

## Intestinal perforation secondary to blunt abdominal trauma in pre-existing inguinal hernia

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**SUMMARY: Intestinal perforation secondary to blunt abdominal trauma in pre-existing inguinal hernia.**

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*Inguinal hernias are very common in men. We report a rare case of intestinal perforation following blunt abdominal trauma in a*

*80-year-old man with pre-existing inguinal hernia. A careful and serial physical examination, with the information obtained from the computed tomography (CT) scan guides the prompt surgical exploration. This case demonstrates that external forces, that may seem too trivial to cause intraperitoneal injury, can cause significant injury when applied to a patient with a hernia. It is possible to repair the intestinal perforation and inguinal hernia in the same operation.*

KEY WORDS: Blunt trauma - Inguinal hernia - Intestinal perforation.

### Introduction

Approximately 25% of males develop an inguinal hernia during their lifetime (1). A clinical exam can do the diagnosis easily. Incarceration and strangulation of the intestinal structures are the most frequent reported complications of unrepaired inguinal hernia. Overall, intestinal and mesenteric injury represents 5% of patients with blunt abdominal trauma (2). The presence of inguinal hernia may be a major factor contributing to acute small intestinal perforation. Such a happening may occur, regardless of whether the force be direct or indirect by muscular contraction, whether it be of trivial magnitude, and whether it be applied to the inguinal area or at a distance from it (3). We report a case of rupture of intestine associated with hernia,

after a moderate abdominal trauma. The intestinal perforation and hernia were repaired surgically at the same time.

### Case report

An 80-year-old man was admitted to the emergency unit with pain in the right inguinal and right lower abdominal region; one hour previously, he slipped and fell, striking his lower abdomen to the ground. His abdominal exam was normal except for mild pain in his reducible right inguinal hernia. The patient was discharged after having performed an ultrasound abdomen, negative for injury and intra-abdominal fluid. About six hours after abdominal trauma, the patient returns to the Emergency Room for worsening of abdominal pain. During re-examination, abdominal tenderness and rebound were observed. An abdominal CT scan with intravenous contrast showed pneumoperitoneum in the abdomen, free air within the right inguinal hernia sac, free fluid and bowel wall thickening of terminal ileum (Figure 1).

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**Figure 1 - Scan of abdomen shows free intraperitoneal air, right inguinal hernia sac with extraluminal air and fluid in abdomen.**

An exploratory laparotomy revealed a small perforation on the antimesenteric border of the terminal ileum and the mucosa pouted through the opening in the serosa; a quantity of turbid, green, free fluid was found in the lower abdomen and pelvis; the bowel wall around the perforation and the mesentery were healthy (Figure 2); the perforation was closed by simple suture. The abdomen was closed with drainage.

A new operative field for the inguinal hernia was prepared. A right inguinal incision was performed and an indirect hernia sac was isolated and reduced in abdominal cavity; a tension-free Liechtenstein hernia repair with a partially absorbable lightweight mesh was performed. The patient made an uneventful recovery and was discharged on the 5<sup>th</sup> postoperative day. Control examination was normal at the 30-day postoperative follow-up.



**Figure 2 - Perforation of the ileum found at the laparotomy.**

## **Discussion**

Bowel perforations caused by blunt abdominal injury in patients with an inguinal hernia is a rare and not well recognised problem; there are few reports in the surgical literature (4, 5). These are more common in men over 45 years of age and in right-sided hernias (4). Intestinal perforation in patients with pre-existing hernias has been reported from blunt trauma to the abdomen (3, 6) and more rarely from blunt trauma directly to the inguinal hernia (4, 5). Vyas et al. found that traumatic intestinal perforation rates were higher in patients with inguinal hernias than in the healthy population (7). When the intra-abdominal pressure is raised by blow or a sudden muscular contraction the increased pressure is transmitted equally to all parts of the bowel wall and it therefore cannot burst; if a loop of bowel is situated opposite a defect in the abdominal wall (a hernia) and thus unsupported on one side, it may burst (6). The resulting pathology is usually a perforation at the anti-mesenteric border of the bowel. Another mechanism is that of a shearing effect applied to a fixed loop and its mesentery between two points, such as the ileocecal junction and the neck of the sac. The perforation in this instance manifests itself as a linear tear at the mesenteric border of the

bowel with eversion of the mucosa (3). Finally, direct trauma to an inguinal hernia can generate a pressure greater than 300 mm Hg, which is more than the 150-260 mm Hg needed to rupture intestinal loops (8). The commonest area of perforation is the small bowel and more specifically the ileum (60% ileum, 10% jejunum, 4% colon) (5). Small bowel perforation has low mortality and complication rates if it is treated early, within 24 h of injury (9). It has been reported that performing serial physical examinations of the abdomen in the haemodynamically stable patient with abdominal trauma is a reliable method for evaluation (5, 10). If the patient develops signs of peritonitis a surgical intervention is needed (10). Ideally, after the first evaluation, performing subsequent evaluations by the same physician over the course of several hours is preferred. In pertinent literature, there is a limited diagnostic role of CT in injury of hollow space organs. Our patient returned to the emergency room after about six hours with worsening of abdominal pain and appearance of peritoneal signs. In this case, on CT, bowel perforation was suspected with the presence of free intraperitoneal air and free fluid; a specific finding of intestinal injury was bowel wall thickening.

It is still controversial whether or not an inguinal hernia should be repaired when it is found during a surgical procedure that is being performed for another intra abdominal pathology (10). Due to early intervention and the limited contamination of the abdominal cavity, some Authors have preferred hernia repair during the same operation (9). A single-stage operation protects the patient from the risk of a second operation and the higher costs. In the general literature there are conflicting opinions about

whether it is safe to use synthetic mesh in a contaminated environment. Vix et al. found no statistical difference in abdominal wall infection, intestinal fistula, or mesh infection, with the use of mesh in a “potentially septic” field (11). Over the following several years, other investigators continued to share their successful experience with synthetic mesh in contaminated fields (12). Finally, the lightweight polypropylene mesh, which contains wide pores and less dense fibers, is likely the most ideal mesh to resist infection (12, 13). Immediate mesh repair was not undertaken in any of the seven cases of small bowel perforation described (2, 4, 8-10, 14-16), all of which occurred since the widespread introduction of tension-free herniorrhaphy with synthetic mesh (1). In our case, the hernia sac was not accidentally open but isolated and sunk; therefore the operating field has not been contaminated by the endoabdominal fluid. Bacteria present in hernia sac and cloudy fluid in hernia sac were found to be significant factors predicting for surgical site infection after incarcerated hernia repair (17). In conclusion the presence of a hernia in a patient who has suffered blunt abdominal trauma, however slight, should make one very suspicious that the patient may have, or may develop, a rupture of the intestine. In selected cases it is possible to repair inguinal hernia in the same operation and use of mesh if the hernia sac is not opened.

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#### *Conflict of interest*

The Authors declares no conflict of interest directly and not directly related to the submitted work.

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