

Translational Research Urology

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Case Report

Partial Cystectomy in Sliding Inguinal Hernia with Bladder Gangrene: A Case Report

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HIGHLIGHTS

- Sliding inguinal hernia with bladder involvement is rare with incidence rate of less than 4% of all inguinal hernia cases and usually diagnosed intraoperatively.
- If there is necrosis or gangrene of the bladder caused by sliding inguinal hernia, partial or total cystectomy may be required based on how vast the area is affected.
- This is our first case report of a sliding inguinal hernia with bladder involvement causing bladder necrosis managed with partial cystectomy.

ARTICLE INFO

Receive Date: 03 January 2024

Accept Date: 06 February 2024

Available online: 18 February 2024

DOI: [10.22034/tru.2024.436576.1172](https://doi.org/10.22034/tru.2024.436576.1172)

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Introduction

A sliding hernia is a type of hernia in which the contents of one or more organs in a body cavity spread simultaneously with the hernia sac into another body cavity. The incidence of sliding hernia is estimated to be around 3-8% of all elective inguinal hernia surgeries. Until recently, sliding hernias were thought to be more anatomically challenging

ABSTRACT

Introduction

A sliding hernia is in which one or more organ contents in the body cavity spread simultaneously with the hernia sac into another body cavity. In some cases, sliding inguinal hernia may involve the bladder herniating along with the inguinal hernia sac, which is more commonly diagnosed intraoperatively. The incidence rate is less than 4% of all inguinal hernia cases.

Case presentation

We report a case of an 83-year-old man who presented with a painful lump on the crease of both thighs with lower urinary tract symptoms. In the middle of surgery, strangulation of the bladder was found together with extensive, poorly demarcated bladder tissue necrosis and few healthy surrounding tissues. Partial cystectomy was performed by excising the affected bladder, leaving the healthy bladder. Finally, the bladder was sutured with absorbable suture, and a 16 Fr Foley urinary catheter was placed through the urethra. Hernioplasty was continued until all of the layers were sutured completely.

Conclusions

Sliding inguinal hernia with bladder involvement is still challenging to date as it can only be recognized intraoperatively. If there is urinary tract organ involvement, especially in the bladder, management in urology needs to be carried out from the beginning.

Keywords: Sliding Inguinal Hernia; Bladder Hernia; Cystectomy; Hernioplasty; Case Report

for the surgeon than non-sliding inguinal hernias without complications. The concept of sliding inguinal hernia anatomically and physiologically is often misunderstood by less experienced surgeons. The main obstacle in the operative approach to this type of hernias is that during the opening of the pouch containing the retroperitoneal organs accidental injury to the surrounding vital organs may



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occur. In some cases, sliding inguinal hernia may involve the bladder herniating along with the inguinal hernia sac which is more commonly diagnosed intraoperatively with the incidence rate is less than 4% of all inguinal hernia cases (1-3). Based on that background, this article is to report a case report of an elderly male patient with a finding of hernia strangulation of the bladder leading to intraoperative gangrene due to sliding inguinal hernia.

Case presentation

An 83-year-old man was brought by his family to the hospital on 14th November 2023 with a chief complaint of a lump on the crease of both thighs since four days before admission. The lump was felt very painful with a pain scale of 7–8. In addition, there were additional complaints felt by the patient, such as nausea and vomiting after eating and drinking, decreased appetite, and difficulty defecating. The patient also complained of urination with frequent frequency. Previously, the patient had a history of heart bypass surgery in 2014 and had consumed acetylsalicylic acid 100 mg once daily and had been stopped about 2 weeks ago. The patient claimed to have been treated for urinary complaints by another doctor and was told to have benign prostate hyperplasia (BPH) and was given tamsulosin 0.4 mg once daily. On physical examination, a palpable lump was found on both inguinal. Laboratory examination showed an elevated leukocyte (21770/ μ L), a raised blood urea level (56.40 mg/dL), a raised blood creatinine level (1.49 mg/dL), a decrease in eGFR (46.3 mL/min/1.73m²), and a decrease in blood sodium level (126 mEq/L).

