Ureteral injury after posterior spinal fusion

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ABSTRACT

Entry into the retroperitoneal space during Minimally Invasive Transforaminal Lumbar Interbody Fusion (MI-TLIF) presents a rare possibility of iatrogenic ureteral injury. Rare complications of ureteral injury after previous open posterior spinal surgery have been reported however there is a paucity of reports after a minimally invasive technique. We now describe a case of ureteral injury after MI-TLIF.

Introduction

Minimally invasive transforaminal lumbar interbody fusion (MI-TLIF) is a posterior surgical approach to the lumbar spine and provides direct, unilateral access to the intervertebral foraminal space. MI-TLIF is indicated after failure of conservative, nonoperative treatment for various conditions including degenerative disc disease, disc herniation, and spondylolisthesis. This approach to lumbar interbody fusion reduces the risk of damage to nerve roots, dura, ligamentum flavum, and spinal muscles.

Iatrogenic ureteral injury is a rare complication that may arise from MI-TLIF. Here we present a 64-year-old male with CT Urogram and retrograde pyelography confirmed ureteral injury after MI-TLIF. Through this case report, we aim to shine a light on the vulnerability of the ureter to injury during posterior lumbar surgery.

Case presentation

A 64-year-old male presented to our neurosurgery clinic complaining of severe pain in the anterior and lateral surface of the right thigh and leg. His past medical history was significant for hypertension and diabetes mellitus. There was no evidence of a previous traumatic incident or radiation exposure. Pre-operatively, creatinine (Cr) level was normal. Computerized tomography (CT) demonstrated a large synovial cyst in the right L5-S1 subarticular zone compressing the right L5 nerve root.

A right L5-S1 facetectomy was performed. The ligamentum flavum was resected and a mass was revealed within the epidural fat at the L5-S1 intervertebral space. The cyst was excised and the exiting right L5 spinal root was fully decompressed. Discectomy and MI-TLIF with neuronavigation and fluoroscopy of the right L5-S1 level were performed. MI-TLIF was used to further decompress the degenerative L5-S1 level and stabilize the spinal segment.

Eight days postoperatively, the patient presented to our Emergency Department with worsening abdominal pain in the left lower quadrant. Cr was found to be elevated to 1.7. A CT scan was performed indicating a large retroperitoneal fluid collection encasing the left ureter. CT Urogram revealed evidence of urinary extravasation from the left ureter (Fig. 1).

Cystoscopy and a left retrograde pyelogram confirmed distal left ureteral injury (Fig. 2 A). A ureteral stent was placed (Fig. 2 B).

Repeat left retrograde pyelography 4 weeks later revealed persistent left ureteral contrast extravasation and a ureteral stent was replaced (Fig. 3 A). Four weeks after that, a final retrograde pyelography revealed no evidence of contrast extravasation and the ureteral stent was removed (Fig. 3 B). No further contrast imaging was performed.

The patient continues to do well two years postoperatively with no hematuria, abdominal pain, AKI, or hydronephrosis.

Discussion

In this case, we report a 64-year-old male with a left ureteral injury sustained after MI-TLIF. Anatomically, the ureters are located in the retroperitoneal space anterolaterally to the psoas muscles. In the abdominal region, the ureters are located laterally to the inferior vena cava and abdominal aorta. They cross anteriorly over the common iliac arteries in the pelvic region to eventually cross immediately anterior to the L4-L5 vertebral bodies.

Ureteral injury is a rare complication following anterior and posterior approaches to lumbar surgery. This may have serious impact on patient morbidity if not diagnosed judiciously.

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CT Urogram and retrograde pyelography remain the mainstay tests for diagnosis. There is a lack of literature surrounding ureteral injury following minimally invasive posterior spinal surgery. Ureteral injuries are most frequently a complication of urological, colorectal and gynecological surgery. Signs of possible ureteral injury are nonspecific and involve abdominal pain, fever, hematuria, and ileus. These broad symptoms can make diagnosing the injury challenging.

Conclusion

Ureteral injury is a rare and sometimes iatrogenic complication that can result from MI-TLIF. Here we report a case that features the importance of prompt imaging postoperatively to detect this rare complication. Serum creatinine testing, delayed contrast-enhanced CT, retrograde pyelography, and ureteral stent placement are helpful in diagnosing and treating the injury.

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Declaration of competing interest

None.

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Fig. 3. A: Repeat cystoscopy, left retrograde pyelogram with persistent distal left ureteral contrast extravasation. B: Final cystoscopy with left retrograde pyelogram showing resolution of left ureteral contrast extravasation. At this point the left ureteral stent was removed and kept out.