


## Case Report

# Laparoscopic-assisted surgery for liposarcoma of the spermatic cord extending to the retroperitoneal cavity through the internal inguinal ring

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### Abbreviations & Acronyms

CT = computed tomography  
LSC = liposarcoma of the spermatic cord  
MRI = magnetic resonance imaging  
SCT = spermatic cord tumor

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**Introduction:** Liposarcoma of the spermatic cord is a rare disease, reportedly treated with radical high orchiectomy. However, laparoscopic-assisted surgery for spermatic cord liposarcoma extending to the retroperitoneal cavity through the internal inguinal ring has not yet been reported.

**Case presentation:** A 78-year-old man had a spermatic cord tumor that extended to the retroperitoneal cavity through the internal inguinal ring and invaded the abdominal wall muscles. We performed laparoscopic-assisted surgery and successfully separated the tumor from the contiguous organs and vessels. The tumor was resected en bloc with abdominal wall muscles, and a muscular defect was repaired with a left tensor fascia lata muscle flap. Pathological analysis revealed a well-differentiated liposarcoma with negative surgical margins. There was no recurrence at 1 year post-surgery.

**Conclusion:** Laparoscopic-assisted surgery is a feasible and minimally invasive procedure for treating liposarcoma of the spermatic cord extending to the retroperitoneal cavity through the internal inguinal ring.

**Key words:** inguinal hernia, laparoscopy, liposarcoma, sarcoma, spermatic cord.

## Keynote message

LSC is a rare disease. Complete surgical resection including contiguous organs and connective tissue is considered necessary for curative treatment. If a tumor extends to the retroperitoneal cavity through the internal inguinal ring, laparoscopic-assisted surgery is a feasible and minimally invasive procedure.

## Introduction

Liposarcoma is a rare soft tissue malignant neoplasm derived from fat cells anywhere in the body. Because of the high risk of local recurrence after resection, contiguous organs and connective tissues are included in the resection to obtain a tumor-free margin for retroperitoneal liposarcomas.<sup>1</sup> LSC usually occurs in adults between 50 and 60 years of age, who present with a chief complaint of a painless inguinal or scrotal mass, and is often mistaken for an inguinal hernia or testicular hydrocele;<sup>2,3</sup> therefore, the diagnosis can be difficult. Radical high orchiectomy with wide excision of surrounding connective tissue is currently recommended for LSC.<sup>4</sup> However, there have been limited reports of surgery for LSC extending to the retroperitoneal cavity through the internal inguinal ring.

Herein, we present the case of a 78-year-old man who underwent successful laparoscopic-assisted surgery for left LSC extending to the retroperitoneal cavity through the internal inguinal ring and invading the abdominal wall muscles.

## Case presentation

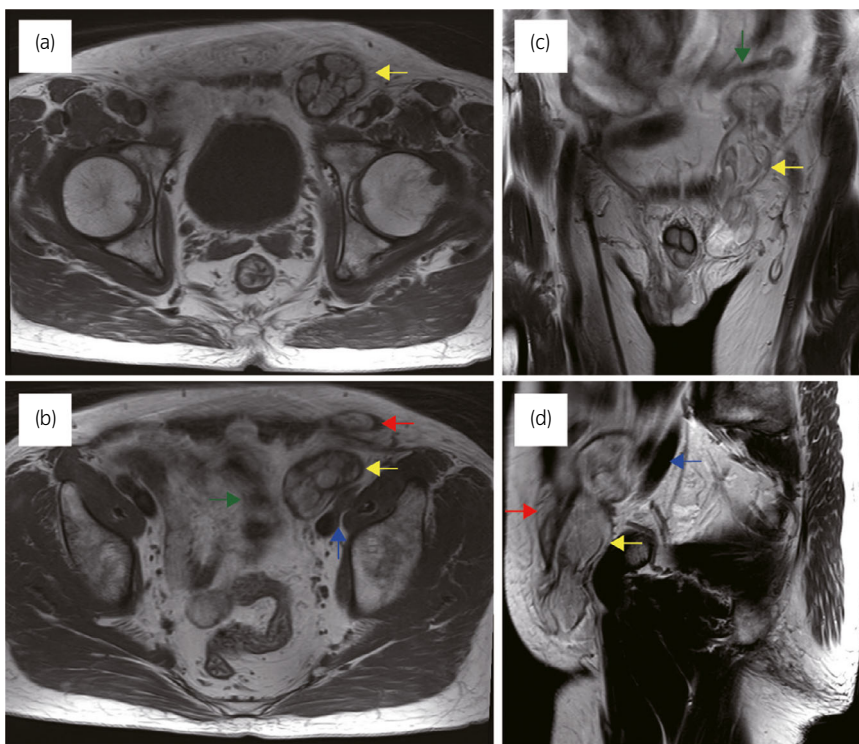
A 78-year-old man, who underwent left orchiectomy due to severe epididymitis approximately 40 years ago, noticed painless swelling of the left inguinal region and underwent a physical