On radiologic examination with a non-contrast whole abdomen CT scan, there was herniation of the

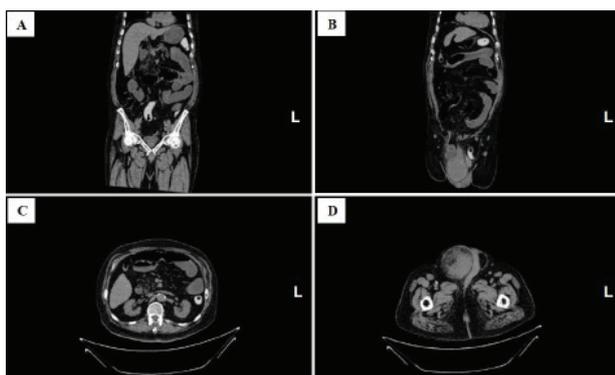


Figure 1. Non-contrast whole abdomen CT scan of the patient revealing intra-abdominal organs conditions in coronal plane (A) and (B), and axial plane (C) and (D). On the picture (B), There was herniation of small bowel through the defect about 31.8 mm in wide on medial from right inferior epigastrica artery and herniation of distal part of descending colon through the defect about 39.3 mm in wide on lateral from left inferior epigastrica artery. In addition, there was small bowel dilatation on herniated proximal ileum about 28.9–31.4 mm in diameter. On the picture (D), the right testis was increased in size about 76.0 x 69.3 x 99.2 mm with a prominent right epididymis accompanied by cuticular thickening and fat-stranding of the right scrotal subcutis

ileum through a 31.8 mm wide defect medial to the right inferior epigastric artery and herniation of the distal part of the descending colon through a 39.3 mm wide defect lateral to the left inferior epigastric artery accompanied by small bowel dilatation proximal to the herniated ileum with a diameter of approximately 28.9–31.4 mm (Figure 1). In addition, there was enlargement of the right testis measuring approximately 76. x 69.3 x 99.2 mm with a prominent right epididymis accompanied by cuticular thickening and fat-stranding of the right scrotal subcutis. However, other genitourinary organs, such as both kidneys, both pelvicalices systems, both ureters, bladder, and prostate were not found abnormalities. This patient was diagnosed with bilateral inguinal hernia with post-renal AKI and was planned for bilateral hernioplasty with mesh insertion by a digestive surgeon (YL) on the following day and received fluid therapy of 10% dextrose infusion coupled with 3% sodium chloride infusion, 1 gram meropenem injection per 8 hours intravenously, 40 mg esomeprazole injection per 12 hours intravenously, and 8 mg ondansetron injection per 8 hours intravenously. The next day, intraoperative strangulation of the bladder was found, so the patient was referred to a urologist (BB) for further management. Examination revealed extensive, poorly demarcated bladder tissue necrosis with little normal surrounding tissue. After obtaining the urologist's consent from the patient's family, a partial cystectomy was performed by excising approximately 10 cm x 7 cm of necrotizing bladder tissue and leaving healthy tissue. After the tissue was freed, two-layer suturing was performed on both edges of the normal bladder tissue with absorbable 3-0 suture. Then, a 16 Fr urine catheter is placed through the urethra and the hernioplasty was continued until the inner and outer suturing of the peritoneum, muscle, submucosa, mucosa, and skin (Figures 2,3,4).

