



Case Report

RECTUM SPARING TRANSPELVIC IMPALEMENT WITH BLADDER AND CERVICOVAGINAL INJURIES

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Received : 22/08/2026
Received in revised form : 18/09/2026
Accepted : 01/10/2026

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DOI: 10.70034/ijmedph.2026.4.34

Source of Support: Nil,

Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (4); 233-237

ABSTRACT

Penetrating perineal impalement can produce complex pelvic visceral injury despite a small external wound. We report a rare rectum-sparing transpelvic injury involving the urinary bladder and cervicovaginal structures. A female patient sustained perineal impalement after falling onto an iron rod. She presented with hematuria and urinary retention, while fecal and flatus continence were preserved. Contrast-enhanced computed tomography with rectal contrast suggested rectal and bladder injury and showed moderate hemoperitoneum. Emergency laparotomy demonstrated a tract entering the left lateral perineum at approximately the 3-4 o'clock position and passing anterior to the rectum. Operative examination identified a partial internal anal sphincter tear involving about 25% of its thickness, a lateral vaginal wall laceration, a cervical rent, a 6 × 2 cm bladder dome rent, and a 2 × 2 cm trigonal rent with urinary extravasation. The rectal mucosa, external anal sphincter, and sigmoid colon were intact. Multilayer primary repair of the bladder, vagina, and cervix was performed, and a paracervical cyst was excised. Recovery was uneventful, and follow-up computed tomography cystography showed no contrast extravasation. This case shows that preserved continence and equivocal imaging do not exclude major transpelvic visceral injury. Careful trajectory assessment, timely exploration, and coordinated surgical repair can preserve urinary, gynecologic, and anorectal function.

Keywords: bladder injury; cervical laceration; impalement injury; perineal trauma; rectal sparing; vaginal laceration.

INTRODUCTION

Perineal impalement is an uncommon penetrating injury in which a rigid object enters the perineum and may traverse several pelvic compartments. Its apparent external severity can be misleading because a relatively small entry wound may accompany extensive internal damage. Published reports describe markedly different trajectories, including penetration close to major vessels or pelvic viscera without catastrophic injury.^[1] Consequently, assessment must establish the course of penetration rather than infer injury severity from the wound dimensions alone. Early recognition also allows appropriate surgical expertise to be assembled before definitive treatment. The principal clinical challenge

is identifying every injured structure while preserving the function of adjacent organs that remain intact.

The diversity of reported injuries limits the development of a single operative strategy. Janez and colleagues described selective management of abdominoperineal impalement, illustrating that treatment depends on demonstrated damage and the patient's clinical condition.^[2] Shrestha and colleagues reported an iron rod injury with minimal visceral damage, further emphasizing the importance of trajectory.^[3] These observations cannot establish comparative treatment effectiveness, but they show why similar mechanisms may produce very different anatomical outcomes. The depth, direction, and shape of the penetrating object, together with its

relationship to the pelvic floor, influence which structures require detailed evaluation.

Urinary tract involvement is particularly important when hematuria, difficulty voiding, or urinary retention accompanies a perineal wound. The bladder may be injured at more than one site, and lesions near its base require assessment of adjacent structures. Urotrauma guidance supports targeted investigation for suspected bladder disruption and operative management of intraperitoneal or otherwise complicated injuries.^[4] Retrograde cystography, performed conventionally or with computed tomography, evaluates bladder integrity; routine intravenous contrast imaging alone is not an equivalent examination. Recognition of urinary leakage matters because persistent extravasation can complicate recovery and compromise neighboring repairs. Diagnostic planning must therefore distinguish general trauma imaging from dedicated urinary tract assessment.

Rectal injury presents a separate diagnostic and therapeutic problem. The rectum lies close to the urinary and genital organs, and an oblique tract may pass alongside its wall without entering its lumen. Preserved continence does not establish rectal integrity or exclude partial sphincter disruption. Rectal trauma literature emphasizes anatomical classification, associated injuries, and direct assessment when the mechanism raises concern.^[5] Distinguishing mucosal or full thickness disruption from isolated injury to surrounding tissues is essential because decisions about repair and diversion depend on the actual lesion. A suspected injury on imaging should therefore be reconciled with operative or endoscopic findings whenever uncertainty persists.