examination in the general surgery department. He was diagnosed with a left inguinal hernia and was followed up. The left inguinal enlargement continued to increase after 10 months. CT scans showed a large fat-density mass, that was not the intestine or omentum, in the left inguinal canal. A left SCT was suspected based on MRI findings, and the patient was referred to our department. MRI revealed a  $13.9 \times 4.5 \times 3.6$  cm tumor in the left inguinal canal, extending to the retroperitoneal space through the internal inguinal ring. The tumor touched the sigmoid colon and iliac vessels, and obviously invaded the abdominal wall muscles (Fig. 1). Blood and urine test results were normal, and positron emission tomography-CT showed no abnormal lymph nodes or distant metastasis. We suspected a left malignant SCT and performed surgery.

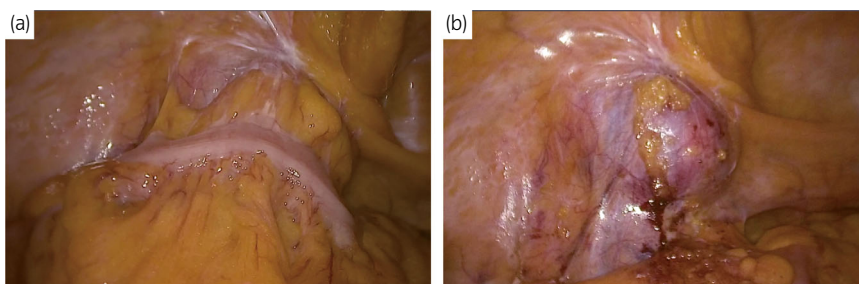
Under general anesthesia, we used a 4-port transperitoneal approach with the patient in the supine open-leg position. The first trocar (12 mm) was placed 1 cm above the umbilicus with an open technique. After establishing the pneumoperitoneum, a  $0^\circ$  laparoscope was inserted through the

first port, and the remaining three ports were placed 2 cm medial to the left anterior superior iliac spine (12 mm), 2 cm medial to the right anterior superior iliac spine (5 mm), and at the midpoint between the suprapubic rim and umbilicus (5 mm). The lateral peritoneal reflection of the mesosigmoid over the left SCT was incised; however, parietal peritoneum invasion was not observed (Fig. 2). The parietal peritoneum around the tumor was incised, and the left gonadal artery and vein, left umbilical ligament and left vas deferens were cut. There was no tumor invasion into the left common iliac artery and vein, left external iliac artery and vein, left inferior epigastric artery and vein, left ureter, or urinary bladder; therefore, all these structures were preserved (Fig. 3).