During the postoperative inpatient monitoring of the patient, the patient's condition was stable with mild-moderate postoperative pain. The patient's diet was step by step started from drinking a few spoons of water,

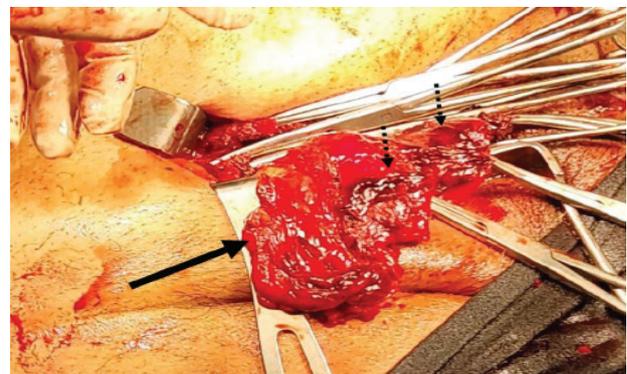


Figure 2. Sliding hernia of the bladder (black arrow head) was found intraoperatively with bladder tissues necrosis (two small dashed black arrow heads)

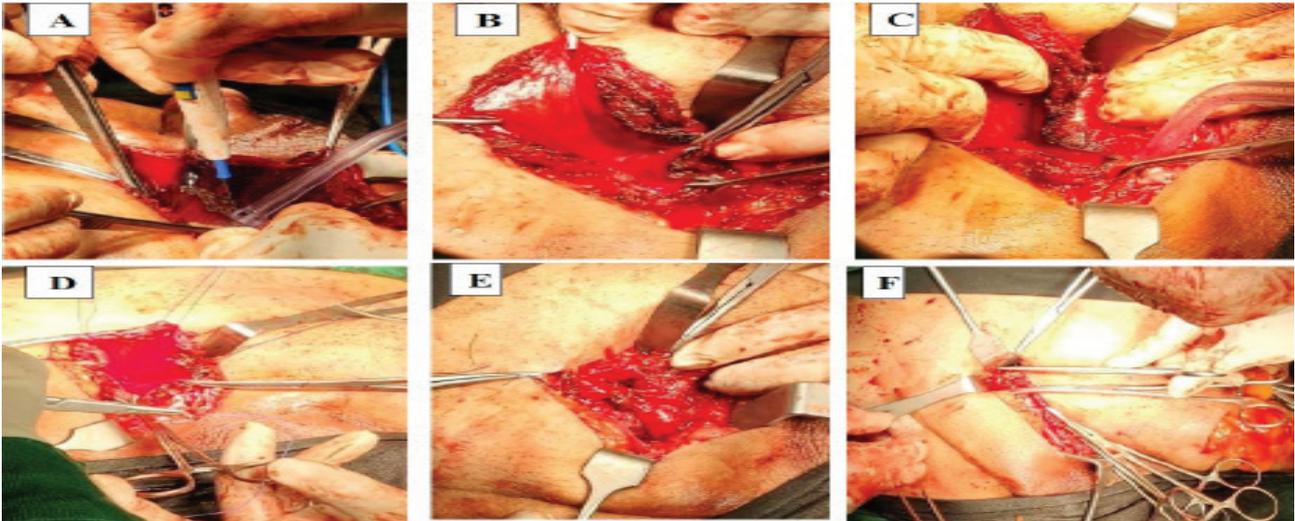


Figure 3. Partial cystectomy of the bladder involved in sliding hernia. Excision of the necrotized bladder was performed (A); then was continued with additional excision of remaining necrotized bladder (B) and (C); after the edges of inscised bladder tissue were clean, two-layer suturing was performed inside and outside of the bladder (D) and (E); and the bladder tissue was completely sutured (F)

