


## Case Report

# Laparoscopic management for a psoas abscess caused by migrated urolithiasis

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### Abbreviations & Acronyms

TB = tuberculosis

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**Introduction:** To describe laparoscopic surgery for psoas abscess caused by migrated urolithiasis.

**Case presentation:** A 64-year-old female had renal stones in the right kidney for 5 years. She developed right back pain. Her body temperature was 37.4°C, and right costovertebral angle tenderness was detected. In blood examination, her C-reactive protein level was elevated. Computed tomography revealed that one stone had migrated into the right psoas muscle and caused psoas abscess. Another stone was detected in the renal parenchyma. Percutaneous drainage and antibiotic treatment were performed until her symptoms and inflammation improved. However, psoas abscess recurred after removal of the drainage tube. The migrated stone was laparoscopically removed after fenestration of psoas abscess, and laparoscopic nephrolithotomy was simultaneously performed for the other stone.

**Conclusion:** To the best of our knowledge, this is the first case report of psoas abscess caused by migrated urolithiasis that was managed by minimally invasive surgery.

**Key words:** drainage, laparoscopy, migrated urolithiasis, nephrolithotomy, psoas abscess.

## Keynote message

Psoas abscesses are generally caused by hematogenous or lymphatic seeding from a distant site or by the direct spread of infection to the psoas muscle from an adjacent structure. We laparoscopically managed a psoas abscess caused by migrated urolithiasis into the psoas muscle. To the best of our knowledge, this is the first case report of its treatment by minimally invasive surgery.

## Introduction

A psoas abscess is a collection of pus in the psoas muscle compartment.<sup>1</sup> It was initially reported by Mynter in 1881 as “psositis” and remains a rarely reported condition. It may be caused by hematogenous or lymphatic seeding from a distant site (primary psoas abscess) or by the direct spread of infection to the psoas muscle from an adjacent structure (secondary psoas abscess). We herein present a case of a psoas abscess caused by migrated urolithiasis.

## Case presentation

A 64-year-old female had renal stones of 3.3 and 2.2 cm in diameter in her right kidney for 5 years (Fig. 1a). She developed right back and hip pain, which persisted for 1 month. Her body temperature was 37.4°C, and right costovertebral angle tenderness was detected. In examining her blood sample, white blood count and C-reactive protein level were elevated to 8260/μL and 8.33 mg/dL, respectively. In an abdominal X-ray, one stone appeared to have descended into the ureter (Fig. 1b); however, computed tomography revealed that it had actually migrated into the right psoas muscle and caused a psoas abscess (Fig. 1c) and perirenal

abscess (Fig. 1d). The other stone was located into the renal parenchyma of the upper pole, and was slightly protruding outward from the capsule of the kidney (Fig. 1d).

A drainage tube was percutaneously inserted into the psoas abscess, 50 mL pus was discharged immediately, and cefotiam (2 g per day) was empirically administered. After *Enterobacter aerogenes* was identified as the pathogen, cefotiam was continued based on the results of a drug susceptibility test. The amount of pus being discharged gradually decreased, and the perirenal and psoas abscesses both disappeared on computed tomography 11 days after the insertion of drainage tube. Since her symptoms had completely resolved and inflammatory markers in the blood examination were also within normal ranges, the drainage tube was removed.

However, the iliopsoas abscess recurred 1 week after the removal of drainage tube. Her body temperature was 37.5°C, and her white blood cell count and C-reactive protein level in a blood examination were 8350/ $\mu$ L and 6.37 mg/dL, respectively. Therefore, we planned laparoscopic fenestration of the iliopsoas abscess, laparoscopic removal of the migrated stone, and laparoscopic nephrolithotomy for the other stone.

