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## TRAUMATIC ABDOMINAL WALL HERNIA FROM HANDLEBAR INJURY, LAPAROSCOPIC REPAIR REPORT OF TWO CASES

### ABSTRACT

**A**lthough rare, traumatic abdominal wall hernia associated with handlebar injury is a well-described entity in the pediatric population with about 40 cases and only one laparoscopic repair reported in children. We present two cases of male patients, 9 and 13 years old, who were assessed in our emergency room for blunt abdominal trauma associated with handlebar injury. The patients showed signs of handlebar trauma in the abdominal wall: one presented with a painful mass, and the other with intermittent pain in the area of trauma with no palpable mass. Neither of the patients were hemodynamically unstable or showed any peritoneal signs. Ultrasound and CT scans were performed in both patients to identify abdominal wall hernias containing bowel content in the absence of other injuries. Laparoscopic repair was performed uneventfully in both patients with interrupted non-absorbable multifilament suture with 2 and 3 ports respectively. Oral intake was initiated one day after surgery and both patients were discharged the following day. In the follow-up visit, the patients were asymptomatic and no signs of abdominal wall hernias were found.

Laparoscopic repair of blunt traumatic abdominal wall hernias is safe and technically possible in children and should be considered as the standard initial approach in the stable patient.

**Keywords:** *Handlebar injury, blunt abdominal wall hernia, laparoscopic repair of abdominal hernia.*

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## INTRODUCTION

Although handlebar injuries are well known in children, abdominal wall hernias secondary to this mechanism are rare. There are few reported cases of this kind, with about only 40 reported cases identified in the reviewed literature (2). Traditionally, management has consisted in repairing the defect through an incision above the hernia or by laparotomy, though other authors propose a conservative approach in the asymptomatic patient (3,4), and there is only one report of laparoscopic repair (1). We present two cases of abdominal wall hernias repaired successfully by laparotomy.

## CASE 1

A 13-year-old boy was referred to our institution three days after suffering a handlebar injury in the right iliac fossa. He presented with history of abdominal pain, nausea and vomiting. On examination he was hemodynamically stable, though a handlebar sign was present in the right iliac fossa (fig 1) with tenderness. No palpable mass was found.



Fig 1. Handlebar sign.



Fig 2. CT scan, with an abdominal wall defect and small bowel through it.

An abdominal ultrasound was performed in the referring institution with an image that suggested a traumatic abdominal wall hernia. A CT scan was performed, without evidence of lesion in the solid viscera and the traumatic hernia was confirmed with bowel protruding through the defect (fig 2).

The patient was taken to the operating room. The laparoscopic approach was performed with one 10 mm port at the umbilicus and two 5 mm ports in the right flank and left iliac fossa, respectively. A 2 cm defect above the internal right inguinal ring was found (fig 3), compromising the peritoneum and transverse and oblique muscles.

The defect contained a segment of ileum, which was reduced, and no signs of ischemia or lesion in its mesentery were found. The defect was closed (fig 4) with interrupted non-absorbable multifilament sutures using the extracorporeal knot tying technique. Oral intake was initiated the next day, and the patient was discharged the following day. In the first follow-up visit, the patient was doing well, without palpable masses or abdominal pain. After two years, the patient remains asymptomatic regarding the abdominal wall hernia with no recurrence.

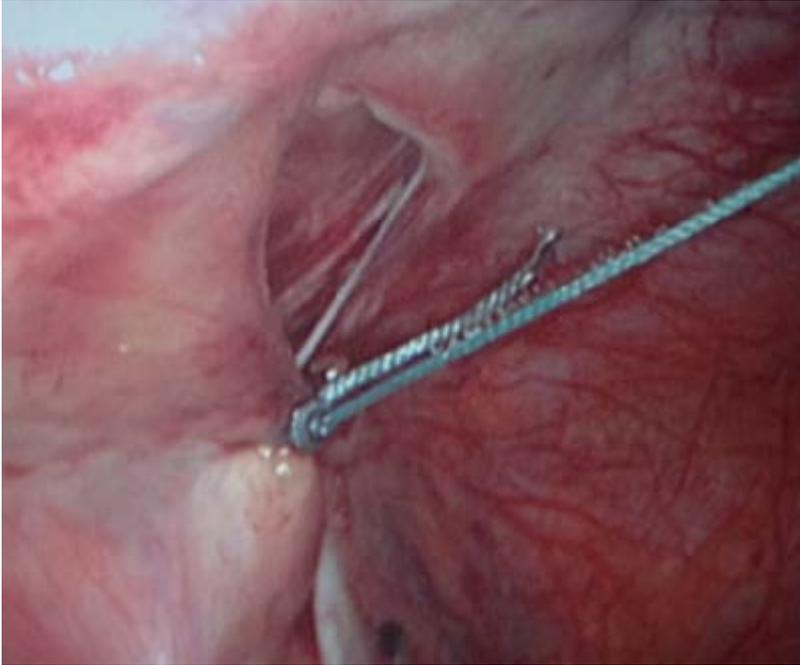


Fig 3. Traumatic abdominal wall defect above the internal inguinal ring.