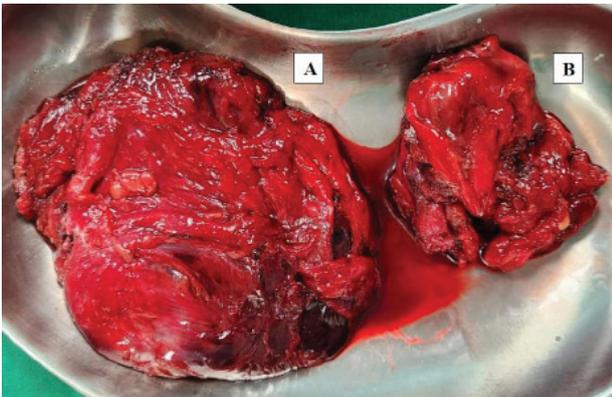


Figure 4. Excised bladder during partial cystectomy was performed. As seen on the picture that the largest tissue on (A) was gangrene of the bladder and the other excised tissue on (B) was the remaining bladder after the tissue on (A) was excised until leaving the healthy bladder tissue

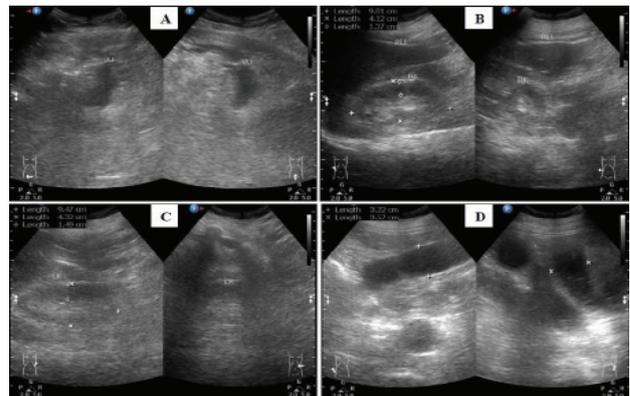


Figure 5. Genitourinary ultrasound revealing the bladder (VU) (A), right kidney (RK) (B), left kidney (LK) (C), and small bowel (D) of the patient on the first day of postoperative care. The bladder (VU) (A) was filled with a small amount of urine, but other abnormalities were unseen. On both kidneys (RK) (B) and (LK) (C), there was increased echocortex, but both cortex-medulla differentiations were still visible. Meanwhile, there was dilatation on the small bowel (D) about 3.2-3.5 cm in diameter (drawn as 'x' sign) on the picture suggesting the presence of ileus

porridge, and up to slightly solid food to restore normal gastrointestinal work. On the first postoperative day, urine production was only about 50 cc per 24 hours. The patient underwent a genitourinary ultrasound to confirm this finding and no abnormalities were found in both kidneys, both ureters, and bladder (Figure 5). On the next day, the urine production gradually began to increase until it reached 800 cc per 24 hours. The patient was discharged on 20th November 2023 and visited back on 1 week after discharge to the outpatient clinic for postoperative wound control.

Discussion

The current definition of sliding hernia is a hernia formed when a retroperitoneal organ protrudes outside the

abdominal cavity in such a way that the organ itself and the overlying peritoneal surface form the sides of a hernial sac (1). In adult population, almost all cases of sliding hernia are more common in men than women. Older patients tend to have sliding hernias whose symptoms develop over a long time and are more common at the age of 60–70 years. Older patients who have a large hernia size with a long history of inguinal lumps are more likely to have retroperitoneal organ protrusion into the hernia sac. The diagnosis is rarely made preoperatively as there are no specific clinical signs indicating the possibility of a sliding hernia. In most cases, the diagnosis of a sliding hernia is made after the hernia sac is opened. If the hernia sac is not opened, small sliding hernias can easily be overlooked. As in recent practice, it has become

