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Trauma and reconstruction

Case report: Bladder to lumbar spinal hardware fistula managed via partial cystectomy and removal of offending piece of spinal hardware

Samuel R. Donnenfeld^{*}, Kenneth J. Carney, George M. Ghareeb

Emory University Department of Urology, Emory University School of Medicine, Building B Suite 1403, 1365-B Clifton Road N, Atlanta, GA, 30322, USA



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ABSTRACT

A bladder to lumbar hardware fistula has never been reported. We report the case of a 67 year old male who presented with a bladder to lumbar spinal hardware fistula approximately four years following an L4-S1 anterior lumbar internal fixation. It was identified through the use of CT cystogram. His case was managed first with cystoscopy and interrogation of the fistula with a Glidewire followed by partial cystectomy and removal of some of the offending spinal hardware.

Introduction

Bladder fistulae are not uncommon. However, to our knowledge, a bladder to lumbar hardware fistula has never been reported. While the most common fistula involving the bladder is the vesicovaginal fistula, there are other types including vesicocolonic fistulae, vesicocutaneous fistulae, and others. In a national database review, the incidence of iatrogenic bladder fistulae related to surgery was 0.11%¹

Iatrogenic bladder fistula formation most commonly occurs following obstetric/gynecologic surgery (7.8/1000 cases), and amongst general surgery cases, the most common surgical procedures leading to fistulae involving the bladder involve open colonic resections.² There is currently no widespread data for bladder fistulae following neurosurgical or orthopedic spinal procedures.

We report the case of a 67-year-old male who presented with a bladder to lumbar spinal hardware fistula approximately four years following an L4-S1 anterior lumbar internal fixation. His initial procedure was complicated by a perioperative abscess formation managed with Interventional Radiology abscess drainage. Several years following this, he reported to our emergency room where a bladder to lumbar hardware fistula was diagnosed and managed successfully with partial cystectomy and removal of the offending spinal hardware.

Case presentation

A 67-year-old male with a history of L4-S1 anterior lumbar internal fixation presented to the Emergency Department complaining of right

gluteal pain, which had gradually worsened over the previous four days. At the time of presentation, he reported subjective fevers, but denied hematuria, hematochezia, and melena. He also denied abdominal pain, nausea, and emesis. His last colonoscopy was five months prior to his presentation.

CT at presentation revealed multifocal areas of gas and necrosis in the right gluteal muscle consistent with an abscess as well as an anterior fusion of L3-L4 and L4-L5 with interbody spacers. Air was seen within the presacral and prevertebral space at L4-L5, which appeared to be in continuity with the spinal hardware. Small foci of gas tracked to the left superior dome of the bladder, which was thickened. Air was also seen tracking into the right S1 and S2 neural foramen. The gluteal abscess was debrided by general surgery. During debridement, no communication with the prevertebral space was identified. The aforementioned foci of gas was re-examined postoperatively with a dedicated CT cystogram, which again demonstrated air tracking towards the dome of the bladder from the spine.

A Foley catheter was placed prior to consultation with the Urology service. At the time of Urology consultation, the patient's mental status had declined since his presentation in the Emergency Department. A urinalysis revealed pyuria for which he received broad-spectrum antibiotics. Given the above CT cystogram findings, the decision was made to take him to the operating room for cystoscopy, repeat colonoscopy, and interrogation of the fistula. Upon visual identification of the fistula and probing with a Glidewire, fluoroscopic evidence provided proof of the tract extending towards the spinal hardware (Fig. 1). Colonoscopy revealed no evidence of colonic involvement. Neurosurgery was then

^{*} Corresponding author.

E-mail addresses: samuel.ross.donnenfeld@emory.edu (S.R. Donnenfeld), kjcarne@emory.edu (K.J. Carney), george.michael.ghareeb@emory.edu (G.M. Ghareeb).

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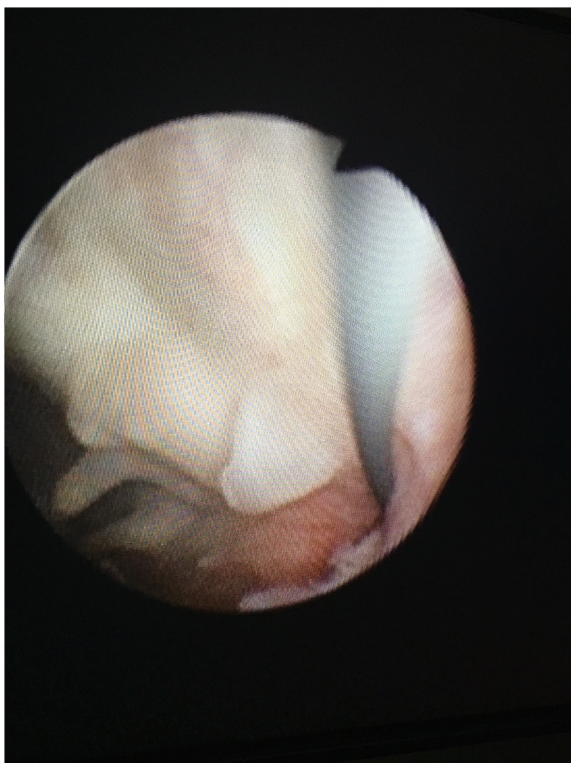


Fig. 1. Cystoscopy viewing of bladder fistula towards the spinal hardware being probed with Glidewire.

