

CASE REPORT



## Intestinal perforation after surgical treatment for incisional hernia: iatrogenic or idiopathic?

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### ABSTRACT

Intestinal perforation (IP) is a life-threatening gastroenterological condition requiring urgent surgical care, which may present itself as an uncommon complication following incisional hernia repair surgery, most often because of iatrogenic traumatism occurring during the procedure. However, we report a case where a spontaneous onset can be hypothesised. A 60-years-old patient underwent repair of an abdominal laparocoele, through rectus abdominis muscle plasty, 5 years after development of an incisional hernia due to exploratory laparotomy for the treatment of acute appendicitis. Xipho-pubic scar was excised and umbilicus and supra-umbilical hernia sac dissected, a linear median incision was performed along the sub-umbilical linea alba, reaching preperitoneal plane to assess any intestinal loop adherence to the abdominal wall. After limited viscerolysis, abdominal wall defect was corrected by 'rectus abdominis muscle plasty' and umbilicus reconstruction by Santanelli technique. Postoperative course was uneventful until Day 29, with sudden onset of epigastric pain, fever and bulge. Sixty cubic centimeter pus was drained percutaneously and cavity was rinsed with a 50% H<sub>2</sub>O<sub>2</sub> and H<sub>2</sub>O V-V solution until draining clear fluid. Symptoms recurred two days later, while during rinsing presented dyspnoea. X-Ray and CT scan diagnosed IP, and she underwent under emergency an exploratory laparotomy, leading to right hemicolectomy extended to last ileal loops and middle third of the transverse, right monolateral salpingo-ovariectomy and a temporary ileostomy by general surgeon. Twenty-three days later an ileostomy reversal surgery was performed and 8 days after she was discharged. At latest follow-up patient showed fair conditions, complaining abdominal pain and diarrhoea, attributable to the extensive intestinal resection. IP following incisional hernia repair, is reported as uncommon and early postoperative complication. In our case, the previous regular postoperative course with late onset lead us to hypothesise a possible idiopathic etiopathogenesis, because of a strangulation followed by gangrene and abscess formation, which might begin before the incisional hernia repair and unnoticed at the time surgery was performed.

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## Introduction

Abdominal incisional hernias are hernias developing through a surgical scar [1] and representing a chronic wound failure. They are common complications in laparotomies, reported in 15–25% of cases, differing from wound dehiscences which are acute type of failures, frequently occurring within the first week of surgery [2]. Around 50% of incisional hernias are detected within 1 year from the initial surgery, and the risk increases by 2% every year after surgery [3,4]. This explains the over 25% recurrence rate after surgical treatment, which can increase

depending from the technique used for abdominal wall repair [5].

Incisional hernias require repair since they tend to enlarge over time, causing pain, discomfort, bowel obstruction, incarceration and strangulation; and overall reducing the quality of life of the patient [1]. Depending on the size and on the presence of previous skin scars on the abdomen, the herniation can be treated through laparoscopic ('closed') or laparotomic ('open') procedures. Among the open, the most frequently used are the onlay techniques (anterior positioning of a mesh after fascia repair) and the keel (suture repair under tension).

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Most intestinal perforations follow traumatic events (blunt abdominal trauma or motor vehicle accident), ingested foreign bodies, or iatrogenic causes such as endoscopic procedures or laparotomies [6,7].

Onset of an intestinal perforation following surgical repair of incisional hernia is usually reported as an uncommon complication that originates soon after surgery, usually because of traumatic handling of bowels during viscerolysis and wall repair [1]. The late onset of the perforation 4 weeks after an uneventful post-op, lead us to postulate the aetiology of a spontaneous intestinal perforation rather than usual iatrogenic [8].

### Case report

A 60-year-old woman presented with a small median, abdominal incisional hernia, due to a laparotomic appendectomy for the treatment of acute appendicitis with peritoneal abscess, occurred 5 years before. At routine physical examination, the abdominal wall showed bulging in the right quadrants, along with a xipho-pubic scar of ~25 cm that included the umbilicus, and a 14-mm diameter tumefaction that increased in size with the Valsalva and straining manoeuvres (Figure 1). Ultrasound scan confirmed the diagnosis and patient underwent an abdominoplasty with incisional hernia repair through open keel technique. The xipho-pubic scar was excised and a dissection of the umbilicus with the supra-umbilical hernia sac (16 × 8 cm) was performed. A linear median incision was performed along the sub-umbilical linea alba, reaching the preperitoneal plane to assess any intestinal loop adherence to the abdominal wall. A limited viscerolysis was performed and the abdominal wall defect was corrected by a rectus abdominis muscle plasty using 'X' type introflecting stitches in Vicryl 1.0 (Ethicon®), reconstructing later the umbilicus using the Santanelli technique [9]. Two Redon type surgical drains were superficially placed, one by each side of the abdominoplasty incision.

