

Delayed Presentation of Traumatic Bladder Injury: A case report and review of current treatment trends

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Citation

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Abstract

Bladder injuries in trauma are well documented and usually easily diagnosed with appropriate imaging. The modality of imaging in suspected bladder injury is evolving rapidly to CT cystogram as the primary imaging of choice in most facilities. After diagnosing a bladder injury the treatment depends on the injury being either intraperitoneal or extraperitoneal. Most extraperitoneal injuries are treated with catheter drainage, antibiotics and rest. We present a case of traumatic extraperitoneal bladder injury likely secondary to a pelvic fracture that was discovered more than a week after the inciting event. An uncommon approach was taken to repair the injury primarily. The case presents negative imaging studies prior to the diagnosis as well as discusses our reason for aggressive treatment for this patient. A review of current diagnostic modalities and therapeutic treatment methods is discussed.

INTRODUCTION

Bladder injuries are rarely seen in blunt abdominal trauma and usually are identified during initial evaluation. Prolonged delay in diagnosis of bladder injury has been reported but only in case studies. We present a young lady with a high index of suspicion for traumatic bladder injury after a motor vehicle accident. Despite multiple imaging modalities we were unable to diagnose the injury until ten days after arrival. An open approach was chosen for her extra peritoneal injury due to associated orthopedic injuries. We discuss our case here as a delayed presentation of an infrequently diagnosed injury.

CASE STUDY

A 38-year-old Caucasian female presented as a restrained passenger involved in a high-speed single motor vehicle accident with multiple rollovers and a prolonged extrication time. There was a brief loss of consciousness reported; however on arrival she was alert but intoxicated. Her primary survey showed hemodynamic stability with systolic blood pressure on arrival of 109 mmHg and a pulse of 84. She complained of pain down her spine, in her right pelvis and lower abdomen. Chest and pelvic x-rays revealed right pneumothorax and right pubic rami fracture. After uncomplicated placement of a Foley catheter there was immediate return of frank blood. She was subsequently placed in a pelvic binder apparatus and taken to the CT

scanner for trauma scans.

Contrasted CT of the abdomen and pelvis revealed multiple injuries including a comminuted fracture of the sacrum with diastasis of the sacroiliac joint as well as right superior and inferior pubic rami fractures. A large pelvic hematoma just superior to the symphysis pubis with suspected active extravasation of arterial contrast was seen with compression of the urinary bladder medially by the hematoma. CT cystogram was then performed after instilling an additional 150 mL of contrast into the bladder. This revealed a well distended bladder with no evidence of a leak (Figure 1). Subsequently, she was taken to the Angiography suite for pelvic embolization by vascular surgery, but this proved to be negative for active hemorrhage.

She was admitted to the intensive care unit and treated for her other injuries at which time she did become hypotensive and require blood transfusion. The gross hematuria did dilute over the next 24 hours. A formal radiographic cystogram was performed her second hospital day to confirm the initial CT cystogram findings and this was negative for bladder injury (Figure 2). Orthopedic Surgery repaired her sacroiliac joint on hospital day four after she had stabilized and was adequately resuscitated. Her pubic rami fractures were initially considered stable and managed conservatively. The next day bladder irrigation with saline was being performed every four hours and the dilute hematuria continued.

Urology consult was made with initial diagnosis of resolving hematoma of the bladder wall with recommendation for continued irrigation and eventual cystoscopy. Over the next few days the hematuria slowly became thicker.

Ten days after initial presentation, a third cystogram was ordered and now showed active extravasation of contrast anteriorly indicating bladder laceration (Figure 3). Repeat pelvic x-rays showed movement of the pubic rami and need for a second operative approach to repair. With a plan for open reduction and internal fixation of the pubic symphysis, the decision was made to perform an open repair of her extraperitoneal bladder laceration simultaneously.

An intraperitoneal approach through a previous pfannenstiel incision was chosen because of the degree of pelvic injury and hematoma with suspected difficulty visualizing the laceration through an extraperitoneal approach. Operative findings showed a one-centimeter laceration of the anterior bladder wall just above the bladder neck to the right of midline. This was an extraperitoneal injury caused by a bony spicule from her right superior pubic ramus fracture. After the spicule of bone was removed and the laceration excised, a three-layer closure of the bladder wall was then performed. At completion, the bladder was filled to capacity without evidence of leak. Near immediate resolution of the hematuria was noted. Two days later the patient was discharged home with a Foley catheter in place. Retrograde cystogram was repeated at six weeks that was negative for a leak and the catheter was subsequently removed. At twelve weeks postoperative she continues to do well.

Figure 1

Image 1: One image from the original CT cystogram showing no extravasation of contrast from the bladder.

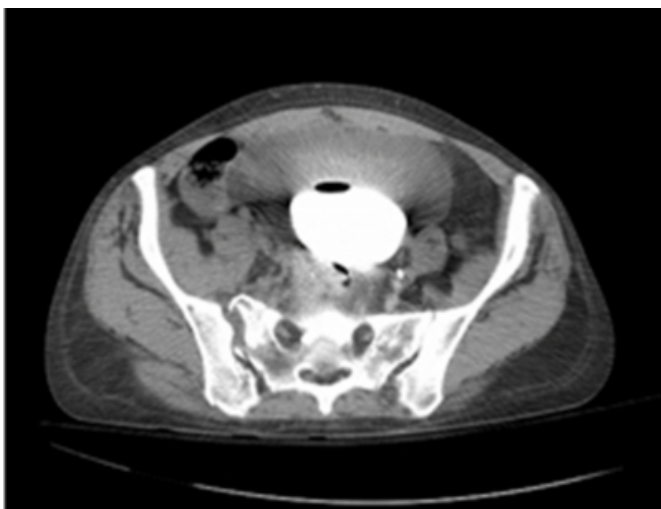


Figure 2

Image 2: Image from the first retrograde cystogram showing no extravasation of contrast on this AP view. Note the right superior and inferior pubic rami fractures.

