



## Full length article

## The management of penetrating rectal and anal trauma: A systematic review



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## ABSTRACT

**Introduction:** Traumatic injuries to the lower gastrointestinal tract (rectum and anus) have been largely reported in the military setting with sparse publications from the civilian setting. Additionally, there remains a lack of international consensus regarding definitive treatment pathways. This systematic review aimed to assess the current literature and propose a standardised treatment algorithm to aid management in the civilian setting.

**Methods:** A systematic review of available literature from 1999 to 2016 that was performed. Primary endpoints were the assessment and surgical management of reported rectal and anal trauma.

**Results:** Seven studies were included in this review, reporting on 1255 patients. 96.3% had rectal trauma and 3.7% had anal trauma. Gunshot wounds are the most common mechanism of injury (46.9%). The overwhelming majority of injuries occurred in males (>85%) and were associated with other pelvic injuries. Surgical management has substantially evolved over the last five decades, with no clear consensus on best management strategies.

**Conclusion:** There remains significant international discrepancy regarding the management of penetrating trauma to the rectum. Key management principals include the varying use of the direct primary closure, faecal diversion, pre-sacral drainage and/or distal rectal washout (rarely used). To date, there is sparse evidence regarding the management of penetrating anal trauma.

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## Introduction

Traumatic injuries to the lower gastrointestinal tract have been predominantly reported from the military setting [1–5]. As a result, a substantial volume of the current management and outcomes of such injuries are based on military publications [6–8], with sparse publications from the civilian settings [9,10]. In broad terms, colorectal injuries that occur during military combat are usually due to high-energy blunt trauma, whereas in the civilian setting, they are typically of a low-energy and penetrating in nature. Therefore, the optimal management strategy for injuries that occur in the civilian setting is unknown. Numerous classifications have been developed with the aim to incorporate the mechanisms and management of colonic, rectal and anal trauma [11].

Military-based research has substantially improved the management practices for lower gastrointestinal trauma. Historical events have led to the development of novel management

strategies. Reports from the American Civil War (1861–1865), showed that colorectal injuries were largely managed non-surgically with mortality rates over 90% [12]. By World War I (1914–1918), primary repair of the injured bowel was established as the standard procedure, but mortality still remained high, (approximately 60%), with of the majority of deaths attributable to sepsis-related complications [13]. World War II (1939–1945) was associated with more substantial technological advancements in weaponry (high-velocity bullets); this resulted in a knock-on effect of more severe colorectal/gastrointestinal injuries. Management shifted towards diversion surgery, with the use of colostomies, due to the complexity of injuries. Such was the change in surgical practice that a letter by the United States Surgeon General (Letter No. 178) mandated the use of diversion colostomy for the treatment of all penetrating colonic injuries. The move to a damage-control surgical approach with diversion resulted in a substantial reduction in mortality (<40%) [3,14]. The use of pre-sacral drainage by interventional radiology became a popular strategy during the Korean War (1950–1953), while the washout of the distal rectum was recommended during the Vietnam War (1954–1975). By this time, associated mortality was estimated at just over 10% for penetrating lower gastrointestinal injuries [15].

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At present, mortality from colorectal trauma is approximately 3%, but associated morbidity remains high (25%) [16], due to development of intra-abdominal sepsis [14]. Basic management principals include early haemorrhage control while reducing contamination of the intra-abdominal cavity. However, there remains a lack of international consensus or definitive treatment guidelines pertaining to lower gastrointestinal trauma. Therefore, the aim of this systematic review was to assess the current literature on the management and outcomes of penetrating rectal and anal trauma and propose a standardised treatment algorithm that would help direct and establish early management and emergency surgery protocols in the civilian setting.