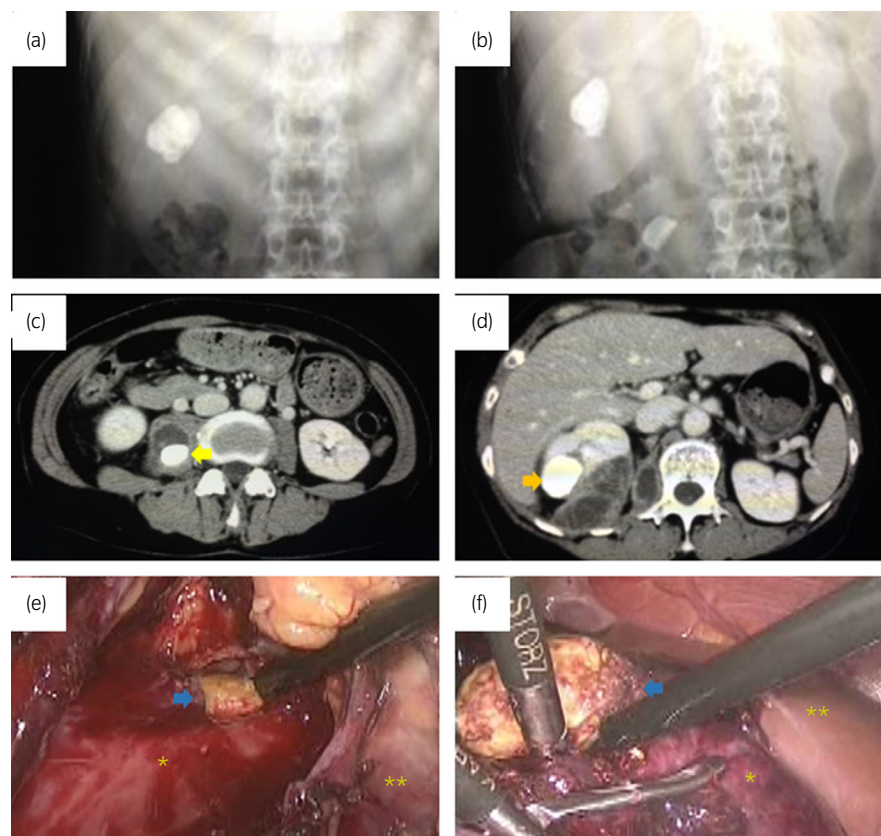
Under general anesthesia, the patient was placed in a lateral position, the retroperitoneum was dilated by a balloon dissector through a 2.5-cm skin incision between the tip of the 12th rib and anterior superior iliac spine, and ports were inserted as shown in Figure S1a. A laparoscopic electrode, vessel sealing device, 10-mm flexible laparoscope, and conventional laparoscopic instruments were used. However, since

severe adhesion was found between Gerota's fascia and the iliopsoas muscle (Video S1), we changed to transperitoneal approach. The port positions are shown in Figure S1b. No adhesions were detected intraperitoneally, and the ascending colon and duodenum were easily dissected from Gerota's fascia and retracted medially. After dissection between the inferior vena cava and right kidney, a psoas abscess was fenestrated using a laparoscopic electrode and vessel sealing device. The migrated stone was easily detected in the psoas muscle and removed (Fig. 1e and Video S2). Laparoscopic nephrolithotomy was then performed for the other stone located in the renal parenchyma. Gerota's fat was adequately removed at the upper pole, and the stone was then easily detected. After the stone was removed, and the renal parenchyma was sutured (Fig. 1f and Video S3). Cefotiam was administered during the perioperative period. After surgery, her temperature and inflammatory markers were within normal ranges. Her postoperative course was uneventful, and the psoas abscess has not recurred for 3 years. A component of the removed stones was calcium oxalate.

## Discussion

We described laparoscopic management for a primary psoas abscess caused by migrated urolithiasis. In the present case, the psoas and perirenal abscesses were confined to a relatively small area, and thus, minimally invasive surgery was highly effective.

Tabrizian *et al.* retrospectively reviewed 61 cases of psoas abscesses.<sup>2</sup> A gastrointestinal tract origin was the most



**Fig. 1** (a) Abdominal X-ray revealed two right renal stones at the level of the first lumbar vertebra. (b) One stone descended to the level of the third lumbar vertebra. (c) Computed tomography revealed a migrated stone in the right psoas muscle (yellow arrow) and fluid collection around the stone, which suggested an abscess. (d) The other stone was located in the renal parenchyma of the upper pole (orange arrow) and a perirenal abscess was found on the dorsal side of the kidney. (e) Intraoperative findings of the migrated stone (blue arrow) (\*: psoas muscle, \*\*: inferior vena cava). (f) Intraoperative findings of laparoscopic nephrolithotomy (blue arrow: stone, \*: kidney, \*\*: liver).

