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Case Report

Scrotal impaling injury causing ascending colon perforation and retroperitoneal fistula[☆]T. McKitterick^{*}, J. Ipsen, J. Cover

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ABSTRACT

Impalement injuries though relatively uncommon are some of the most dramatic and are known to cause significant damage due to the forces involved, the combination of blunt and penetrating mechanisms, and wound contamination.

They generally occur following falls from a height, motor vehicle accidents or other high velocity mechanisms. Their management requires specific consideration to the prehospital management of the impaling object, management of any organs injured and appropriate debridement and washout of the tract.

We report a case of a scrotal impalement traversing the abdominal cavity and causing a colonic injury and a rib fracture which resulted in a chronic discharging sinus from the patient's retroperitoneum.

Case presentation

A 48-year-old male who was using a broom to aid him climbing into the back of a truck when he fell and became impaled on the broom through his scrotum. The patient denied any other injuries. The patient removed the broom from the wound, mobilised and was transferred to a rural hospital where he received a tetanus booster and intravenous antibiotics prior to being transferred to the regional hospital.

On presentation to the regional hospital the patient complained of significant groin and abdominal pain. On examination he was haemodynamically stable, and a primary survey revealed no abnormalities. His secondary survey revealed abdominal tenderness in the right iliac fossa, tenderness and swelling over the inguinal canal and a puncture wound to his left hemiscrotum. His past medical history was significant for obesity, hypertension.

Given the mechanism and clinical findings the patient underwent a CT scan of his C-Spine, chest abdomen and pelvis which showed a right groin haematoma, stranding and free air around the caecum, subcutaneous gas in the right flank at the latissimus dorsi and a minimally displaced 11th rib fracture on the right (Fig. 1). His blood investigations of note included a venous lactate of 3 and a haemoglobin of 140.

The patient was transferred to theatre for an exploratory laparotomy. On initial inspection no colonic injury was identified, however, due to the imaging findings the ascending colon was mobilised and 2 defects were noted on the retroperitoneal aspect of the ascending colon. Significant oedema and bruising of the retroperitoneal tissues was also noted. The testicular and cord structures were

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intact as well as all major vessels and organs within the trajectory of the injury. A right hemicolectomy was performed and the entry wound was extended, washed out and opposed loosely around a Yeates drain.

The patient was transferred to the intensive care unit intubated. He was extubated on day 1 post operatively. The patient was treated with 10 days of intravenous co-amoxiclav with agreement from the infectious diseases team due to intraabdominal contamination. TED stockings and 5000 international units of heparin twice daily were commenced for DVT prophylaxis. He was transferred to the ward on day 5.

On day 10 the patient complained of chest pain and was found to be tachycardiac and desaturating. A CT Pulmonary angiogram was performed showing bilateral large pulmonary emboli. Therapeutic anticoagulation was commenced with enoxaparin. A lower limb doppler did not show any deep vein thrombosis. He was switched to oral rivaroxaban prior to discharge home on day 16.

6 months later the patient presented to the emergency department with a painful swelling over his right flank. He underwent an incision and drainage under general anaesthetic and wound swabs were sent. He was discharged on oral antibiotics with daily wound packing. The wound swabs cultured *Escherichia coli*. The site continued to discharge fluid and a CT was performed which showed a tract extending from the site of his sinus to the right pararenal fascia with no collection identified.

As a result, debridement of the sinus tract was performed, however, the wound continued to discharge. At a dressing change 2 months later however a piece of denim fabric measuring 4x4cms was seen extruding from the wound (Fig. 2). This was removed and since there has been a significant decrease in the discharge from the wound.

Discussion

Abdominal impalement cases, though infrequent in nature, have been published previously with the most common mechanisms involving motor vehicle accidents and those falling from a height onto fixed metal objects [1]. The management of these cases follows the basic principles of management of penetrating trauma with added consideration to the removal of the impaling object, thorough exploration to ensure concurrent injuries are not missed and appropriate washout and antibiotic coverage given the high levels of contamination associated.

Our case differs from those given that the patient was impaled on a broom handle and his fall was from a relatively low height of 2 m. This mechanism has not been previously reported and would be considered unlikely to cause this level of injury. The patient's body habitus likely impacted the level of penetration. This will be something that will be needed to be considered in future as obesity becomes more prevalent [2].

Current guidelines recommend cross-sectional imaging in stable patients with abdominal penetrating trauma and the benefit of this was highlighted by this case as the initial findings of the laparotomy not showing any colonic injury [3]. Without preoperative imaging this patient may have been deemed suitable for an inguinal exploration and wash out or if a laparotomy had been performed the injury to the retroperitoneal aspect of the colon may have been missed.