During post-operative course in plastic surgery ward, the patient was checked by surgeons and nurses four times a day. Weak peristalsis could be assessed by the second post-op day during auscultation of lower abdominal quadrants, indicating a resumption of intestinal flow. She was afebrile and in good general conditions throughout her recovery, starting deambulation by the second post-op day, and having bowels open for both gas and faeces by the third post-op day. Her post-operative course was overall uneventful, returning to normal bowel function, drains were removed at discharged on post-op Day 4 with a total amount of 50 cc.

The patient returned for first follow-up 4 days after hospital discharge, showing a clean healing wound, that was deterged and dressed. The same process was repeated in the next four follow-up visits, and stitches were removed on the 23rd post-op day; however, on the 29th day, the patient returned referring a median epigastric bulg and an episode of fever to 38 °C, still with normal feeding and transit. The visiting plastic surgeon noticed a ballottement in the xipho-umbilical region that was accompanied by erythema of the overlying skin, and pain during the palpation of the abdominal wall. Sixty cubic centimeter of pus were percutaneously drained and the cavity was cleaned using saline solution, hydrogen peroxide and betadine until clear fluid was drained back from it. It was concluded that patient developed a subcutaneous abscess in the epigastric region, and 20°cc of the collected purulent material, as well as a cotton swab, were send for microbiological testing that later determined the positivity to *Streptococcus anginosus*. The patient pre-emptively began an antibiotic therapy based on Levofloxacin 500 mg administration, one pill twice a day.

Two days later, on the 31st post-op day, the patient returned for the seventh follow-up, with persistent pain and xipho-umbilical bulge surprisingly draining more purulent exudate (80 versus 60 cc from the previous visit) and complaining dyspnoea after rinsing with hydrogen peroxide. Chest X-ray was showed moderate levels of sub-diaphragmatic free gas, prevalently present on the left side, abdominal CT scan confirmed the supra-mesocolic and subdiaphragmatic presence of free endoperitoneal gas, compatible with an intestinal perforation (Figures 2 and 3). She underwent exploratory laparotomy by general surgeons, showing a plastic peritonitis requiring an extended right and transverse colectomy, where perforation and abscessing mass were located, together with the last ileal loops damaged during dissection. During the procedure, the patient also underwent a right monolateral salpingo-ovariectomy and a temporary ileostomy to protect her from the septic state she was in. A histological examination was performed on the resected 60 cm of small intestines and 30 cm of the right colon, as well as the right ovary and 4 × 2 cm of the right Fallopian tube. The histology revealed marked haemorrhagic serositis of the distal ileum and the caecum, with extended areas of ischaemic necrosis and ulceration in the right colon (Figure 4).

Postoperatively the patient was transferred to the Intensive Care Unit, and Metronidazole (500 mg × 3), Levofloxacin (500 mg × 3), Imipenem (500 mg × 4) and Tigecycline (100 mg × 2) as well as the anti-mycotic Fluconazole (400 mg × 2) were administrated. The patient recovered well and underwent an ileostomy

reversal surgery two weeks after, and discharged 8 days after (Figure 5).

## Discussion

In untreated abdominal hernias, intestinal perforation can be a complication derived from the obstruction of visceral structures, causing strangulation and gangrene; however, intestinal perforation may also occur as a rare complication following incisional hernia repair surgery or laparotomies such as abdominoplasties [6]. Spontaneous perforation in adult patients is rare [8], especially without prior history of visceral trauma [6], most commonly occurring after fluoroscopic procedures such as barium enemas (0.01–0.04% of cases) or endoscopic procedures such as colonoscopies (0.1–0.9% of cases), especially in patients with favouring factors such as advanced diverticulosis, inflammatory bowel disease, steroid use, malignancy and pre-existent partial tears or necrosis [10].

A typical case of bowel perforation occurring after surgery is characterised by an abrupt onset few hours after the surgery, as described in a case of abdominal perforation and necrotising fasciitis following abdominal liposuction [11], considerably different from our case where the perforation showed over 29 days after the surgery.

The few cases reported in literature mentioning a late onset of bowel perforation after laparotomies, refer its origin to the vacuum suction created by surgical drains [12]. The types of drains referred to in the article are silicone drains used under closed suction, similarly to the system used in our patient's surgery, but they were left in place for longer term, after extensive gastrointestinal surgeries such as stomach and colon resections, unlike our case where they were removed by the fourth post-op day. Surprisingly in most of the reported cases, spontaneous recovery occurred conservatively after the removal of the drains, while in our case the complication was reported after their removal and required an exploratory laparotomy.

