

Ureteric injury after lumbosacral microdiscectomy: A case report and review of literature

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Abstract Microdiscectomy is considered a very safe procedure with few serious complications. Ureteric injury following microdiscectomy is rarely reported in the literature. We report a rare case of iatrogenic ureteric injury following L5-S1 microdiscectomy for prolapsed intervertebral disc which was detected early and managed in time.

Key Words: Iatrogenic, microdiscectomy, prolapsed intervertebral disc, ureteric injury

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INTRODUCTION

Iatrogenic injuries account for the majority of ureteric injuries.^[1] The most common location is distal one-third of the ureter, and most common causes are gynecologic and colorectal surgeries.^[2] Ureteric injuries are also known to occur after lumbar spine surgeries.^[3] Microdiscectomy, presently, is the standard treatment for herniation of lumbosacral disc material. The microsurgical approach through the “interlaminar window” is synonymous with the terms “microdiscectomy” or “microsurgical discectomy.” The goal of this surgical procedure is the removal of slipped disc material (nucleus, endplate, anulus fibrosis) from the spinal canal to decompress the neural structures. Overall complications of microsurgical discectomy range between 1.5% and 15.8% in the literature with an average of 7.8%.^[4,5] Ureteric injury after microdiscectomy has been reported rarely.^[6] The mechanisms that may lead to ureteric injury after posterior approaches to lumbar spine involve injury by

pituitary rongeurs or sucking in of ureter into the field while removing the disc material.^[7] Most of these injuries are not recognized intraoperatively.^[8] A high index of suspicion and awareness of this complication as likely event are required for timely diagnosis and treatment. In our case, the ureteric injury was recognized in the early postoperative period. Thus, an astute neurosurgeon and timely intervention by urologist can help in early diagnosis and appropriate treatment of this potentially devastating complication.

CASE REPORT

A 44-year-old male patient, known case of symptomatic left paracentral prolapsed intervertebral disc (PIVD) presented to our outpatient department with a history of microdiscectomy via interlaminar window at L5-S1 done in a private hospital 5 months ago. The surgery was uneventful according to the details available from concerned neurosurgeon and operative records.

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Two days after surgery, the patient developed left flank pain with high-grade fever. Clinical examination revealed left flank tenderness. Contrast-enhanced computed tomography (CT) abdomen revealed a large collection in left retroperitoneal area anterior to left psoas muscle overlying sacral ala region [Figure 1]. Urology consultation was taken, and immediate CT-guided pigtail drainage of collection was done, which drained clear fluid [Figure 2a]. The creatinine level of fluid was 40 mg/dl. A provisional diagnosis of left ureteric injury was made and a left retrograde pyelography (RGP) was done, which revealed complete cut-off with extravasation of contrast at mid sacroiliac joint, and a left percutaneous nephrostomy (PCN) was placed [Figure 2b]. The patient was discharged in good condition on left PCN, with a daily output of about 1.5 L. Antegrade pyelography done after 4 weeks showed complete cut-off at the upper border of left sacral ala [Figure 3]. The patient was subsequently referred to our institute for further management. With a provisional diagnosis of iatrogenic left

ureteric stricture secondary to injury during microdiscectomy, we planned him for definitive surgery. A lower midline incision was made, and a transperitoneal approach was used. Intraoperatively, the left ureter was normal up to the pelvic brim. The ureter below the pelvic brim was fibrosed and strictured [Figure 4a and b]. The defect length was around 6 cm, thus a decision to make Boari flap was made. The repair was completed using Boari flap, and a tension-free nonrefluxing tunneled anastomosis was fashioned between the healthy segment of the left ureter and Boari flap [Figure 5a-c]. The postoperative course was unremarkable. The patient was discharged in stable condition and is doing well in his two follow-up visits.

LITERATURE REVIEW

Using words like microdiscectomy/microdiskectomy, ureteric/ureteral injury in MEDLINE and literature citations, a total of 3 relevant case reports of ureteric injury after lumbar microdiscectomy were identified from 1977 to 2015. All three earlier reported cases involved surgery at the L4-L5 vertebral level in contrast to our case where the L5-S1 vertebral level was involved. Tables 1 and 2 highlight the salient points of previous case reports.

