CASE REPORT

Ureteral injury after posterior lumbar discectomy with interbody screw fixation

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SUMMARY

We report a case of iatrogenic ureteral injury secondary to L5 laminectomy and microdiscectomy with L5–S1 bone graft with posterior lumbar interbody fusion using presacral cancellous screw fixation, managed by initial ureteral stent placement and subsequent Boari bladder flap repair. A 33-year-old woman underwent L5 laminectomy and microdiscectomy with L5–S1 bone graft with posterior lumbar interbody fusion using presacral cancellous screw fixation. On postoperative day 10, she developed lower abdominal pain, vomiting and fever. Ultrasonogram and contrast-enhanced CT demonstrated a large pelvic urinoma secondary to a right lower ureteric injury. This was managed initially by ureteral stent placement and subsequent Boari bladder flap repair. Ureteral injury following spinal surgery is a rare surgical complication with significant morbidity and

mortality. A high index of suspicion is essential for early appropriate management and renal salvage.

BACKGROUND

Unlike during pelvic or retroperitoneal surgery, where one is acutely aware of the proximity of the ureter and hence its potential for injury, spinal surgery in the prone position is not a procedure one would normally associate with ureteric injury. Though rare, to be aware of this potential complication helps us to be that extracareful in our surgical approach. Also, the paucity of early signs and symptoms caused by this complication demands a high index of suspicion for its early and appropriate management.

Figure 1 X-ray on admission demonstrating nasogastric tube and presacral cancellous screw in situ.

Figure 2 Contrast-enhanced CT showing large pelvic urinoma (arrow) and right hydroureteronephrosis.

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Figure 3 Contrast-enhanced CT showing large pelvic urinoma (larger arrow) displacing the bladder with Foley's balloon (small arrow).

CASE PRESENTATION

A 33-year-old woman was admitted to the neurosurgery clinic with persistent low-grade fever, lower abdominal pain, vomiting and urinary retention. She had undergone L5 laminectomy and microdiscectomy with L5–S1 bone graft with posterior lumbar interbody fusion using presacral cancellous screw fixation 2 weeks prior. This was performed for L5–S1 spondylolisthesis with left S1 radiculopathy. The surgery was performed in prone position using a vertical incision over L5–S1 standard L5 laminectomy and discectomy were performed followed by placement of a bone graft at the site. The fixation was performed following a percutaneous puncture just anterior to the coccyx and passage of a guidewire under fluoroscopic guidance. A 45 mm cancellous cannulated screw was passed over the guidewire after tapping. The position was confirmed by X-ray. The postoperative period was uneventful with good recovery, and she was discharged after 8 days. Physical examination revealed a distended abdomen with lower abdominal tenderness. Bowel sounds were sluggish (figure 1). Ultrasonography showed an 8×4×5 cm fluid collection in the pouch of Douglas and this was confirmed by contrast-enhanced CT (CECT; figures 2 and 3). Suspecting a haematoma or abscess formation, needle aspiration was performed under anaesthesia. Three hundred millilitres clear fluid was drained that was later biochemically confirmed to be urine. The patient was then referred to our department.

INVESTIGATIONS

The patient's renal parameters were normal, but total leucocyte count was elevated. A review of the CECT also showed mild

right hydroureteronephrosis. Cystoscopy and retrograde ureterogram demonstrated cut-off with contrast extravasation from the right ureter at S1–S2 level (figure 4). There was a thin streak of contrast entering the upper ureter and the renal pelvis. Ureterorenoscopy confirmed a midureteric injury.

DIFFERENTIAL DIAGNOSIS

- ▶ Haematoma
- ▶ Abscess
- ▶ Urinoma

TREATMENT

Ureterorenoscopy confirmed a midureteric injury. A 6Fr 26 cm DJ ureteral stent was indwelled (figure 5). Following good clinical recovery, the patient returned 2 months later for further assessment. Repeat ureterorenoscopy after stent removal demonstrated a complete midureteric stricture at S2 level. Surgical exploration was performed via a right Rutherford Morrison's incision. Dense fibrosis was observed surrounding the lower ureter. Healthy dilated ureter was identified close to the pelvic brim, where it was transected. An 8 cm Boari anterior bladder flap was fashioned, tubularised and anastomosed to the healthy ureter over a 6Fr ureteral stent.