In female patients, a transpelvic tract can additionally involve the vagina and cervix. Such injuries may coexist with urinary symptoms that dominate the initial presentation, making systematic examination especially important. Assessment should document the relation of each lesion to the proposed trajectory and clarify whether communication exists between injured organs. Immediate priorities include recognition of bleeding and contamination, while subsequent evaluation should consider urinary, anorectal, and gynecologic recovery. Detailed reporting of these anatomical relationships is valuable because isolated descriptions of an entry wound or one visceral defect may underestimate the complexity of the overall injury.

We describe perineal iron rod impalement producing separate bladder dome and trigonal rents, lateral vaginal and cervical lacerations, and partial internal anal sphincter disruption. Despite radiological suspicion of rectal involvement, exploration documented intact rectal mucosa, external anal sphincter, and sigmoid colon. The report examines the discrepancy between suspected and confirmed injuries, the rationale for targeted primary repair, and the interpretation of an uncomplicated early recovery. It also identifies limitations imposed by incomplete clinical and follow up documentation. Presentation

follows the CARE reporting framework, with unavailable patient information explicitly acknowledged rather than inferred.^[6]

Case Presentation

Patient Information and Clinical Findings

A female patient presented following an accidental fall onto an iron rod, resulting in penetrating trauma to the left lateral perineum. The external entry wound was described at approximately the 3–4 o'clock position. The entry site and proposed course of penetration are illustrated in Figures 1 and 2. The mechanism and anatomical location raised concern for extension beyond the perineal soft tissues into the pelvis. The available clinical information did not specify the patient's age, the interval between injury and presentation, or whether the rod remained in place on arrival.

The principal presenting urinary symptoms were hematuria and urinary retention. These findings raised suspicion of lower urinary tract injury in the context of the penetrating mechanism. In contrast, passage of feces and flatus was preserved, and fecal and flatus continence were reported to be maintained. Thus, the initial presentation combined prominent urinary symptoms with apparently preserved anorectal function. The latter findings did not establish the integrity of the rectal wall or individual sphincter components, which were subsequently assessed during operative evaluation.

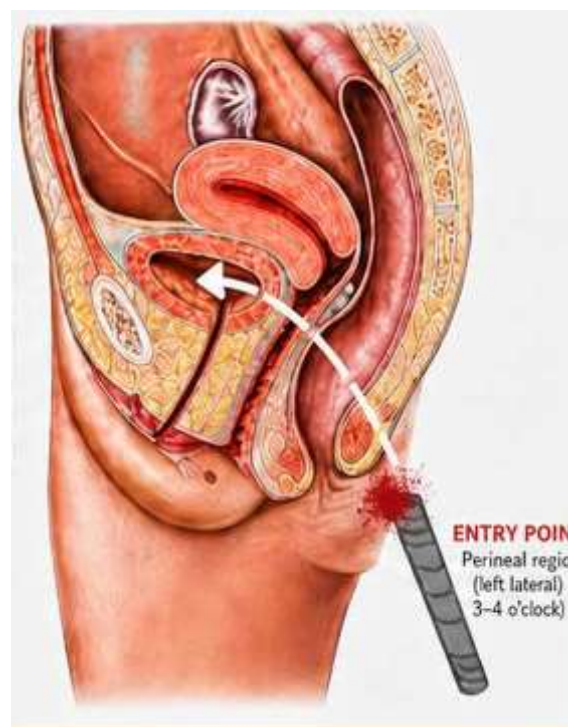


Figure 1: Sagittal anatomic illustration showing the left lateral perineal entry and proposed anterior transpelvic trajectory. The tract passes anterior to the rectum toward the cervicovaginal structures and bladder. Adapted from Netter's Anatomy; publication permission or replacement with an original schematic is required