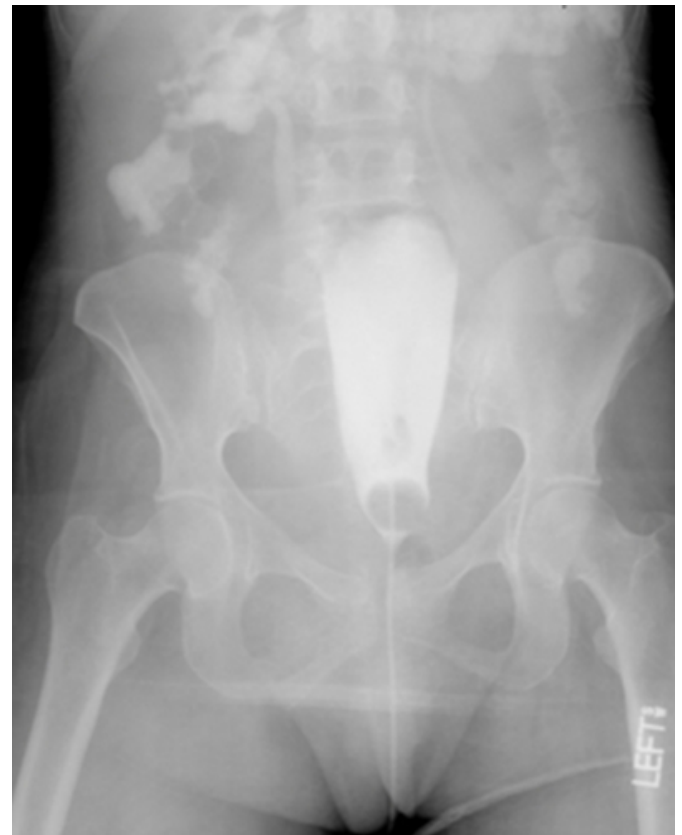


Figure 3

Image 3: AP view of retrograde cystogram done ten days after admission, showing extravasation of contrast anteriorly indicating bladder perforation.



DISCUSSION

Extraperitoneal bladder injuries in blunt abdominal trauma

are infrequent and rarely require repair. Nearly all patients with bladder rupture have either gross hematuria or a pelvic fracture and when combined there should be a high index of suspicion.^{1,2,3} Some authors agree that a CT cystogram is sufficient in diagnosing bladder injuries in the acute trauma setting yet others recommend a formal cystogram.^{4,5,6} In trauma patients, it is reported that fewer than half are in a condition which allows diagnosis by a retrograde cystogram.⁴ This combined with a high false negative rate reported as up to 27% for routine cystograms in the trauma setting, has increased the interest of CT cystography.³ CT cystography as performed in our case has been reported as approaching 100% sensitivity for clinically important bladder injury making it equivalent to conventional cystography.^{1,5,7}

The initial CT with contrast of the abdomen and pelvis was augmented by using CT cystography in what we thought was an obvious bladder injury. Within twenty-four hours a retrograde cystogram was also performed as a confirmatory test. These negative findings confirm that it was not a delayed diagnosis but a delayed presentation of bladder injury. We plan to use CT cystography more in the future as CT technology has become an excellent diagnostic tool for urological trauma and an important adjuvant to retrograde cystography in identifying bladder injuries in the trauma setting. We identified two conflicting studies that reviewed the time to diagnosis of extraperitoneal bladder injuries. Hsieh, et al reported 2.3 +/- 1.2 hours but an average of 6.7 days was published by Ziran, et al. in a patient population between 1991 and 1996.^{3,4} We find this very interesting and question if the difference in diagnostic time was related to no standard use of CT cystography.

We know that the fractured pubic rami led to the bladder injury and believe it was a progressive process worsened with mobilization that led to the final injury. Greater than 90% of all extraperitoneal bladder injuries are reported to be caused by various types of pelvic fractures.^{8,9,10,11} Complete non-weight bearing of the lower extremity and bed rest is initially recommended but difficult to mandate in the frustrated trauma patient. Our patient was alert and without significant pain, which led her to believe that ambulation would be acceptable. On multiple occasions she was found up in a chair and attempting to ambulate on her own.

Multiple studies have recommended catheter drainage of extra peritoneal bladder injuries with close monitoring, with which we agree.^{4,12,13,14} Based on the location of the

orthopedic repair, a definitive repair of her extraperitoneal bladder injury was required. The time between her initial inciting event and the time she was diagnosed with the injury was concerning for a failure of conservative therapy. She had ten days of catheter drainage with no evidence of resolution of the hematuria.

Although it is probably safe to assume that bladder injuries will continue to be a rare event, they will occur. It has been shown that a high index of suspicion and rapid utilization of all resources is our only way of diagnosing these injuries in a timely manner. Bony spicules in close proximity to the bladder wall have been speculated to be an increased risk for bladder rupture if seen and should be attentively looked for.¹⁵ CT cystography continues to impress with its accuracy but a retrograde cystogram should be performed when index of suspicion is high and CT is negative. Finally, conservative management is still a valuable option for extraperitoneal bladder injuries in the appropriate situation.

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