**Table 1** Reports of laparoscopic management for a psoas abscess

Author	Year	n	Primary or secondary	Cause of psoas abscess	Pathogen	Approach
Al Shehri <i>et al.</i> <sup>7</sup>	2017	1	Secondary	Appendicitis	<i>Staphylococcus epidermidis</i>	Transperitoneal
Zhang <i>et al.</i> <sup>4</sup>	2015	39	Secondary	Thoracolumbar TB	TB	Extraperitoneal
Otowa <i>et al.</i> <sup>8</sup>	2014	1	Secondary	Appendicitis	<i>Streptococcus</i> species <i>Escherichia coli</i> <i>Enterobacter cloacae</i> <i>Peptostreptococcus prevotii</i>	Transperitoneal
Kodama <i>et al.</i> <sup>5</sup>	2014	1	Secondary	Discitis	<i>Klebsiella pneumoniae</i>	Extraperitoneal
Bandyopadhyay <i>et al.</i> <sup>9</sup>	2011	1	Secondary	Crohn's disease	Undescribed	Transperitoneal
Choi <i>et al.</i> <sup>10</sup>	2010	1	Secondary	Appendicitis	<i>Pseudomonas aeruginosa</i> <i>Serratia marcescens</i>	Transperitoneal
Atkin <i>et al.</i> <sup>6</sup>	2005	1	Secondary	Discitis	TB	Extraperitoneal
Katara <i>et al.</i> <sup>3</sup>	2004	1	Primary	Unknown	<i>Staphylococcus aureus</i>	Extraperitoneal

frequent cause of psoas abscesses (inflammatory bowel disease in 14 cases, diverticulitis in two, appendicitis in one, and pancreatitis in one). Some cases occurred after surgery, including aortic surgery in three cases, spinal surgery in one, and kidney transplantation in one. Although TB is historically a common cause of psoas abscesses, a tuberculous abscess originating from the spine was only found in one case. Percutaneous drainage alone was successful in only 40% of cases. In the majority of cases with a gastrointestinal tract origin, percutaneous drainage was only a bridge to definitive therapy (open drainage).

Laparoscopic management for a psoas abscess is extremely rare. Forty-six cases of laparoscopic management for a psoas abscess have been reported (Table 1). Primary and secondary psoas abscesses were reported in one and 45 cases, respectively. A case of a primary psoas abscess was attributed to the spread of *Staphylococcus aureus*.<sup>3</sup> In secondary psoas abscesses, the spread of infection from vertebrae or vertebral discs was the most common cause.<sup>4–6</sup> The spread of infection from gastrointestinal diseases was identified as the secondary cause.<sup>7–10</sup> Laparoscopic management was performed by transperitoneal and extraperitoneal approaches in four and 42 cases, respectively.

A psoas abscess caused by migrated urolithiasis is extremely rare, with only two cases being reported,<sup>11,12</sup> and laparotomy was performed for drainage and removal of the stone in both cases. In the present case, psoas and perirenal abscesses were confined to a relatively small area, and thus, we selected minimally invasive surgery.

## Conclusion

In cases in which a psoas abscess is confined to a relatively small area, minimally invasive surgery may be one of the treatment options available. Approaches (transperitoneal or extraperitoneal) need to be selected based on several conditions, such as the location of the psoas abscess and severity of adhesion.

## Conflict of interest

The authors declare no conflict of interest.

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## Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

**Figure S1.** (a) Port positions in retroperitoneal approach. The camera port was inserted between the tip of the 12th rib and anterior superior iliac spine. Another two ports were inserted into the anterior and posterior axillary lines at the same levels. (b) Port positions of intraperitoneal approach. The camera port was inserted at the exterior edge of the abdominal rectus muscle at the level of the umbilicus. Two 12-mm ports were inserted at the exterior edge of the abdominal rectus muscle caudal of the arcus costalis and the midclavicular

line at the level of the umbilicus. A 5-mm assistant port was inserted at the anterior axillary line caudal of the arcus costalis for retraction from the liver and kidney.

**Video S1.** Intraoperative findings of severe adhesion between Gerota's fascia and the iliopsoas muscle via extraperitoneal approach.

**Video S2.** Intraoperative findings of the removal of migrated urolithiasis from the psoas muscle via intraperitoneal approach.

**Video S3.** Intraoperative findings of laparoscopic nephrolithotomy via intraperitoneal approach.