



## Case Report

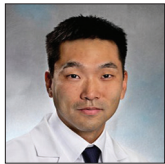
# Spinal osteomyelitis and epidural abscess caused by ureterovertebral fistula: A case report

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## ABSTRACT

**Background:** Ureteral fistulas are abnormal connections between the ureters and other organs. Maintaining a high index of suspicion is important because they can precipitate dangerous complications such as sepsis and renal failure. Connections to a vertebral body have only been documented in the setting of trauma. Here, we present a 67-year-old female with a ureterovertebral fistula extending into the L3 vertebral body.

**Case Description:** A 67-year-old female with a history of endometrial adenocarcinoma underwent surgery and radiation therapy complicated by a right ureteral obstruction requiring stent placement. Five months later, she developed back pain and MR-documented L2-L4 level osteomyelitis/discitis with a psoas phlegmon/abscess, which required drainage. A fistula was later identified between the right ureter and the psoas phlegmon. Despite percutaneous nephrostomy placement and aggressive IV antibiotic treatment, she was readmitted for persistent signs of infection over the next few months during which time she was repeatedly and unsuccessfully treated with multiple antibiotics. Sixteen months following her original stent placement, she developed right leg weakness and urinary incontinence attributed to the MR-documented ureteropsoas fistula extending into the L3 vertebral body. Following a nephrectomy with ureteral ligation, an L3 anterior corpectomy with interbody fusion for discitis at both L2-L3 and L3-L4, and an L1-L5 posterolateral fusion, she was discharged to a rehabilitation center.

**Conclusion:** In patients with recurrent sepsis, osteomyelitis/discitis, or psoas abscess of unknown origin or who have a significant history (e.g., pelvic malignancy, radiation, and instrumentation), it is important to consider urodynamic testing to look for a ureteral leak or fistula.

**Keywords:** Epidural abscess, Osteomyelitis, Ureterovertebral fistula

## INTRODUCTION

Urinary tract fistulas, abnormal connections between the urinary and other organ systems, can have a wide variety of causes, anatomic locations, organ involvement, and clinical features. Typical precipitating events include iatrogenic injury, trauma, inflammatory diseases, infection, malignancies, or radiation. Fistulas including the ureters, specifically, usually connect to the intestines, vascular system, skin, or female reproductive tract.<sup>[1,2]</sup> Ureteral fistulation can lead to intra-abdominal sepsis, renal failure, and, rarely, vertebral osteomyelitis/spinal abscess.<sup>[1,2,10]</sup> Here, we describe a 76-year-old female who developed a fistulation between her right ureter and the L3 vertebral body secondary to L2-L3/L3-L4 discitis/osteomyelitis and psoas abscess, leading

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to paraparesis warranting surgical debridement 17 months following stent placement for endometrial adenocarcinoma.

## CASE DESCRIPTION

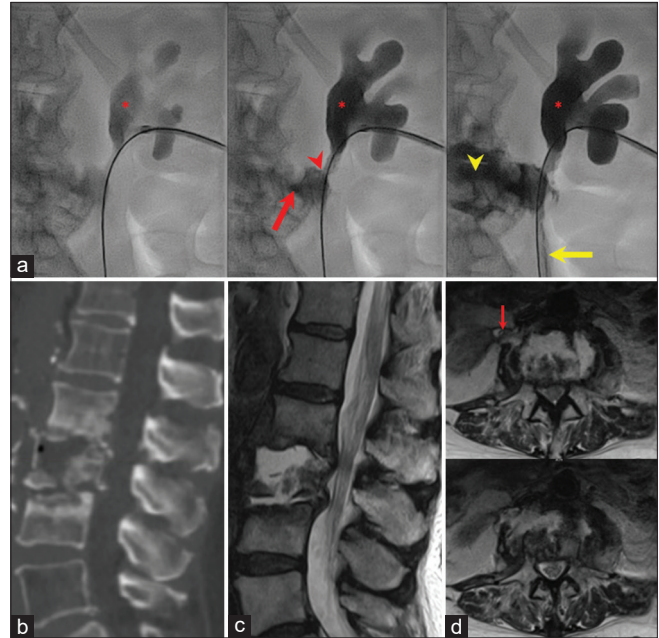
A 67-year-old female with endometrial adenocarcinoma with known metastases to the liver and spine underwent a total abdominal hysterectomy, bilateral salpingo-oophorectomy, omentectomy, and radiation therapy. Postoperatively, the patient developed malignant right ureteral obstruction with hydronephrosis requiring ureteral stent placement. Five months later, she returned to the hospital with worsening back pain. The spine MR revealed abnormal signal enhancement ventrally between the L2-L4 levels consistent with osteomyelitis, L2-L3/L3-L4 discitis, and left psoas muscle phlegmon. Interventional radiology (IR) percutaneously drained the abscess, and cultures grew *Bacteroides fragilis* and *Streptococcus mitis*.

