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## Case Report

# Extraperitoneal rectal trauma in a patient with multiple gunshot wounds: A case report and literature review

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## ABSTRACT

Penetrating rectal trauma is an uncommon presentation, particularly in centres with low rates of trauma, and requires a high index of suspicion to identify and treat. Management of penetrating rectal trauma has evolved over several decades and previously included proximal diversion, distal rectal washout, and presacral drainage as the primary surgical maneuvers to reduce mortality. Recently, a more conservative approach has been adopted, as the applicability of combat experience to the civilian setting has been questioned. In this report, a case of extraperitoneal rectal injury in a patient with multiple gunshot wounds provides a backdrop for literature review and discussion of the modern diagnostic and management approaches to penetrating rectal trauma.

## Introduction

Penetrating rectal trauma is an uncommon presentation in civilian trauma centres, particularly in areas with low incidence of trauma, and thus requires a high index of suspicion to identify and treat. The management of penetrating rectal trauma has evolved over several decades – experience in the Vietnam War established proximal diversion, distal rectal washout, and presacral drainage as the primary surgical maneuvers to reduce mortality [1], but in more recent years, a conservative approach has been adopted, as the applicability of combat experience to the civilian setting has been questioned [2]. We present a case of extraperitoneal rectal injury in a patient with multiple gunshot wounds, at a Level 1 trauma centre where penetrating trauma is relatively rare. Written and informed consent was provided for the use of patient information and images.

## Case

A 25-year-old male was brought to the emergency department with multiple gunshot wounds to the neck, thorax and pelvis. He arrived hemodynamically stable, and found on primary and secondary survey to have no obvious injuries that would necessitate immediate intervention. Seven bullet wounds were identified in total, with one in the left lateral gluteal region. We proceeded to thoracic and pelvic radiographs, at which time a radiolucent projectile was noted in the soft tissues lateral to the right hemipelvis, potentially corresponding to the entry site at the left lateral gluteus. There was no blood on digital rectal exam. He underwent cross sectional imaging of the neck, chest, abdomen and pelvis, where findings suggestive of a rectal injury were identified including

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suspicious projectile entry and exit sites (Figs. 1 and 3), and extraluminal air in the mesorectal fat, with layering density suggestive of hematoma in the perirectal soft tissues (Fig. 2). He was consented for an examination under anesthesia, possible laparotomy, and possible fecal diversion. With careful consideration of the collective experience of the involved surgical team in managing penetrating trauma as well as the safety of the patient, an open approach was chosen over laparoscopy.

The patient had sustained a left distal femur fracture with an embedded projectile and was brought to the operating room for open reduction and internal fixation. Following this, he was repositioned in lithotomy and a rigid sigmoidoscope was inserted. Blood was noted within the rectum, 10 cm from the anal verge, with no obvious lacerations or devitalized appearing mucosa. The decision was made to divert with loop sigmoid colostomy to prevent pelvic sepsis. Upon entering the abdomen, there was a small amount of sanguinous free fluid noted, but no enteric contamination. There was hematoma along mesentery of sigmoid colon, but the entirety of the bowel was healthy and viable. We noted hematoma in zone three of the retroperitoneum which was nonpulsatile and non-expanding, and therefore not explored. A stoma was matured and the abdomen closed. He completed a 14 day course of antibiotics with gram negative coverage on the presumption that there was contamination of his pelvis. He had an uneventful post operative course – his diet was advanced, with no clinical or biochemical signs of pelvic sepsis.

## Discussion

The anatomic distinctness of the rectum as both an extraperitoneal and intraperitoneal organ accounts for much of the challenge in the diagnosis of rectal trauma, even in high-volume centres. As in the present case, the suspicion of an injury to the rectum is often initially raised on assessment in the trauma bay, where the potential internal path of a projectile is estimated based on the position of the external bullet wounds. The diagnosis is then supported with a combination of digital rectal exam (DRE), computed tomography (CT), and endoscopic examination [2].

Long included as part of the trauma survey, DRE has more recently fallen out of favour, due to its limited clinical utility and relative invasiveness [3]. A 2009 retrospective review of 77 patients with penetrating rectal trauma found that of the 38 patients who had a negative DRE in the trauma bay, 25 were ultimately found to have full thickness rectal injuries (sensitivity of 51%) [3]. Another review found DRE to have a false-negative rate of 67% in the detection of rectal injuries [4]. This is reflective of our experience in the present case, where DRE was negative despite the presence of a rectal injury.

Radiographic detection of a rectal injury is challenging, as the most specific findings, including extravasation of lumenally administered contrast, and clear visualization of a mural defect, are rarely present [5]. Many trauma centres do not routinely include lumenally administered contrast in the performance of trauma CTs. The most sensitive radiographic finding to identify any penetrating bowel injury is a wound tract adjacent to the bowel [5]. Findings relevant to penetrating anal or rectal injury in particular include rectal wall thickening, perirectal stranding, and free fluid. Extraluminal air and fluid in the mesorectal fat is a nonspecific finding, but significantly raises clinical suspicion and prompts further investigation.

Direct visualization of the rectal lumen is undertaken to identify the presence, location, and extent of a suspected rectal injury [2,3]. Rigid sigmoidoscopy is reported to have a sensitivity of about 71% for rectal injuries in general, and 88% for extraperitoneal rectal injuries specifically [3]. A 2020 South African review reported a detection rate of less than 50% for rectal injuries on sigmoidoscopy [6]. Intraluminal blood may be the only finding to suggest a rectal injury and in such situations, the specificity of the test is reduced.

The management of penetrating rectal trauma in the civilian setting has been shifting away from the routine use of distal rectal washout, presacral drainage and proximal diversion. The majority of trauma surgeons no longer routinely perform distal rectal washout or presacral drainage, as there is a paucity of literature demonstrating any benefit from these procedures outside of the context of high-velocity, combat-associated traumatic rectal injuries [6,7]. A multicenter retrospective review by the American Association for the Surgery of Trauma (AAST) group identified 459 patients with extraperitoneal rectal injury, and found that distal rectal washout and presacral drainage were independently associated with increased occurrence of abdominal complications – measured as a



Fig. 1. Projectile entry tract in left hemipelvis soft tissues.



Fig. 2. Gas and hematoma in the mesorectum.



Fig. 3. Projectile and exit tract through right hemipelvis soft tissues.

composite outcome of abdominal abscess and/or pelvic or retroperitoneal abscess and/or fascial dehiscence [8]. Most of these patients underwent proximal diversion alone, with fewer intraabdominal complications, but no difference in mortality, when compared to those who also underwent presacral drainage or distal rectal washout.

Proximal diversion, however, has largely remained a component of the management of rectal trauma, though this too has been a topic of debate. A small prospective study by Gonzalez et al. examined 14 patients with non-destructive penetrating extraperitoneal rectal injuries managed without proximal diversion, and found no increase in complications when compared to a matched group of 14 rectal injury patients who had undergone proximal diversion [9]. An extensive review of the existing literature on the topic was undertaken by the Eastern Association for the Surgery of Trauma (EAST) group in 2016, in an effort to establish clinical practice guidelines [10]. This work culminated in the recommendation that patients should undergo proximal diversion, with the omission of distal rectal washout and presacral drainage, in cases of non-destructive penetrating extraperitoneal rectal injuries.

## Conclusion

The presented case highlights the diagnostic and treatment considerations for extraperitoneal penetrating rectal trauma. It offers a learning opportunity for surgical residents, fellows, and staff – particularly those who serve communities with low volumes of penetrating trauma, where one must remain vigilant for the detection, diagnosis, and timely treatment of this uncommon presentation.

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