DISCUSSION

The term “microsurgical discectomy” describes the removal of herniated parts of lumbar intervertebral discs through a posterior approach with the help of a surgical microscope and microsurgical instruments. It implies the application of the general principles of microsurgery as well as the approach to the anatomical target area through a limited skin incision. Using MEDLINE and literature citations, we identified total

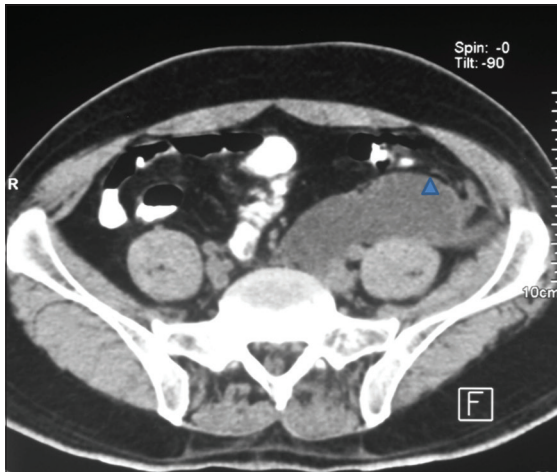


Figure 1: Contrast-enhanced computed tomography abdomen showing large collection anterior to left psoas muscle (arrow head)

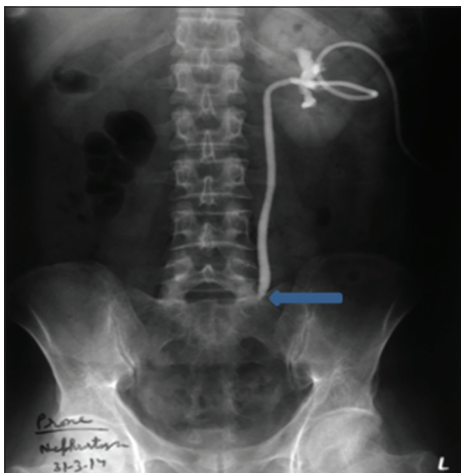


Figure 3: Left antegrade pyelogram showing complete cut-off at upper border of left sacral ala (arrow)

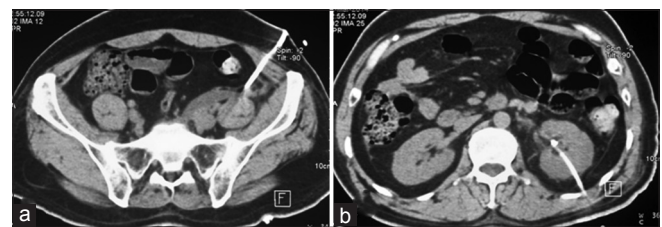


Figure 2: Computed tomography abdomen showing (a) pigtail catheter in collection, (b) left nephrostomy *in situ*

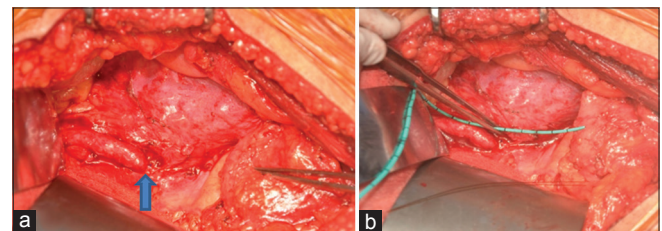


Figure 4: Intraoperative photos showing (a) complete cut-off at mid ureteric level (arrow) with long segment loss of ureter, (b) length of defect as measured using ureteric catheter

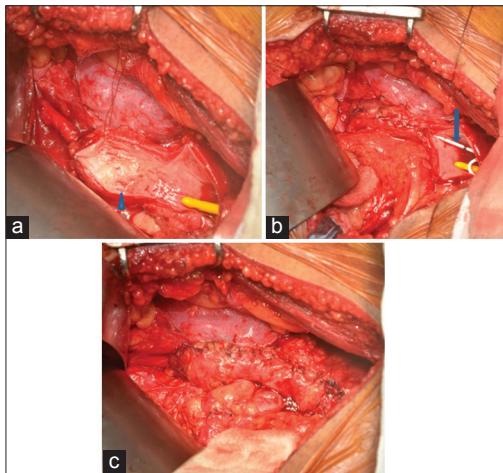
Table 1: Analysis of available literature

| Author | Age/sex | Diagnosis | Level of spinal surgery | Spine surgery performed | Type of microdiscectomy | Intraoperative identification of injury |
|---|-----------|-----------------------|-------------------------|---|-------------------------|---|
| Tainio and Kylmala ^[6] | 54/female | PIVD* L4-L5 | L4-L5 | Lumbar microdiscectomy | Not available | No |
| Cho et al. (2009) ^[7] | 28/male | Recurrent PIVD* L4-L5 | L4-L5 | Lumbar discectomy followed by microdiscectomy | Interlaminar window | Yes |
| De Quintana-Schmidt et al. ^[9] | 43/female | PIVD* L4-L5 | L4-L5 | microdiscectomy | Not available | No |