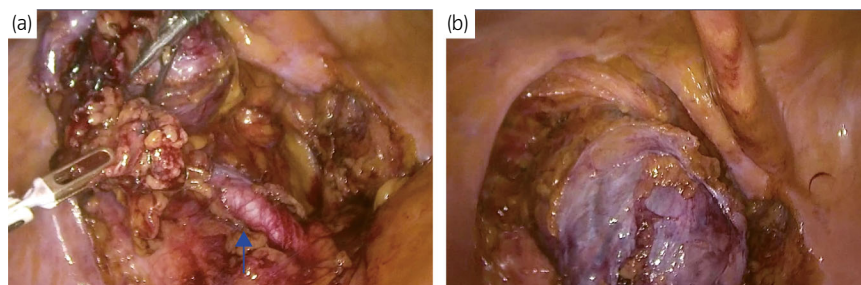
Subsequently, we incised the skin over the SCT, and the tumor was resected en bloc with the inguinal canal and contiguous abdominal wall muscles including the rectus abdominis, external and internal oblique muscles, and transversus abdominis muscle. Plastic surgeons reconstructed the  $13 \times 6$  cm abdominal wall muscle defect with a left tensor fascia lata muscle flap (Fig. 4). The operation time was 5 h



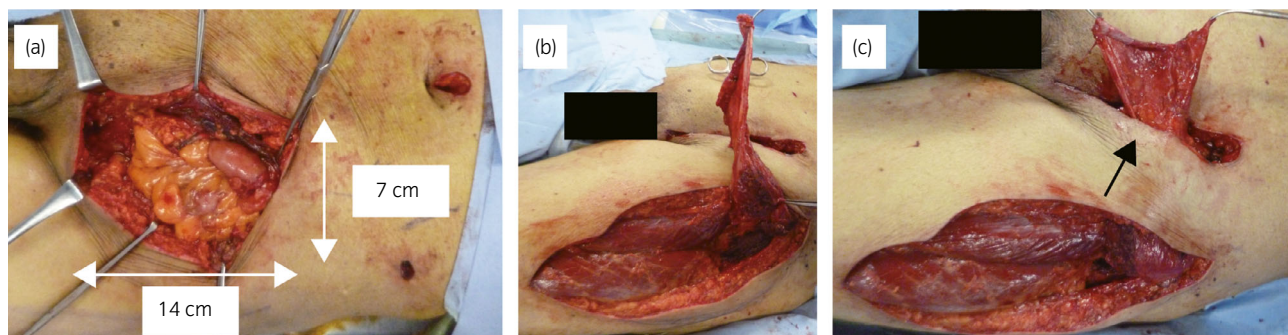
**Fig. 1** MRI scans (a, b: axial view, c: coronal view, d: sagittal view) show a large fat-density tumor (yellow arrows) in the left inguinal canal extending to the retroperitoneal cavity and invading abdominal muscles (red arrows). The tumor touched the sigmoid colon (green arrows) and external iliac vessels (blue arrows).



**Fig. 2** Intraoperative laparoscopic view of (a) the SCT covered by the sigmoid colon, and (b) after the mesosigmoid was incised.



**Fig. 3** Intraoperative laparoscopic view of (a) the external iliac vessels (blue arrow) which were separated from the SCT. (b) There was no apparent tumor invasion other than the abdominal wall muscles.



**Fig. 4** Intraoperative view of the reconstruction of (a) the abdominal muscle defect (b) with a left tensor fascia lata muscle flap. (c) The muscle flap was passed under the subcutaneous tissue from the left thigh.

and 46 min, and estimated blood loss was 130 mL. There were no perioperative or postoperative complications. Pathological analysis revealed a well-differentiated liposarcoma with invasion to the abdominal wall muscles, but the surgical margins were negative. He was followed up without being administered any adjuvant therapies, and a CT scan showed no recurrence or metastasis at 1 year post-surgery.

