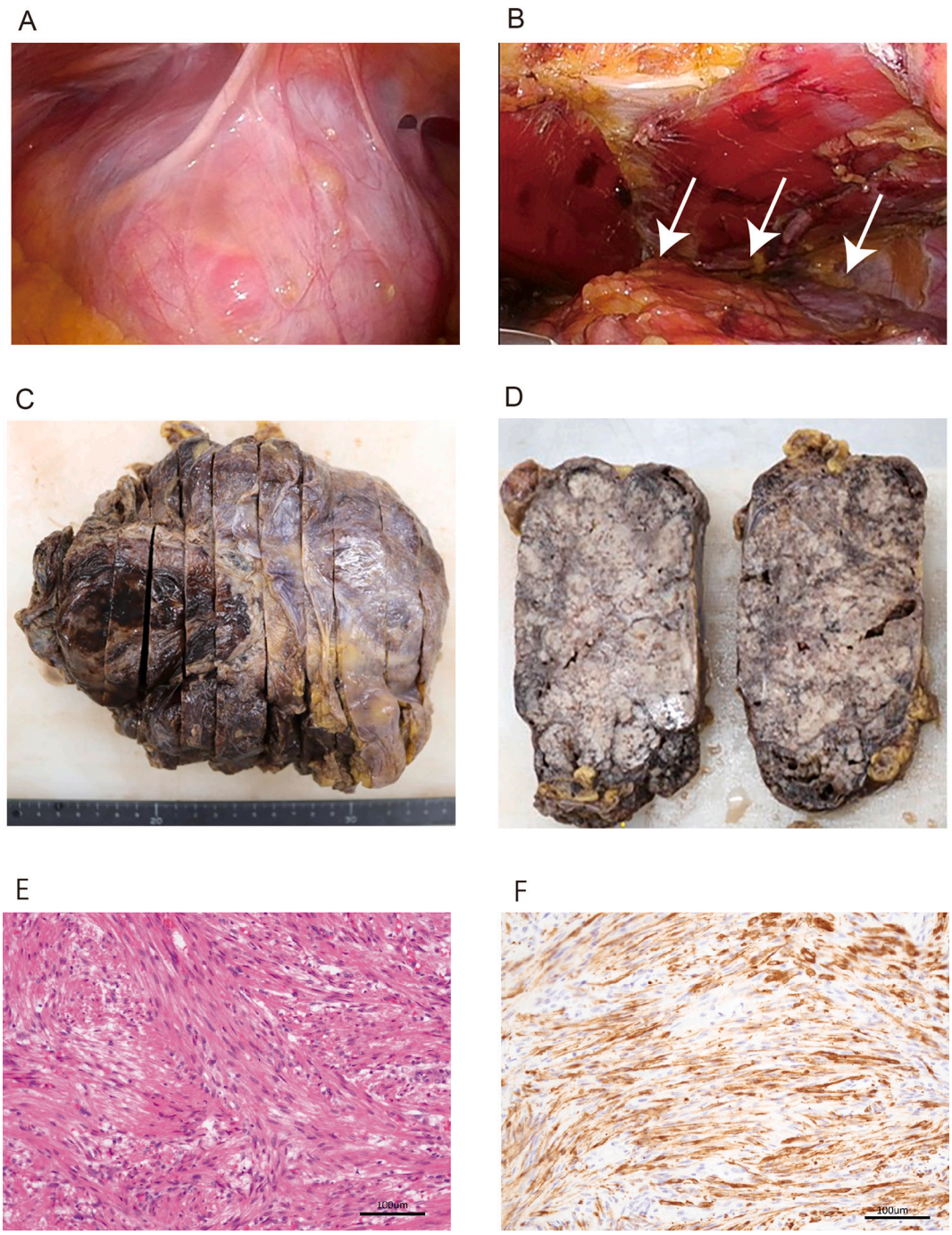

Fig. 2. Intraoperative findings and pathological appearances.
The tumor is located extraperitoneal layer, and no apparent adhesion with intraabdominal organs is observed (A). The tumor was removed without incident from abdominal wall by antegrade approach (B, tumor: arrows). Macroscopic appearance is shown (C-D). The tumor measures 21 × 17 cm in size and is well circumscribed. Cutting surface shows a white to gray-colored heterogeneous appearance. No apparent necrosis and hemorrhage are observed. Histologically, spindle-shaped tumor cells with elongated nuclei proliferate in fascicular fashion (E). Immunohistochemically, the tumor cells are positive for desmin (F).