*PIVD: Prolapsed intervertebral disc

Table 2: Analysis of available literature

| Author | Mechanism of injury | Level of ureteric injury | Extent of injury to ureter | Delay in detection of ureteric injury | Treatment of ureteric injury | Outcome |
|---|--|--------------------------|----------------------------|---------------------------------------|---|---------|
| Tainio and Kylmala ^[6] | Not available | Upper | Not available | 6 days | End to end anastomosis | Good |
| Cho et al. (2009) ^[7] | Inadvertent passage of pituitary rongeur through intertransverse space | Lower third | Not available | None | End to end anastomosis | Good |
| De Quintana-Schmidt et al. ^[9] | Trying to control excessive bleeding | Not available | Not available | 36 h | Emergency laparotomy and end to end anastomosis | Good |

**Figure 5:** Intraoperative photos showing (a) Boari flap being harvested (arrowhead), (b) closure of flap over double-J stent (arrow), and (c) final picture after completion of anastomosis

3 case reports of ureteric injury after lumbar microdiscectomy. All three earlier reported cases involved surgery at the L4-L5 vertebral level, in contrast to our case where the L5-S1 vertebral level was involved [Tables 1 and 2]. Overall complications of microsurgical discectomy range between 1.5% and 15.8% in the literature with an average of 7.8%.^[4,5] There are significantly less severe intraoperative complications as compared to nonmicrosurgical discectomies.^[10] The most important as well as the most frequent complications are: urinary retention (5%), perineural fibrosis (3%), superficial wound infection (2%), dural tears (1%), deep venous thrombosis (1%), postoperative segmental instability (1%), disc space infection (<1%), root injury (<1%), lesions due to positioning (<1%), cauda equina syndrome (<0.1%), retroperitoneal blood vessel injury (<0.1%), and epidural hemorrhage (<1%).^[10] Ureteral injury is a rare complication of lumbar spinal surgery.^[3] Posterior as compared to anterior or anterolateral approaches to the lumbar spine are more commonly associated with ureteric

injuries.^[4,5] Commonly cited factors responsible for ureteral injury during posterior lumbar discectomy include lean and thin patient, defects in or absence of the anterior annulus, and retroperitoneal scars or adhesions from previous surgery or inflammation.^[4] None of these risk factors was present in our case. The use of a rongeur-type instrument while removing herniated material, or clearing the disk space may also cause ureteral injury.^[7] The ureter is anatomically related close to vertebral bodies, especially, near L5 and S1. It crosses the common iliac artery and vein ventrally and appears medial to these vessels at the lumbosacral junction.^[11] Diagnosis of ureteric injury after lumbar spine surgery is likely to get delayed in view of nonspecific symptoms and no intraoperative pointers to such an event.^[8] Urgent ultrasonography or CT abdomen can reveal retroperitoneal collection or proximal hydroureteronephrosis.^[12] Once the ureteric injury is diagnosed, it is essential to know the extent of the damage. RGP may reveal contrast extravasation or complete cut-off at the level of injury. If the injury is partial, a double-J stent may be placed and later on definitive therapy can be done.^[12] If the injury is complete PCN should be done initially, and the level of injury may be evaluated afterward using antegrade pyelography or nephrostogram.^[13] In our case, since the injury was complete, left PCN was done initially. Definitive repair can then be done according to the level of ureteric injury. In our case, since there was long segment mid and lower ureteric stricture, Boari flap repair was done.^[14] Using this repair, a defect of up to 10–15 cm can be bridged. Thus, a neurosurgeon's awareness for causing possible ureteral injury even during microdiscectomy, and timely intervention by a urologist, if such an event occurs, is essential for early detection and appropriate management.

CONCLUSION

Ureteric injury following microdiscectomy for PIVD can occur rarely. A high index of suspicion, prompt diagnosis, and early

intervention by a urologist are essential for decreasing the morbidity and salvaging the renal function.

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Conflicts of interest

There are no conflicts of interest.

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