increasingly rare to routinely open inguinal hernia sacs, and some sliding hernias may be operated on without being noticed. Interestingly, a percentage of sliding inguinal hernias can present clinically as complicated cases with almost 12% of all sliding hernias presenting with bowel obstruction to the emergency department (1). In a systematic review, signs and symptoms that may be found on history taking and physical examination indicating a sliding inguinal hernia of the bladder include inguinal lump (60.3%), lower urinary tract symptoms (LUTS), especially storage symptoms (frequency) and dysuria (47.6%), inguinal pain (39.7%), manual scrotal compression to empty the bladder (12.7%), acute renal injury (AKI) (7.8%), urinary retention (4.8%), and can even be asymptomatic (12.7%) (4). Sliding inguinal hernia of the bladder rarely presents as obstructive uropathy, but it should be considered in patients with inguinal masses along with the presence of AKI based on history and physical examination. The diagnosis can be confirmed by abdominal ultrasonography, non-contrast abdomen CT scan, or cystography. Based on a systematic review, CT scan examination is more sensitive for detecting sliding inguinal hernia than ultrasonography (36.5% vs. 25.4%). CT scan images that can be found in sliding inguinal hernia in the bladder can be extraperitoneal (61.6%) and intraperitoneal (17.4%) hernias (4, 5).

Our case report shows similar findings to the literature. An 83-year-old male patient was brought to the emergency department with painful lumps in both thigh creases accompanied by frequency as the one of LUTS symptoms. Laboratory examination showed leukocytosis, elevated blood urea and creatinine levels, decreased eGFR, and hyponatremia. A non-contrast whole abdomen CT scan showed ileal herniation through right and left inguinal defects, and no abnormalities in either kidneys, both ureters, bladder, and urethra. Initially, the patient was diagnosed with bilateral inguinal hernia with post-renal AKI, but, intraoperative strangulation of the bladder that had been necrotized by the inguinal hernia was found, indicating a sliding inguinal hernia in the bladder organ.

Traditionally, the surgical management of sliding hernia cases has been challenging as they typically involve the excision of the entire peritoneal hernia sac and high-level ligation of the remaining excision site. As some sliding hernia pockets contain retroperitoneal organs, the risk of injury to these organs is higher. Currently, excision of the pouch is not mandatory. Smooth dissection of the pouch allows for free tension repair as in other inguinal hernia surgeries. Opening the pouch and controlling the contents is done in all cases of inguinal hernia to confirm the diagnosis of sliding hernia. However, if there is any doubt about the nature of the pouch itself, it is advisable not to open it as it may be the wall of the small bowel or bladder. Hernia surgery can use mesh with or without a plug which may seem less risky (1).

In a retrospective study, sliding inguinal hernia was a risk factor for re-operation and should be corrected with mesh to reduce the risk of recurrence. If the diagnosis of sliding inguinal hernia is recognized preoperatively, correction should be considered using Lichtenstein method rather than a laparoscopic approach due to the lower rate of re-operation (6). The key to successful hernia surgery is a smooth dissection, clear anatomy, and the use of body-safe prosthetic materials (1). The main surgical steps that should be taken to improve safety in sliding inguinal hernia surgery are careful separation of the spermatic cord, separation of the transverse fascia adjacent to the neck from the hernia bag, careful identification of the cavity and wall of the sliding hernia, and smooth dissection of the adhesions to allow the return of the cavity and hernia bag into the preperitoneal cavity (1). Laparoscopic surgery for sliding inguinal hernia may be possible, but the technique requires good technical skills. However, conversion to an open surgical procedure may be required in as many as 10% of all cases with laparoscopic surgery (1). The bladder organ may be part of a sliding hernia which is always recognized by the presence of perivesical fat and surface veins. Recognizing a sliding hernia of the bladder and correcting it promptly gives very satisfactory results. If a sliding hernia of the bladder is recognized intraoperatively, it should be corrected with two-layer suturing using absorbable suture. Once corrected, the bladder should remain freely drained via a urethral catheter for 7–10 days. A cystogram should be performed to ensure complete healing before attempting micturition. It is also important to check the integrity of the ureteral orifice before correcting a sliding hernia in the bladder. If in doubt, a retrograde study should be performed on the operating table. Any bladder injury adjacent to the ureteral orifice should be stented or ureteral reimplantation performed. Further features that obscure extraperitoneal bladder injury include urinoma formation, which requires drainage with a catheter for 2–3 weeks, drainage of the urinoma, debridement of the bladder, and concurrent correction with antibiotics. Undetected intraperitoneal bladder injury always presents with peritonitis and requires a laparotomy, bladder correction, catheter drainage, and antibiotics (7). In a systematic review, open surgery was the most preferred operative approach for sliding inguinal hernia of the bladder (80.4%).