Spontaneous perforation might also be the initial clinical presentation of an occult intestinal disorder, such as ileal perforation in some forms of Crohn's disease, jejunal perforation in coeliac disease complicated by enteropathy-associated T-cell lymphoma (EATL), or colonic perforation in collagenous colitis [13,14].

The perforation in our patient was an acute process with a new onset that might have been linked to certain infectious agents. Acute onset of intestinal perforation caused by CMV ileitis, in an HIV-positive patient [15,16] in renal transplant recipients [17,18] and in patients with immunocompromised status is also



Figure 1. Preoperative front view.



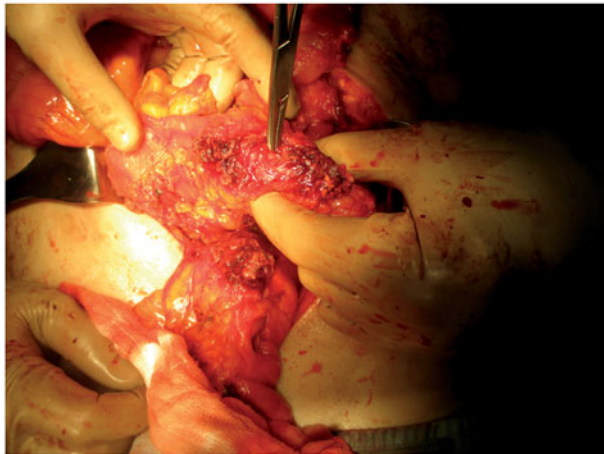
Figure 2. X-ray showing moderate levels of sub-diaphragmatic free gas, prevalently to the left side.

reported [19]. Other cases of infectious perforation, reported mainly in the past and in developing countries, are caused by typhoid fever [20]. There have also been reported cases of colon perforations following the administration of certain medications, such as kayexalate [21].

Some authors support other aetiologies in the onset of intestinal perforations in adults, such as longstanding and unrecognised disorders (congenital, metabolic, neoplastic or vascular causes) or even genetic factors and mutations that might determine connective tissue alterations, leading to a weaker



**Figure 3.** Abdominal CT scan confirming supra-mesocolic and subdiaphragmatic free endoperitoneal gas, compatible with an intestinal perforation.



**Figure 4.** Intraoperative view during exploratory laparotomy, showing ileal perforation ~3mm cause of the acute presentation.

structure or defects in its synthesis or repair [6]. The macroscopic presentation of the necrotising and ulcerated colon in our patient is consistent with the 'stercoral type' of spontaneous bowel perforation, as classified by J.A. Berry in 1984 [8] (stercoral perforation is a 'round' or an 'ovoid' hole with necrotic and inflammatory edges) as opposed to the idiopathic type (idiopathic perforation is a linear tear with normal appearance of the colonic wall), although the most frequent locations are on the left colon. This type of perforation is probably derived from an increased colic pressure caused by fecalomas obstructing intestinal transit. The hard-impacted stools formed in the left colon perforate the recto-sigmoid colon by ischaemic necrosis [22]. This hypothesis is to be considered therefore unlikely.



**Figure 5.** One-month postoperative result.

It might otherwise be possible that the case reported might have been the consequence of a strangulation followed by gangrene and abscess formation, which began unnoticed before the incisional hernia repair surgery was even performed. Being the incisional hernia median, and making the strangulation of the transverse colon possible. The narrowness of the hernia neck (only 14mm in diameter) increases the risk of a strangulation, which on the contrary is less likely when the hernia has a wider neck [23,24]. However, the necrotising process was extended not just to the transverse colon, but to the entire ascending colon as well as some intestinal loops, making this hypothesis difficult to prove.

## Conclusion

Most intestinal and bowel perforation in adults, are associated to traumatic aetiology, i.e. as a complication to laparotomies. IP following incisional hernia repair, is reported as uncommon and early postoperative complication. In our case, the previous regular postoperative course with late onset, lead us to hypothesize a possible idiopathic etiopathogenesis, because of a strangulation followed by gangrene and abscess formation, which might begin before the incisional hernia repair and unnoticed at the time surgery was performed.

Further studies on aetiological mechanisms of intestinal perforation onset after surgery are needed. To the best of our knowledge, this might be the first episode

described in scientific literature of bowel perforation occurring long term after laparotomic surgery.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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