

A concealed small bowel perforation in an adult secondary to bicycle handlebar trauma

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ABSTRACT

Traumatic abdominal wall hernia (TAWH) secondary to bicycle handlebar is a rare injury. The majority of the literature describes abdominal wall herniation in children. We present a rare case of TAWH in an adult with a concealed small bowel perforation. Although clinical examination in conjunction with computed tomography can exclude the majority of solid organ injuries, small bowel injuries can often be missed. Our case initially revealed a serosal tear in the small bowel but, on close inspection, a separate 3mm perforation was identified, hidden in the small bowel mesentery. We strongly support a low threshold for operative intervention if there is any suspicion. Moreover, we stress the importance of meticulous examination during laparotomy as this injury could have been easily missed, resulting in potential morbidity or mortality in a patient sustaining such an injury.

KEYWORDS

Traumatic abdominal wall hernia – Bicycle handlebar injury – Small bowel perforation

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Traumatic abdominal wall hernia (TAWH) secondary to a bicycle handlebar is a rare injury. Many of the published cases have been identified in children. One recent literature review identified 21 cases of TAWH as a result of bicycle handlebar trauma in children between the ages of 4 and 14 years. However, there were no intra-abdominal findings of small bowel injury, and all cases were managed with laparotomy and layered closure.¹ Haimovici *et al* described the first case of an incarcerated handlebar hernia associated with multiple jejunal perforations and mesenteric tears in a 15-year-old boy.² Karaman *et al* reported two cases of antimesenteric ileal perforations in 14 children over a 3-year period.³ To the best of our knowledge, we present the first adult case of a concealed bowel perforation in the mesenteric border of the midileum.

Case history

A 25-year-old man with no past medical history or any pre-existing abdominal wall hernias was pedalling a bicycle on an incline when his chain derailed. This caused him to fall on to the handlebars, resulting in a blunt trauma injury to his abdomen. He was complaining of severe abdominal pain and a mass in the lower abdomen. His vital signs were unremarkable.

Abdominal examination demonstrated a 10cm x 5cm diffusely tender, non-reducible swelling in the infraumbilical

region, associated with a ring-shaped ecchymosis caused by the bicycle handlebar end. Computed tomography showed a 12mm tear in the rectus sheath, inferior to the umbilicus, containing small bowel loops in the subcutaneous tissue. There was no intra-abdominal free air or fluid.

A lower midline laparotomy was performed. Small bowel loops were visible in the subcutaneous fat. There was a bilateral transverse tear in the rectus sheath with separation of rectus muscle in the midline. Omentum and small bowel mesentery were also protruding through the ruptured peritoneum.

On examination of the small bowel, two injuries were identified initially (Fig 1). There was a partial, full thickness tear of the mesentery and a 10mm serosal tear on the antimesenteric border of the midileum. The mesenteric defect and the serosal tear were repaired with interrupted absorbable sutures. Prior to closure of the rectus sheath, a final inspection of the length of the small bowel from the duodenojejunal flexure to the terminal ileum was performed. An unexpected third injury was identified (Fig 2). There was a 3mm full thickness perforation concealed in the mesentery of the small bowel. The location of this relative to the other injuries is identified by the dotted oval in Figure 1.

Due to the finding of three injuries in close proximity, a decision was made to perform a limited small bowel resection with a stapled side-to-side anastomosis. The rectus sheath tears were closed with interrupted non-absorbable

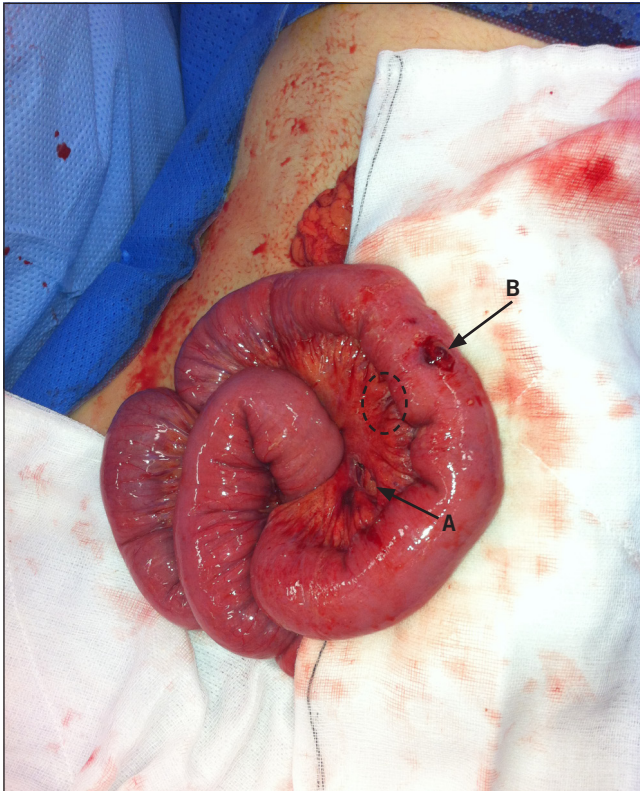


Figure 1 A partial, full thickness tear of the mesentery (A) and 10mm serosal tear on the antimesenteric border of the midileum (B). The dotted oval is the position where the third injury was later identified. (See Fig 2.)

sutures and the midline laparotomy was closed in a continuous fashion.

The patient's postoperative pain management consisted of morphine administered via patient controlled analgesia for the first two days. His bowels opened on day 3 and he was discharged uneventfully on day 5. A follow-up appointment was arranged.

Discussion

TAWH is an uncommon cause of blunt abdominal trauma and was first described by Selby in 1906.⁴ In 1980 Dimyan *et al* developed the term 'handlebar hernia' as a result of direct blunt trauma against a motorcycle handlebar during a head-on collision.⁵ Wood *et al* characterised TAWH into three types: small defects as a result of blunt trauma, larger defects sustained by high energy transfer such as motor vehicle accidents and intra-abdominal bowel herniation as a result of a deceleration injury.⁶



Figure 2 A 3mm full thickness perforation, concealed in the mesentery of the small bowel (C)

The force sustained from blunt injury does not penetrate the abdomen because of the elastic properties of the skin. However, the increased abdominal pressure due to direct impact results in energy dissipation through the abdominal wall, leading to shearing of fascial and muscle layers.⁵ The most likely cause of a small bowel injury in such cases is a crush injury between the handlebar and vertebral spine.

Conclusions

In the setting of TAWH, computed tomography may exclude major abdominal trauma but small bowel injury can be difficult to demonstrate. We strongly support a low threshold for operative intervention if there is any suspicion. Initially, only a serosal and mesenteric tear were identified. Nevertheless, on subsequent examination, a concealed perforation was detected. It is extremely important to adopt a meticulous, systematic approach to inspecting the small bowel. This is essential to prevent potential morbidity and/or mortality in patients sustaining such mechanisms of injury.

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