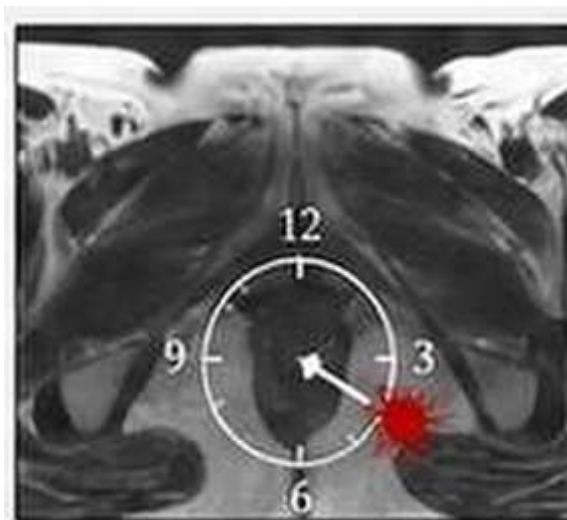


Figure 2: Axial orientation image localizing the left lateral perineal entry site at approximately the 3-4 o'clock position.

Diagnostic Assessment

Contrast-enhanced computed tomography of the abdomen and pelvis was performed with rectal contrast. The examination raised suspicion of injury to both the rectum and urinary bladder and demonstrated moderate hemoperitoneum. Axial and coronal images showed the pelvic injury trajectory, as illustrated in Figures 3 and 4. These findings indicated that the injury involved more than the externally visible perineal wound.

Although rectal injury was suspected radiologically, the imaging findings did not establish whether the penetrating tract had entered the rectal lumen or passed immediately adjacent to its anterior aspect. The combination of urinary symptoms, suspected pelvic visceral injury, and intraperitoneal fluid prompted emergency operative exploration. The anatomical diagnosis was therefore established by correlating the imaging findings with direct observations at laparotomy.



Figure 3: CECT axial view showing the pelvic injury trajectory indicated by the arrow

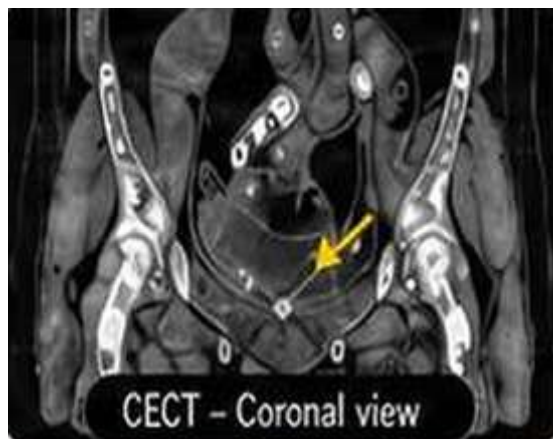


Figure 4: CECT coronal view showing the pelvic injury trajectory indicated by the arrow

Operative Findings

Emergency laparotomy demonstrated a transpelvic tract passing anterior to the rectum. Exploration identified two separate bladder defects: a dome rent measuring 6×2 cm and a trigonal rent measuring 2×2 cm. The operative images demonstrate the dome and trigonal injuries in Figure 5A and 5B, respectively. Urinary extravasation was documented in association with the trigonal defect. The presence of defects at two different bladder sites showed that the urinary injury was not confined to a single visible laceration.

Associated genital tract injuries comprised a lateral vaginal wall laceration and a cervical rent, illustrated in Figure 5C and 5D. A partial tear of the internal anal sphincter, involving approximately 25% of its thickness, was also identified. Despite the proximity of these lesions to the anorectal structures, the rectal mucosa, external anal sphincter, and sigmoid colon were documented as intact. The operative findings therefore distinguished partial sphincter injury from rectal mucosal penetration and clarified the earlier radiological suspicion of rectal involvement.