OUTCOME AND FOLLOW-UP

The patient had an uneventful postoperative convalescence. Foley's urethral catheter was removed 10 days later. The ureteral catheter was removed at 6 weeks. The patient is well and asymptomatic at follow-up after 3 months. Ultrasonogram of the abdomen and pelvis was normal.

DISCUSSION

The ureter lies in the retroperitoneal space within a fat tissue envelope, wedged between the anterolateral aspect of the vertebral body and the psoas muscle. It is closely related to the aorta on the left and inferior vena cava on the right. It crosses the common iliac vessels at the lumbosacral junction before it dips into the pelvis. During posterior lumbar discectomy, it is at risk of injury due to this close relationship with the vertebral body and its disc.^{1 2} Factors that predispose to ureteral injuries include absence of the anterior annulus, previous surgery with retroperitoneal scarring or the misuse of rongeur type instruments.^{1 2} It is seen to be more vulnerable in lean patients, like ours, where it is even more closely related to the vertebral body.^{1 2} The prone position and supporting pelvic pillows during surgery further press the ureter against the vertebral

Figure 4 Right retrograde ureterogram (A) and ureteric catheter (B) demonstrating complete cut-off at S1–S2 level.

Figure 5 (A and B) Right DJ ureteral stent in place (anteroposterior and lateral views).

body.^{1 2} Ureteral injuries are the result of perforation of the pre-vertebral or anterior longitudinal ligament by instruments clearing the disc space.^{1–3} Typically, the injured ureter is contralateral to the side of dissecting due to the tangential passage of the instrument. The most common location is the distal third of the ureter at around L4–L5 level.^{2 3} Ureteral injuries are occasionally found concomitantly with vascular injury in the pelvis and retroperitoneum.¹ Clear fluid located around the spine, postsurgery, could be irrigation saline, cerebrospinal fluid (rare), chyle from a torn thoracic duct (more common) or urine.¹ The paucity of early symptoms and signs in ureteral injury necessitates a high index of suspicion by the treating surgeon for prompt diagnosis and management.^{1 3} The duration until diagnosis, which is crucial for salvage of the involved renal unit, in most reported cases ranged from 3 days to 6 weeks after surgery.^{1 2 4} The first attempt to treat the ureteral injury should be ureteral stenting, retrograde or antegrade.⁵ Failing this, a temporary diverting percutaneous nephrostomy and antegrade combined with retrograde contrast imaging is performed to evaluate the nature and length of the ureteral injury. Surgical options include end to end ureterostomy, ureteric reimplantation, Boari bladder flap and even autotransplantation, rarely.^{2 3 5–7} Careful use of surgical instruments is key in preventing this iatrogenic complication. Non-specific symptoms and signs such as abdominal pain, fever, vomiting, prolonged ileus or persistent leucocytosis should alert the surgeon to a possible ureteral injury. Awareness of this potential complication is essential in prompt diagnosis. Early urological intervention results in renal preservation, and at times is even life-saving.

Learning points

- ▶ Awareness of this potential complication is essential.
- ▶ Careful and meticulous surgical technique by the orthopaedic/neurosurgeons.
- ▶ High index of suspicion postoperatively.
- ▶ Timely intervention saves a renal unit.

Competing interests None.

Patient consent Obtained.

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REFERENCES

- 1 Isiklar ZU, Lindsey RW, Coburn M. Ureteral injury after anterior lumbar interbody fusion. A case report. *Spine* 1996;20:2379–82.
- 2 Defay P, L'Hermite J, Wiederkehr P. An unusual ureteric injury. *Br J Urol* 1986;58:567.
- 3 Trinchieri A, Montanari E, Salvini P. Renal autotransplantation for complete ureteral avulsion following lumbar disk surgery. *J Urol* 2001;165:1210–11.
- 4 Gayer G, Caspi I, Garniek A. Perirectal urinoma from ureteral injury incurred during spinal surgery mimicking rectal perforation on computed tomography scan. *Spine* 2002;27:E451–3.
- 5 Guerriero WG. Ureteral trauma; surgical repair. *Urol Clin North Am* 1989;16:237–48.
- 6 Kaffenberger S, Tomaszewski JJ, Alice K, et al. Hand-assisted laparoscopic ureteroureterostomy with renal mobilization for delayed recognition of a proximal ureteral injury after lumbar disk surgery. *Can Urol Assoc J* 2010;4:E82–5.
- 7 Demirkesen O, Tunc B, Ozkan B. A rare complication of lumbar disk surgery: ureteral avulsion. *Int Urol Nephrol* 2006;38:459–61.

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