## Discussion

LSC is a rare soft tissue malignant neoplasm derived from fat cells in the spermatic cord. Recently, 327 cases of LSC have been reported.<sup>5</sup> Liposarcoma (46%) is the most common histologic type of malignant SCT, followed by leiomyosarcoma (20%), histiocytoma (13%), and rhabdomyosarcoma (9%).<sup>6</sup> Liposarcoma is classified into subtypes of atypical lipomatous tumor/well-differentiated liposarcoma, dedifferentiated liposarcoma, myxoid liposarcoma, pleomorphic liposarcoma, and mixed-type liposarcoma, according to the World Health Organization classification.<sup>7</sup> Our case involved a well-differentiated liposarcoma, which is considered a low-grade subtype, but is sometimes locally invasive and may recur.<sup>8</sup> The antitumor effects of chemotherapy and radiotherapy for liposarcomas are limited, and hence, complete surgical resection is necessary for curative treatment. Therefore, not only tumor resection but also a radical high orchiectomy with wide margins that include the surrounding connective tissue is recommended for the treatment of LSC.<sup>4</sup>

In our case, the tumor was extending to the retroperitoneal cavity through the internal inguinal ring. Usually, LSC extends toward the scrotal side because of skin

extensibility and tumor gravity. However, if the patient has a potential for an inguinal hernia, it is possible for the LSC to extend through the hernia. Moreover, the patient in our case underwent a left orchidectomy approximately 40 years ago, and we speculated that this pulled the spermatic cord to the proximal side, causing the tumor to easily extend to the retroperitoneal cavity through the internal inguinal ring. As a result, resection of contiguous organs and vessels such as the sigmoid colon and the external iliac artery and vein was also considered. By using a laparoscope, we were able to observe the border of the tumor and normal connective tissue more clearly from the intraperitoneal side. As a result, we could successfully preserve the contiguous organs and vessels and obtain a tumor-free margin with a minimally invasive approach. Furthermore, if the tumor invades the surrounding muscles necessitating a wide resection, abdominal wall defects can be closed with a left tensor fascia lata muscle flap;<sup>9</sup> in this case, it is important to plan the resection area and consult plastic surgeons before surgery.

To our knowledge, this is the first case report of laparoscopic-assisted surgery for LSC extending to the retroperitoneal cavity through the internal inguinal ring. Although further studies with more patients and a longer follow-up period are required, this case indicates that laparoscopic-assisted surgery is a feasible and minimally invasive procedure for this condition.

## Conflict of interest

The authors declare no conflict of interest.

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## Editorial Comment

### Editorial Comment to Laparoscopic-assisted surgery for liposarcoma of the spermatic cord extending to the retroperitoneal cavity through the internal inguinal ring

I read the case report by Ochi *et al.* with great interest.<sup>1</sup> The authors presented a 78-year-old man with a spermatic cord tumor that extended to the retroperitoneal cavity through the internal inguinal ring. They performed laparoscopic-assisted surgery and separated the tumor from contiguous organs and vessels. Pathological findings showed a well-differentiated liposarcoma with negative surgical margins and the patient had no recurrence after the first year of surgery. This is the first report of laparoscopic-assisted surgery for giant liposarcoma of the spermatic cord.

A complete resection with a negative microscopic margin is crucial for treating liposarcoma and there is no standard treatment such as radiotherapy or chemotherapy other than surgery.<sup>2</sup> However, liposarcoma in the spermatic cord is infrequent and the method of surgery is not established due to the fact that excessive extended excision requires resection of major blood vessels and organs around the spermatic cord, leading to deterioration of patients' quality of life.<sup>3</sup> Especially in cases of giant spermatic cord tumors, pararectal incision would be required on top of inguinal incision, which would result in higher surgical stress for patients. From this point, laparoscopic-assisted surgery is considered to be a safe and minimally invasive option for treating tumors in external iliac vessels, the bladder and the corpus spongiosum of penis from tumor.

As the authors mention, long follow-up periods and case accumulation are required to check for recurrence. I am personally interested in whether or not the rate of peritoneal recurrence would increase due to the peritoneum opening during laparoscopic-assisted surgery which is conducted by the intraperitoneal

approach. Peritoneal metastasis is a recurrence that is difficult to treat.<sup>4,5</sup> To avoid peritoneal recurrence, laparoscopic-assisted surgery conducted by the retroperitoneal approach, such as totally extraperitoneal repair procedure for inguinal hernia, might be one that should be considered.

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## Conflict of interest

The author declares no conflict of interest.

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