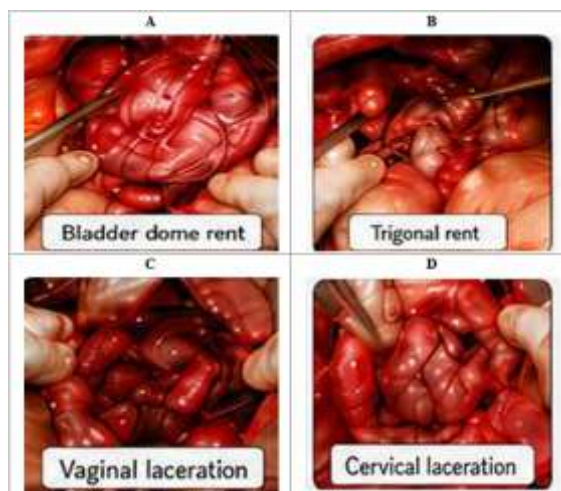


Figure 5: Intraoperative images in a single panel: (A) bladder dome rent (6×2 cm); (B) trigonal rent (2×2 cm); (C) lateral vaginal wall laceration; (D) cervical rent

Surgical Treatment

The bladder, vaginal, and cervical defects underwent primary repair in multiple layers during the same operation. A paracervical cyst encountered at exploration was also excised. The available record did not provide the histopathological findings of the cyst or indicate whether it was related to the traumatic injury.

The documented treatment addressed the confirmed urinary and cervicovaginal defects. No separate technique for management of the partial internal sphincter tear was described. Details of the suture materials, ureteric assessment, drains, and intraoperative testing of the bladder closure were also unavailable. Consequently, the operative account is limited to the anatomical findings and repairs explicitly recorded.

Follow Up and Outcomes

The postoperative course was reported to be uneventful. Follow-up computed tomography cystography showed no contrast extravasation, providing imaging evidence of bladder integrity at the time of assessment. This finding was consistent with healing of the repaired bladder defects. The timing of the cystogram, duration of urinary catheterization, and length of hospital stay were not specified in the available documentation.

No postoperative urinary, gynecologic, or anorectal dysfunction was reported during the available follow-up. However, a defined surveillance interval and formal functional assessments were not provided. The documented outcome therefore comprises an uncomplicated postoperative course and a cystogram without demonstrable leakage; it does not establish long-term urinary, sexual, reproductive, or continence outcomes. The principal clinical events are summarized in Table 1.

Table 1: Clinical timeline

Stage	Clinical event
Mechanism	Fall onto an iron rod causing left lateral perineal impalement.
Presentation	Hematuria and urinary retention; fecal and flatus continence preserved.
Imaging	CECT with rectal contrast suggested rectal and bladder injury and showed moderate hemoperitoneum.
Operation	Emergency laparotomy identified bladder dome and trigonal rents, cervicovaginal lacerations, and a partial internal sphincter tear; rectal mucosa, external sphincter, and sigmoid colon were intact.
Treatment	Primary multilayer repair of the bladder, vagina, and cervix; excision of a paracervical cyst.
Outcome	Uneventful recovery; CT cystogram showed no contrast extravasation.

DISCUSSION

The distinguishing feature of this case is extensive urinary and cervicovaginal injury with preservation of rectal mucosal integrity. The documented tract passed anterior to the rectum despite entering close to the anal sphincter complex. Earlier impalement reports demonstrate that trajectory can permit visceral sparing even after substantial penetration.^[1-3] In this patient, however, rectal sparing coexisted with two bladder defects and genital tract lacerations. Preserved passage of stool and flatus therefore provided limited reassurance about the overall injury burden. It did not exclude partial internal sphincter disruption or clinically important damage elsewhere in the pelvis.

The bladder dome and trigonal rents required separate anatomical assessment. The American Urological Association guideline supports surgical repair of traumatic intraperitoneal bladder rupture and assessment of the bladder neck and ureteric orifices during repair.^[7] These considerations are particularly relevant to a trigonal defect, where proximity to the ureteric orifices may affect reconstruction. The documented multilayer repairs and subsequent absence of contrast extravasation support successful early closure. However, the available record does not specify ureteric assessment, suture material, intraoperative leak testing, or catheter duration. These omissions limit evaluation of

the operative technique and should be resolved from the clinical record.

