

# Combined Rectovesicular Injuries from Low Velocity Penetrating Trauma in an Adult

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## ABSTRACT

The most common concomitant site of injury following a penetrating anorectal injury is the genitourinary tract. In anorectal penetrating injuries, other organ injuries must be thoroughly evaluated. In the presence of concomitant rectal and posterior bladder injury, consideration should be given to omental interposition between the surgically repaired organs to prevent fistula formation. Fecal diversion may be required depending upon the integrity of the anal sphincters. Combined rectal and genitourinary trauma from stab wounds or impalement is rare, and requires an interdisciplinary approach utilizing the collaborative expertise of both trauma surgical and urology teams to optimize the intraoperative and postoperative care of the patient.

## CASE REPORT

A 41-year-old man with a history of depression was brought to the emergency department after multiple self-inflicted transanal stab wounds with a 6-inch steak knife. There was also an incidental stab wound involving the left wrist. The knife was removed by the patient prior to presentation. On physical exam he had diffuse abdominal pain, but was otherwise hemodynamically stable. Digital rectal exam revealed gross blood and inability to squeeze on the examining finger consistent with sphincter muscle injury. A Foley catheter revealed gross hematuria. The patient was taken to the operating room for proctoscopy, cystoscopy, and exploratory laparotomy. Intraoperative findings on proctoscopy included 3 rectal lacerations involving the internal and external anal sphincters. The largest laceration measured 3 cm in length and was located 5 cm from the anal verge at the 12 o'clock position. The trajectory of this wound was directed into the posterior prostatic urethra and posterior bladder neck. The Foley catheter was easily palpated through this injury. The rectal injury was repaired transanally with a single-layer, running, locking 3-0 chromic stitch. The 2 additional lacerations at the 3 o'clock and 6 o'clock position were repaired in a similar fashion.

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Cystoscopy demonstrated a laceration to the posterior bladder neck in the midline communicating with a large laceration in the left posterolateral prostatic urethra. The laceration was deep such that peri-prostatic fat was grossly visualized. At laparotomy there was no evidence of intraperitoneal bladder injury or other bowel injuries. The bladder neck laceration was repaired through a midline cystotomy using a running 3-0 Vicryl stitch

(Figure 1). A vascularized omental flap was dissected and placed between the 2 repairs of bladder and rectum to minimize fistula formation. Ureteral stents, a suprapubic catheter, and urethral Foley catheter also were placed. The extensive damage to the anal sphincter mechanism required a diverting loop sigmoid colostomy with presacral drain placement. Other minor injuries were lacerations to both hands, which were sutured by plastic surgeons.

The patient's hospital course was unremarkable, and on postoperative day (POD) 9 he was discharged to a psychiatric facility. On follow-up (POD 22) a retrograde urethrogram suggested continued prostatic urethral extravasation and the Foley catheter was left in place. A subsequent urethrogram 3 weeks later showed no evidence of extravasation or rectourethral fistula, and both catheters were removed. The ureteral stents were removed endoscopically a week later. Five months later the patient underwent reversal of the colostomy. He is now 8 months out from his injury with normal voiding, no incontinence, and no evidence of fistula formation.

## DISCUSSION

Genitourinary trauma is uncommon, with the majority of injuries being extraperitoneal bladder trauma (70%-95%) associated with pelvic fractures.<sup>1</sup> There is a higher reported incidence of genitourinary injury and combined genitourinary-rectal injuries with high velocity penetrating trauma. In a report of all penetrating rectal trauma at a single institution over a 13-year period<sup>2</sup> there were 200 cases of penetrating rectal injury, with 17 cases (8.5%) of concomitant genitourinary injuries (13 bladder injuries, 3 urethral injuries, and 1 ureteral injury), all associated with