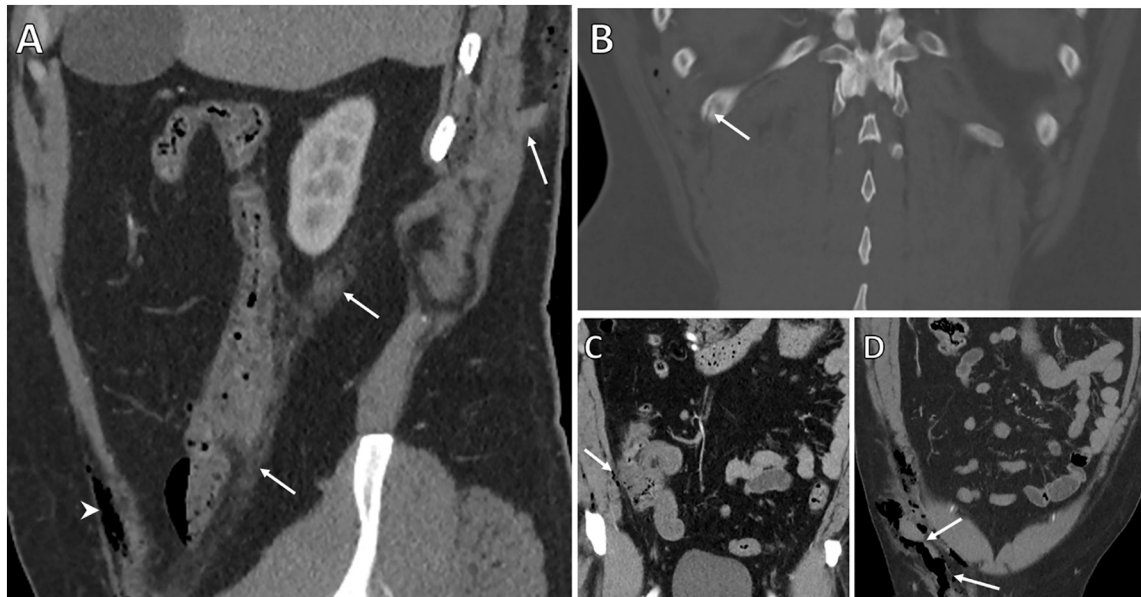


Fig. 1. Intraoperative penetrating scrotal trauma. Sagittal (A) and coronal (B, C & D) CT abdomen post contrast in a 48-year-old male following scrotal impalement with a broom. A) The path of the impaled broom can be seen to follow a "tract" of inflammatory change in the right paracolic gutter (arrows) and pre-peritoneal gas (arrowhead), note the proximity of the ascending colon. B) In bone window setting, an associated non-displaced fracture of the right twelfth rib is apparent (arrow). C) Intraoperative free gas (arrow) adjacent to oedematous ascending colon concerning for bowel injury. D) demonstrates the volume of gas within the right inguinal canal (arrows).

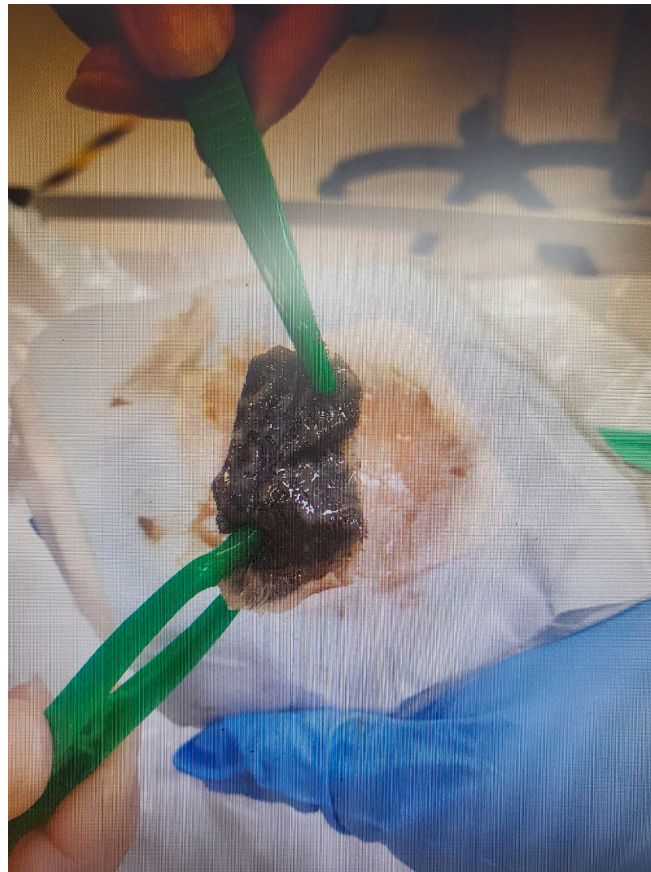


Fig. 2. 4 × 4 cm piece of denim removed from wound.

Trauma patients are known to be significant risk of VTE, with reported incidence of 44 % in this population [4]. The patient was placed on chemical and mechanical prophylaxis from the day of admission. However, evidence suggests higher dosing of chemical prophylaxis in trauma patients and highlights the importance of dosing being weight and BMI adjusted [4].

Retroperitoneal cutaneous fistula has previously been reported in a patient with bowel perforation [5]. The management of the recurrent collection and sinus is a complex factor given that source appeared to be retained foreign body in the pararenal tissues. To perform a deep debridement and washout would be an option however this would be associated with risks to the renal and adrenal structures.

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Conflicts of interest

None.

References

- [1] M. Saha, Abdominal and thoracic impalement injuries in children due to fall from height: our experience, *Indian J. Surg.* 81 (5) (2019 Oct 9) 439–444.
- [2] A. Fox, W. Feng, V. Asal, What is driving global obesity trends? Globalization or “modernization”? *Glob. Health* 15 (1) (2019 Dec 27) 32.
- [3] L. Smyth, C. Bendinelli, N. Lee, M.G. Reeds, E.J. Loh, F. Amico, et al., WSES guidelines on blunt and penetrating bowel injury: diagnosis, investigations, and treatment, *World J. Emerg. Surg.* 17 (1) (2022 Dec 4) 13.
- [4] R. Bigos, E. Solomon, J.D. Dorfman, M. Ha, A weight- and anti-xa-guided enoxaparin dosing protocol for venous thromboembolism prophylaxis in intensive care unit trauma patients, *J. Surg. Res.* 265 (2021 Sep) 122–130.
- [5] H. Şahin, M.K. Bircan, A. Gedik, A retroperitoneal abscess with cutaneous fistula developed after stercoral fistula operation: a case report, *Int. Urol. Nephrol.* 30 (1) (1998 Jan) 39–40.