In addition, other techniques, such as Lichtenstein (32.6%), Bassini (15.2%), Mac Way (4.3%), and Shouldice (2.2%) were also performed in patients with sliding inguinal hernia of the bladder. Mesh placement (34.8%) may also be required in these cases. If the sliding inguinal hernia of the bladder is large enough during intraoperative surgery, cystoscopy may be required to avoid bladder injury. Laparoscopic surgery can also be performed in these patients along with control cystoscopy to reduce the risk of bladder injury but is currently underutilized

(6.5%) as it requires specialized skills and experience. Postoperative complications of sliding inguinal hernia of the bladder are reported to be almost non-existent (69%). However, complications may arise in some patients, such as peritonitis (17.4%). In addition, intraoperative complications can also be found with the appearance of fluid in the operating field during surgical correction of the hernia, requiring a blue ink test through the urethral catheter to confirm the diagnosis and suture the injury. Another complication that can occur is the absence of urine production after hernia surgery which needs to be confirmed by imaging such as a CT scan or ultrasound (4).

Similar to the literature, our patient underwent open hernioplasty with mesh insertion and partial cystectomy for sliding inguinal hernia with intra-operative bladder involvement. Our patient's surgery was performed by a digestive surgeon and a urologist. Cystoscopy was not performed on this patient. Two-layer suturing of the bladder was performed using absorbable thread, and then a urethral catheter was maintained for 1 week. During the operation, there were no obstacles, and the operation went smoothly. Postoperative care in our patient also did not encounter any complication that could aggravate the patient's clinical condition. On the first postoperative day, our patient underwent an ultrasound due to urine production of about 50 cc/24 hours, but fortunately, there was no abnormality in the urinary organs so the patient might have pre-renal or renal AKI. After our patient's condition improved, the patient was discharged from the hospital and after 1 week was recommended for outpatient control at the polyclinic.

Conclusions

Sliding inguinal hernia with bladder involvement is still challenging to date as it can only be recognized intraoperatively. Nevertheless, management in the field of urology needs to be carried out from the beginning of the discovery of urinary tract organ involvement, especially the bladder, to prevent genitourinary complications associated with sliding inguinal hernia. Surgery in this type of hernia requires exposure to sufficient experience for surgeons so that if they encounter this case, it will certainly not be a difficulty in the future.

Authors' contributions

The first author, JH, was the one who was responsible of study conception and design, and wrote the manuscript and provided data. Meanwhile, the second and the third author, BB and YL, supervised the process and edited the manuscript. All authors reviewed the results and approved the final version of the manuscript.

Acknowledgements

Special thanks to the Department of Urology, Siloam Hospitals Medan, Medan, Indonesia and Department of

Digestive Surgery, Siloam Hospitals Medan, Medan, Indonesia.

Conflict of interest

The author declares that there is no conflict of interest.

Funding

There is no funding.

Ethical statement

The case agreed to report his issue anonymously after signing the informed consent. This case report is based on the CARE checklist.

Data availability

Data will be provided on request.

Abbreviations

AKI	Acute Kidney Injury
BPH	Benign Prostate Hyperplasia
CT	Computed Tomography
eGFR	Estimated Glomerular Filtration Rate

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How to cite this article

Hakim J, Bachsinar B, Leonardi Y. Partial Cystectomy in Sliding Inguinal Hernia with Bladder Gangrene: A Case Report. *Transl Res Urol*, 2024;6(1):4-9.

DOI: [10.22034/tru.2024.436576.1172](https://doi.org/10.22034/tru.2024.436576.1172)

URL: https://www.transresurology.com/article_189846.html