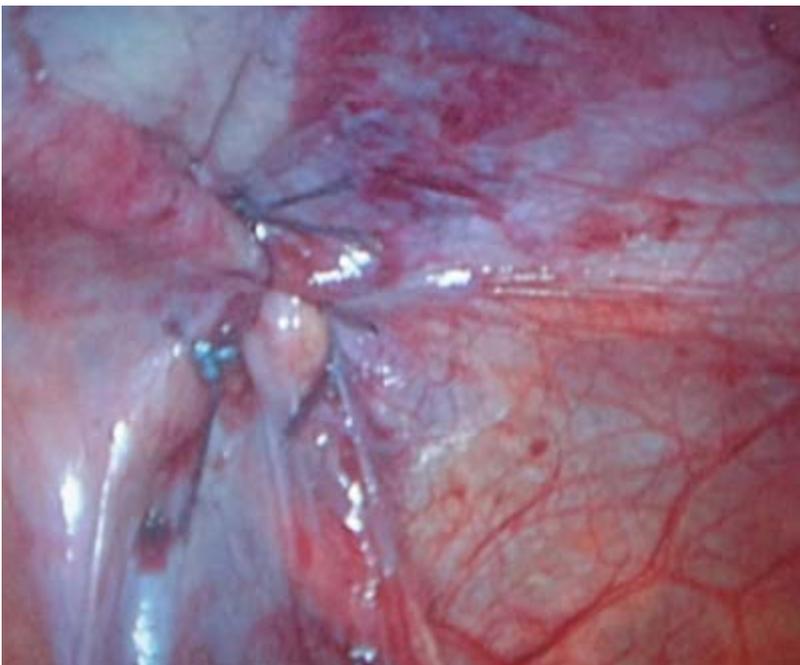


Fig 4. Closed defect.

## CASE 2

A 9-year-old boy presented to our institution 12 hours after suffering a handlebar injury in the upper-left abdomen. After the injury, he noticed a painful abdominal mass at this level, and subsequently, vomiting. On examination, the patient was hemodynamically stable, with the handlebar sign (Fig 5) at the level of the upper-left abdomen, with a tender palpable mass.

An ultrasound was performed, and an abdominal wall hernia was identified and confirmed by a CT scan evaluation (Fig 6) in which no other lesions were found. The abdominal wall hernia was filled by a small bowel segment.

Based on these findings, the patient was taken to the operating room for laparoscopic repair. Two 5 mm ports were used, one through the umbilicus and one in the right iliac fos-



Fig 5. Handlebar sign.



Fig 6. CT scan demonstrates the presence of an abdominal wall hernia with bowel content.



Fig 7. Abdominal wall hernia with omentum.

sa, after the pneumoperitoneum was insufflated. Only the omentum (Fig 7) was identified inside the hernia, and was reduced.

The defect was about 4 to 5 cm long compromising the peritoneum and transverse and oblique muscles. It was corrected with interrupted non-absorbable sutures. The needle was passed through 2 mm skin incisions above the hernia and recovered with an endoscopic needle holder. Then, the edges of the hernia were taken and the needle was recovered again through the skin incision. The suture was tied until the defect was corrected completely. Oral intake was initiated and tolerated the next day and the patient was discharged the following day. In the follow-up visit, the patient was doing well, without signs of hernia recurrence.

## DISCUSSION

Abdominal wall hernias represent about 1% of lesions related to blunt trauma (1). Although rare, traumatic abdominal wall hernia associated with handlebar injury is a well-described entity (1) in the pediatric population with about 40 cases reported in the reviewed literature (2). Most cases of pediatric handlebar injuries occur between the ages of 9 and 14 (8). Abdominal wall hernias can be detected soon after handlebar injury or a few days after as it is not always evident in the physical examination, such as it was in our first case and other reported cases (5). Additionally, a lack of knowledge of this pathology might result in missed and underreported cases in the asymptomatic patient (4).

As described above, a high index of suspicion is needed to perform the diagnosis (7),

and complementary imaging using abdominal ultrasound and CT scan might also be necessary. In one of our children, clinical findings were insufficient to perform the diagnosis and complementary images were needed. CT scans will also help in the evaluation of additional injuries (5).

Usually in children, these kinds of hernias are secondary to a low energy trauma, as in bicycle handlebar injuries (5), and it is secondary to a sudden application of blunt force that is insufficient to penetrate the skin but strong enough to disrupt the muscle and fascia (6). In the reviewed literature no major related injuries were reported and were correlated with the findings in our cases (6).

Open layer repair has been used traditionally either through an incision above the hernia or by laparotomy (2,5). Laparoscopy has been used for diagnostic purposes (2,6) and there is one report of laparoscopic repair using an Endo Close TM system (Covidien, Mansfield, MA) (1). We present two different techniques that can be used in the management of this disease that are reproducible with adequate results. Other authors have postulated the possibility of a conservative approach for the asymptomatic patients, as they identify spontaneous resolution with time (3,4). Nevertheless, we don't have enough experience with this approach to be able to recommend it. Early primary repair is also reported to limit ongoing morbidity related to pain, limitation of function, and hospital stay (7).

Laparoscopic repair of blunt traumatic abdominal wall hernias is safe and technically possible in children, and should be considered as the standard initial approach in the stable patient.

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