[11].

3. Discussion

Leiomyoma of the bladder is classified into three types depending on the growth pattern and the location as follows; intravesical type, intramural type, and extravesical type [2]. Clinical symptoms differ depending on the type and size [2–4]. Intravesical leiomyoma and larger (greater than 3 cm in the largest diameter) can cause urinary symptoms that include outlet obstruction, hematuria and irritative voiding symptom. Intramural and extravesical leiomyoma are usually asymptomatic; however, symptomatic abdominal mass or bladder symptom caused by tumor compression may occur in larger tumors [2,3]. The present case was typically extravesical, and the chief complaint was abdominal elevation without apparent urinary symptoms.

As preoperative diagnosis, the possibility of urachal carcinoma could not be ruled out, because of contiguous appearance to umbilicus, and internal heterogeneous findings were observed in part of the tumor by CT and MRI. However, the tumor was well circumscribed and no apparent invasive appearance was observed intraoperatively. Therefore,

we adjusted to preserve the umbilicus. The result of histological findings was compatible with ordinary leiomyoma, and there was no necrosis or hemorrhagic changes. Although imaging, including MRI, is useful for clinical diagnosis, the need for histological examination for conclusive diagnosis of leiomyoma and exclusion of malignancy had been noted [2,3].

In majority of the cases, surgical resection is reported as the treatment for leiomyoma of the bladder. Small intravesical leiomyoma can be removed by TUR; however, partial cystectomy is performed for larger tumors [4–8]. In addition, total cystectomy and ileal conduit for giant leiomyoma or regrowth after TUR have also been reported [5,9]. Since the tumor in the present case was located at extravesical side of the bladder dome and expanded to umbilicus (initially diagnosed as urachal tumor), we planned the surgical procedure in accordance with laparoscopic partial cystectomy for large urachal tumor. As a result, laparoscopic approach was useful in observing the location of tumor and intestinal tract (there was no adhesion), and antegrade resection of the tumor from abdominal wall was performed without incident. However, because the tumor was too large and extensively adhered to the bladder, open conversion was necessary. Recently, surgery for urachal carcinoma has changed from an open to a laparoscopic procedure, and robot-associated laparoscopic surgery seems to have become standard [10]. Although minimal abdominal incision may be necessary to remove the large tumor, it may be possible to perform the entire surgical procedure under robot-associated laparoscopic approach. Which type of surgical approach (open or laparoscopic) is appropriate for such large tumors is controversial. Based on our results, combined surgery of laparoscopic and open surgery is an option for such giant tumor with unknown origin.

4. Conclusion

We experienced a case of extravesical giant leiomyoma. As the possibility of urachal tumor was not excluded completely, laparoscopic resection and planned open partial cystectomy were performed. Laparoscopic approach was useful in observing the positional relationship between the giant tumor and adjacent intestinal organs. And antegrade resection could be performed without incident. The procedure may be useful for the resection of large extravesical bladder leiomyoma. However, further study including a greater number of cases will be necessary to arrive at a conclusive indication.

Abbreviations

CT	computed tomography
MRI	magnetic resonance imaging
T2WI	T2 waited image
TUR	transurethral resection

Consent

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

Ethical approval

Ethical approval for this case report (approval number: C-0171) was provided by the Ethical Committee of Miyazaki University, Miyazaki, Japan on 7 May 2024.

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Author contribution

KI drafted the manuscript, performed the surgery, observation and approved the final version of the manuscript.

HT performed examinations, cared for the patient, and approved the final version of the manuscript.

YS reviewed the pathological specimens, and approved the final version of the manuscript.

SM, AS and TK drafted the report and contributed the final version of the manuscript. All authors read and approved the final manuscript.

Guarantor

Toshiyuki Kamoto.

Research registration number

Not applicable (this case report is not registered for research studies).

Conflict of interest statement

The authors declare that there is no conflict of interest.

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