Postoperative imaging should be interpreted in relation to injury complexity. The Eastern Association for the Surgery of Trauma guideline distinguishes follow up requirements for simple and complex bladder injuries, although its evidence concerns blunt trauma and cannot be transferred uncritically to impalement.^[8] Japanese urotrauma guidance provides additional recommendations for bladder injury assessment and treatment.^[9] In this case, the combination of dome and trigonal injury makes documentation of healing especially useful. A negative computed tomography cystogram establishes that no leak was demonstrated at that examination; it does not independently establish normal voiding, continence, or durable urinary function.

The radiological concern for rectal injury was not confirmed at exploration. This discrepancy illustrates the need to interpret imaging alongside the mechanism and direct anatomical findings. The Western Trauma Association algorithm supports structured evaluation of suspected rectal trauma, including further assessment when injury cannot be confidently excluded.^[10] WSES bowel injury guidance likewise recognizes limitations of imaging in penetrating trauma and the importance of clinical context.^[11] Here, hemoperitoneum and suspected injury to multiple pelvic organs supported urgent

operative assessment. The report should specify how rectal integrity was established, including whether examination under anesthesia, proctoscopy, or another direct assessment supplemented laparotomy. Comparison with a published case of bladder perforation accompanying rectal impalement reinforces the importance of evaluating the urinary tract when a penetrating pelvic injury produces hematuria.^[12] The present case differs because the rectal mucosa remained intact. Repair and diversion decisions should follow the confirmed injury pattern rather than the presumed involvement of adjacent organs. Rectal trauma guidance addresses management of actual rectal disruption; it does not justify diversion solely because a tract passes nearby.^[5,10] Separate documentation of the internal sphincter, external sphincter, and rectal wall is therefore valuable. The reported partial internal sphincter tear also warrants continued assessment of continence.

The vaginal and cervical lacerations were repaired during the same operation as the bladder defects. Their coexistence supports examining the entire threatened pelvic pathway rather than stopping after identifying a urinary lesion. Anatomical closure addresses the recognized defects, but the available information cannot establish the quality of later genital tract healing. Follow up should document abnormal bleeding or discharge, pain, urinary leakage through the vagina, and relevant sexual or reproductive concerns. Similarly, urinary symptoms and stool or flatus control require explicit assessment. A defined surveillance interval and recorded patient reported symptoms would also permit clearer comparison with other published cases and strengthen interpretation of the outcome. Such observations would connect the operative findings to functional recovery more convincingly than an uncomplicated hospital course alone.

This report is limited by its single patient design and incomplete baseline and follow up information. Patient age, admission physiology, laboratory findings, detailed repair technique, and surveillance duration were unavailable. Consequently, the favorable reported recovery cannot establish long term preservation of urinary, reproductive, sexual, or anorectal function. CARE guidance supports transparent reporting of these gaps.^[6] The main contribution is anatomical: major bladder and cervicovaginal injury can occur despite rectal sparing, and systematic exploration can clarify an uncertain radiological diagnosis.

CONCLUSION

A perineal entry wound and preserved continence can coexist with extensive transpelvic visceral injury. In this case, an iron rod injured the internal anal sphincter, lateral vaginal wall, cervix, bladder dome, and trigone while sparing the rectal mucosa, external

sphincter, and sigmoid colon. Timely exploration, deliberate mapping of the trajectory, systematic inspection of all threatened pelvic organs, and coordinated multilayer repair produced an uncomplicated recovery and a leak-free postoperative cystogram. The case supports a low threshold for exploration when imaging and mechanism suggest multi-organ pelvic injury, even when rectal function appears preserved.

Patient Perspective

A patient perspective was not available.

Declarations

Ethics approval: Institutional requirements for publication of a single case should be confirmed before submission.

Consent for publication: Written informed consent was obtained from the patient for publication of this case report and the accompanying images.

Conflict of interest: The authors declared no conflict of interest.

Funding: The authors received no financial support for the preparation or publication of this case report.

Data availability: All data relevant to this case are contained within the report; access to additional clinical information is subject to patient confidentiality and institutional policy.

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