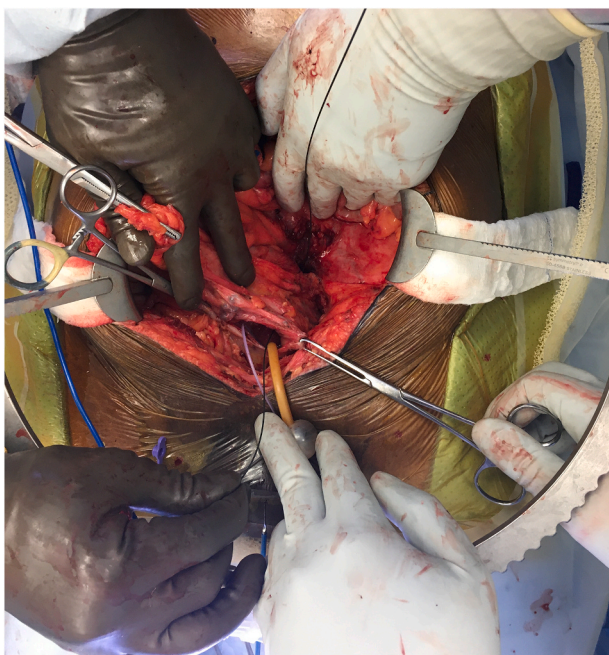


Fig. 2. Wire passing through bladder fistula to spinal hardware.

consulted for evaluation and management who recommended removal of some of the spinal hardware.

The following day the patient was taken back to the operating room. Exploratory laparotomy and extensive lysis of adhesions was performed.

The fistula and abscess wall were clearly identified, and the fistula was taken down with a partial cystectomy via anterior cystotomy, abdominal washout, and evacuation of the presacral abscess cavity (Fig. 2). As left hydroureteronephrosis was noted on preoperative CT scans and significant scar tissue was found to be surrounding the left ureter, a 6 French x 28 cm Double J ureteral stent was placed as well. Neurosurgery removed a single screw that was identified to be the offending hardware. Further exposure of the presacral space was deemed to be too high risk as the patient's aorta and common iliac arteries were completely encased in dense, adherent scar tissue. An omental flap was then harvested and secured in the pelvis, reinforcing the bladder closure and allowing for tissue interposition between the bladder and former abscess cavity. The patient was extubated and taken back to the ICU for further care with a 16Fr catheter in place. In the immediate postoperative period the patient progressed well and was subsequently sent to the floor several days later without incident. His neurological status improved significantly during this period.

Discussion

Bladder fistulae typically present with hematuria and suprapubic tenderness and can be associated with peritonitis. A high index of suspicion is required to identify rare bladder to spinal fistulae in patients with prior spinal surgery, microscopic hematuria, pyuria, and lower back pain. After confirmation with CT cystogram, we advocate for the use of cystoscopy, Glidewire probing, and confirmation with fluoroscopy to better identify the length and direction of the tract in question when there is an unclear or unusual source of the fistula, as outlined above.

Per the AUA Guidelines for bladder fistulae, to characterize and identify a bladder fistula, at minimum three images of the anterior and posterior pelvis are necessary via cystography. A critical step in performing cystography is adequate distention of the bladder with 300–400 cc of contrast via retrograde instillation.³ A CT scan without proper filling of the bladder is neither specific nor sensitive for diagnosing a bladder fistula. A CT cystogram such as the one obtained on this patient has the same sensitivity as a plain film cystogram when performed properly. Additionally, we also advocate for direct visualization with cystoscopy as it is beneficial for operative planning for eventual takedown and repair.

Depending on the location and type of spinal hardware, it is possible for it to be partially removed to help prevent fistula recurrence. Careful surgical technique is necessary when taking down the fistula, and partial cystectomy when feasible may be used for definitive treatment.

Conclusion

Bladder to spinal hardware fistulae can be properly identified through the use of CT cystogram and can be managed successfully with open fistula takedown and removal of part of the offending spinal hardware. Direct visualization of the tract via cystoscopy and probing with a Glidewire can be beneficial for preoperative planning.

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