Over the next 5 months, she was readmitted 3 times with recurrent infections despite multiple oral and IV courses of antibiotics. The CT urogram of her abdomen/pelvis revealed a right ureteral fistula extending to the psoas muscle. Blood cultures revealed *Bacteroides vulgaris*, *Enterococcus faecalis*, and *Aerococcus urinae*. Despite the placement of a diverting percutaneous nephrostomy and exchanging ureteral stent, the infections persisted. Urine cultures showed *Citrobacter*, *Candida tropicalis*, and mold speciation consistent with *Fusarium* species.

Sixteen months after original stent placement, she was readmitted with the right lower extremity weakness and increased urinary incontinence. The MRI demonstrated progression of her osteomyelitis and discitis from L2-L4 with significant osseous destruction of L3 and spinal cord stenosis due to osseous retropulsion. A nephroureterogram with stent exchange demonstrated a worsening ureteropsoas fistula with contrast extravasation into the osteomyelitic cavity within the L3 body (i.e., progression to ureterovertebral fistula) [Figure 1]. Multidisciplinary discussions led to: (1) a right nephrectomy with distal ureteral ligation for definitive treatment of the fistula and infection control and (2) an anterior L3 corpectomy with interbody fusion (L2-L3/L3-L4) and posterolateral fusion at L1-5. Tissue culture obtained during this single-session surgery revealed *Enterococcus faecium* and *Candida glabrata*. Postoperatively, her motor examination remained stable, and she was discharged to a rehabilitation center on antibiotics where she continues to recover.

## DISCUSSION

Connections between ureters and vertebral bodies are extraordinarily rare, and they are almost uniformly due to trauma. Dagain *et al.* discussed a ureterovertebral fistula to



**Figure 1:** Postinfectious ureterovertebral fistula. (a) IR nephrogram (left to right, during injection; red asterisk demarcates the right renal pelvis; yellow arrow demarcates the right ureter) obtained during nephrostomy exchange demonstrating extravasation of contrast and opacification of the abnormal connections to the psoas phlegmon (red arrowhead) and adjacent osteomyelitic L3 vertebral body (red arrow) consistent with ureterovertebral fistula. Sagittal CT (b) and T2-weighted MRI (c) demonstrating extensive osseous destruction at L3. (d) Axial T2-weighted MRI images demonstrating continuity of the right ureter/renal pelvis containing her ureteral stent (red arrow) and the cystic space in the L3 vertebral body.

L3 after a vertebromedullary gunshot wound. The fistula was identified by CT.<sup>[2]</sup> Soundararajan *et al.* described a ureterovertebral fistula after an L4 fracture in a patient with ankylosing spondylitis who presented with high-grade fever and back pain. CT and MRI studies showed ureteric leak into the psoas muscle with resultant abscess formation.<sup>[10]</sup> Other pelvic malignancies and their treatment regimens have been linked with urinary fistulas and subsequent osteomyelitis (i.e., of the pubic bone in association with pubosymphseal urinary fistula after prostate cancer<sup>[3-5,9]</sup> and/or cervical cancer<sup>[6,8]</sup> treatments).

### Diagnostic testing for urinary fistulas

Diagnosis of urinary fistulas can be made through urological examinations. Fistulography is the most direct means of fistula visualization and should be used when feasible (e.g., cutaneous fistulas).<sup>[12]</sup> Intravenous urography, once first line in upper urinary tract fistula diagnosis, has been largely replaced by CT.<sup>[2,7,11]</sup> Overall, the key to diagnosis and management is maintaining a low threshold to investigate its presence.

### Difficulty with diagnosing ureteral fistulas

Ureteral leaks or fistulas can go undiagnosed for protracted periods of time at which point they often become severely symptomatic. Suspicion should be high, especially in patients with a history of cancer surgery. Note, the patient presented had an original pelvic malignancy, radiation, and prior instrumentation that all put her at high risk for the delayed complications that occurred several months later.

### CONCLUSION

In patients with recurrent sepsis, osteomyelitis/discitis, or psoas abscess of unclear origin, it is important to consider urodynamic testing to evaluate whether these findings may be attributed to a ureteral leak or fistula.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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