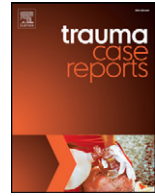




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Case Report

Patterns of retroperitoneal trauma following gunshot violence: A case series[☆]

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ABSTRACT

Introduction: Abdominal trauma is defined as any injury to the abdomen and its containing viscera. Common penetrating injuries including gunshot or stab injuries are increasing worldwide. However, retroperitoneal gunshot injuries have a lower incidence than trans-abdominal trauma and can have substantially different outcomes.

Case report We report a series of three family members involved in gunshot violence over an 18-month period. Each sustained retroperitoneal gunshot injuries with varying injury patterns and treatment courses. Interestingly, one patient had a delayed small bowel perforation on day 6 post injury.

Discussion: Retroperitoneal trauma following gun violence has a lower incidence than trans-abdominal trauma. There is a paucity of literature describing injury patterns following this type of injury and their subsequent management. In the context of penetrating retroperitoneal trauma, the retroperitoneal organs are at risk and therefore serial clinical and/or radiological assessment is necessary. Delayed small bowel injury as a consequence of retroperitoneal gunshot is an unusual finding, with no reports to our knowledge in the literature.

Conclusion: this case series highlight that penetrating retroperitoneal trauma can produce a variety of injury patterns. Therefore a wide clinical acumen is needed to ensure a successful outcome. The trajectory of the bullet may help ascertain potential injuries, but serial assessment and observation are also important. Ultimately, individual cases must be treated accordingly, based on clinical stability, severity of injury and

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radiological findings. Despite initial stability, patients should always be observed for delayed complications.

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Introduction

Abdominal trauma may be defined as any injury to the abdomen and its containing viscera. It can be classified as blunt or penetrating, with blunt being the more common [1]. Alternatively, penetrating injuries are further sub-classified as missile or non-missile. The most common penetrating injuries worldwide are gunshot or stab injuries.

Despite increasing gun related trauma over recent years in the Republic of Ireland, it remains relatively low in comparison to other western countries. Ireland's homicidal rate of firearm injury is 0.32 per 100,000 population, while America and South Africa have rates of 2.9 and 80 per 100,000 population respectively [1]. Worldwide, males are more common victims, with mean age ranging from 18–25years [2].

The distribution of gunshot injuries to the body is very variable, with significant differences in extent of injury. Frequently, it involves the lower trunk or the abdomen. Missile injuries to the abdomen most commonly result in trauma to the small intestine and specifically the distal ileum [1].

Management of penetrating trauma has evolved over the last century. Expectant management was commonplace during the First World War. With better sterilization, antimicrobials and surgical techniques a considerable shift to operative management, including mandatory laparotomy during the Second World War occurred. However, the role of selective laparotomy became more established during the Vietnam War [3]. In recent decades, improved diagnostics including laparoscopy, computerized tomography imaging and focused ultrasound scans help to better delineate those patients that require earlier surgical intervention. Overall, such modalities have resulted in improved overall survival for those patients presenting with penetrating abdominal injuries [3,4].

This case series describes a variation of penetrating (gunshot) injuries inflicted on three family members over an 18-month period, each presenting to the same general hospital. They had a common pattern of retroperitoneal bullet entry but with varying outcome.

Presentation of cases

Table 1. Summarizes each case, including demographics, mechanism of injury, assessment and treatment, imaging, management approach and outcome.

Discussion

Worldwide gun-related violence is increasing [5]. As a result, there have been increased publications discussing management. Many high-volume centers are increasingly employing selective non-operative management for abdominal gunshot injuries [6]. This has been largely based on data relating to anterior/trans-abdominal injuries. Retroperitoneal trauma following gun violence is uncommon compared to trans-abdominal trauma, but is largely managed using similar guidelines as anterior gunshot wounds [7]. Studies have observed that injury severity is directly related to bullet type and trajectory, type of weapon (low versus high velocity) and distance from the victim [4].

There is paucity in the literature describing the pattern or frequency of organ involvement in retroperitoneal penetrating injuries. Traditionally, any penetrating injuries to the torso, whether trans-abdominal or retroperitoneal required a mandatory operation [3]. However, with better radiological imaging there has been a shift to more conservative management strategies, reserving surgical exploration for any patient that presents or develops clinical instability or peritonism [7].

Velmahos et al. reported on 203 consecutive patients with gunshots to the back. 31% of patients had emergency laparotomy performed from the outset, while 69% were observed clinically. Only 3% of those managed conservatively required subsequent laparotomy, while 3.4% of those initially managed operatively had negative findings [7]. Other series have shown negative laparotomy rates for all types of penetrating abdominal

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