## Material and methods

### Literature search and study selection

A systematic review was performed according to the guidelines and recommendations from the preferred reporting items for systematic reviews and meta-analyses checklist (PRISMA) [17]. Institutional review board approval was not required. We conducted an electronic systematic search using of the Pubmed and Embase databases examining for articles published relating to rectal and anal trauma. The following search terms were used: (anal trauma[Title/Abstract]) OR (rectal trauma[Title/Abstract]). Additionally, the Cochrane Central Register of Controlled Trials was checked for relevant articles. The search was performed on the 15th of September 2016 independently by two authors (DA and DC)

with screening of potential abstracts and full-text viewing of suitable publications.

### Eligibility criteria

To be included in this analysis, articles had to be published in the last 17 years (1st September 1999 to 30th August 2016) and be reported in English. All titles were initially screened and appropriate abstracts were reviewed. Each of the relevant/eligible publication reference section and Google scholar was also screened for other applicable publications (Fig. 1). Articles must report on surgical management of rectal or anal trauma. Additionally, they must report on surgical outcomes and complications. Case series with less than 10 were excluded.

### Data extraction and outcomes

Two authors (DA and DC) independently extracted data from identified eligible studies. A third person (MK) acted as an independent arbitrator over any disputes. Data relating to each individual publication was extracted using standardised extraction forms and included the following: general data (author's name, study design, year of publication); type of injury, injury setting (military, civilian setting, etc.), associated injuries, management (primary repair, debridement, pre-sacral drainage, distal rectal washout) and outcome (end-stoma, septic morbidity, overall 30 day mortality).

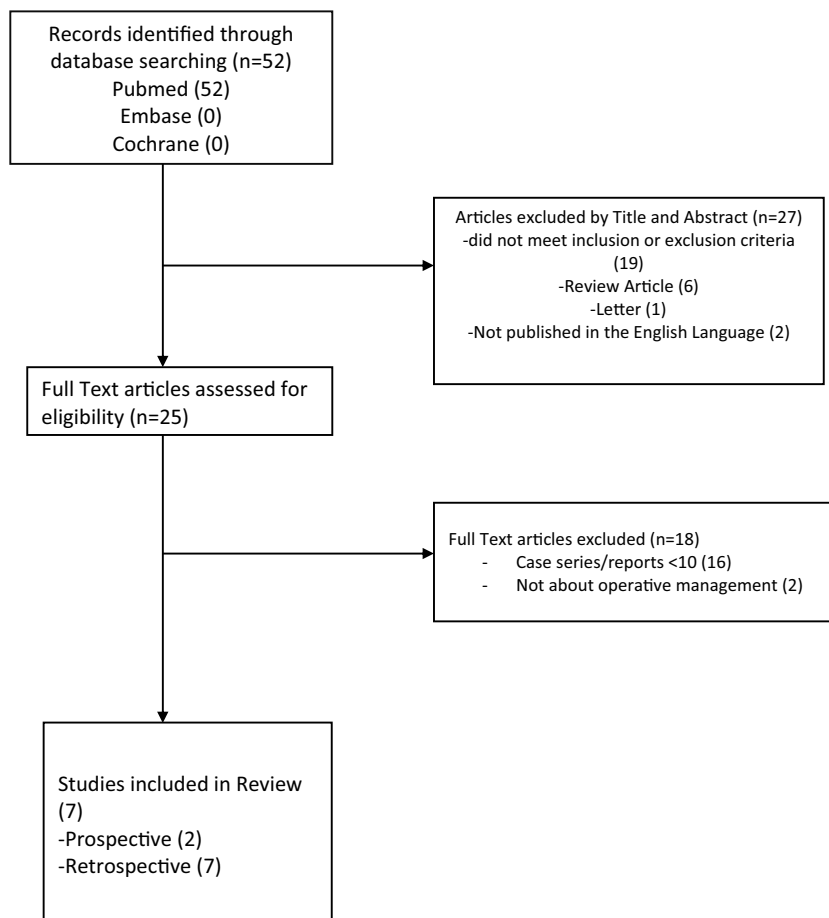


Fig. 1. PRISMA Flowchart outlining the selection process.

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