gunshot wounds. Complications in 17 patients with combined penetrating rectal and genitourinary injuries revealed abscesses (pelvic, suprapubic, and subphrenic) in 18%, bladder stones in 12%, and urethral strictures in 12%. A case series of 69 gunshot wound patients treated at a single academic institution over a 9-year period<sup>3</sup> compared the management and postoperative complications of these high velocity penetrating injuries. The review identified 29 patients with isolated rectal injuries, 16 with isolated bladder injuries, and 24 with combined rectal and bladder injuries. There were 2 cases complicated by colovesical fistula formation and 2 cases of urinoma formation, all of which occurred only in those patients with combined rectal and posterior bladder injuries. Because of the higher incidence of postoperative complications (fistula, urinoma, abscess) in the combined rectal and genitourinary injuries, the authors of both studies suggested that these cases may benefit from placement of an omental interposition flap between the rectal and bladder repairs. Though both of these case series reviewed gunshot injuries, not low velocity injuries such as impalement or stab wounds as occurred in our patient, they offer insight into the complications that occur following combined rectal and bladder injuries. Because of concerns about possible fistula formation, we chose to interpose omentum between the rectal and bladder neck repairs.

The need for fecal diversion in the management of penetrating rectal injuries is debatable. A study reported in 2006 examined the management of nondestructive (all less than 25% circumferential injury) penetrating extraperitoneal rectal injuries without fecal diversion.<sup>4</sup> These were diagnosed on proctoscopy, and any intraperitoneal injury was repaired primarily while extraperitoneal injuries were left to heal secondarily. No presacral drainage was used. When comparing 14 patients managed in this fashion to historical matched controls that were treated with fecal diversion (loop colostomy or Hartmann's procedure), the researchers noted a shortened hospital stay in the nondiverted group (7.2 vs 9.8 days) that was not statistically significant, and no occurrences of retroperitoneal abscesses in either group. This study suggests that nondestructive penetrating rectal injuries could be managed successfully without fecal diversion. However, it is important to note that in our case the patient did not have a typical nondestructive penetrating rectal injury. Instead, lacerations to both the internal and external anal sphincters in multiple locations exceeding 25% of the anal circumference were identified. Additionally, there was a bladder neck injury with a full-length prostatic urethral laceration, which we felt altered our treatment algorithm to include fecal diversion for maximum healing.

Rare penetrating urethral injuries (anterior and posterior) are typically treated by primary repair with urinary diversion.<sup>5</sup> More common is traumatic disruption of the posterior urethra, which is usually associated with pelvic fracture. These types of injury are generally managed with initial suprapubic catheterization for urinary diversion and delayed urethroplasty.<sup>6</sup> In the case of

**Figure 1.** Laceration of the Posterior Wall of the Bladder Neck Seen through a Midline Cystostomy.



bladder neck laceration, repair is indicated in order to preserve urinary continence (due to damage to the external sphincter by the urethral disruption). With rectal injury, surgical repair is indicated to prevent infection of the associated pelvic hematoma as well as fistula formation. In our case, while the urethra was not completely disrupted, there was a full thickness laceration of the bladder neck (ie, internal urinary sphincter) extending toward the prostatic apex and external urinary sphincter. Thus there was a concern about future incontinence due to possible compromise of both urinary sphincters. Surgically, the bladder neck was the only accessible defect. Therefore, we felt it was important to repair it primarily to preserve the integrity of the internal sphincter.

Whether suprapubic catheter drainage is needed in addition to urethral catheter drainage is also debatable. One study<sup>3</sup> showed a higher rate of suprapubic catheter drainage in the combined rectal and bladder injury group (88%) compared with the isolated bladder injury group (56%), but there was no reduction in fistula/urinoma formation with suprapubic catheter drainage, leading the authors to conclude that suprapubic catheter drainage of bladder injuries should be reserved for cases in which long-term catheterization is anticipated or the repair is extensive or incomplete. In our case, with an injury extending from the bladder neck to the prostatic apex in which we could only repair the bladder neck, we chose to use both suprapubic and urethral catheters in an effort to maximize drainage. However, it is possible that a urethral catheter alone would have sufficed.

## CONCLUSION

In anorectal penetrating injuries, other organ injuries must be ruled out. The most common concomitant site of injury following a penetrating anorectal injury is the genitourinary tract, and a high index of suspicion must be maintained. In the presence of concomitant rectal and posterior bladder injury, consideration

should be given to omental interposition between the surgically repaired organs to prevent fistula formation. Fecal diversion may or may not be used in addition. Importantly, an interdisciplinary approach utilizing the collaborative expertise of both trauma surgical and urology teams optimizes the intraoperative and postoperative care of the patient.

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