Small bowel obstruction via herniation through an iatrogenic defect of the falciform ligament following laparoscopic cholecystectomy

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ABSTRACT

Internal herniation of the small bowel through a defect in the falciform ligament and subsequent small bowel obstruction is exceedingly rare with the majority of previous cases being attributed to congenital abnormalities. As laparoscopic techniques approach the forefront of modern surgery, an iatrogenic source for a falciform ligament defect has emerged over the last decade. In this case, a 50-year-old patient presented with signs of acute small bowel obstruction 10 days after a laparoscopic cholecystectomy. On diagnostic laparoscopy, part of the jejunum was found to have herniated through an opening in the falciform ligament. This was likely to have been caused by trauma during the cholecystectomy. Following relief of the obstruction, the defect was closed with polyglactin sutures.

KEYWORDS

Internal hernia – Bowel obstruction – Falciform ligament

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Case History

A 50-year-old man was admitted to hospital with a 4-hour history of worsening abdominal pain, nausea and bilious vomiting. He had been admitted ten days previously for an elective laparoscopic cholecystectomy, which was uneventful, and he had been discharged the following day with analgesia. He was otherwise fit and well, with no significant past medical history and no regular medication.

The patient was alert, orientated and his observations were within normal limits. His abdomen was distended with generalised tenderness on palpation, particularly at the right upper quadrant, but no signs of peritonitis. His blood tests demonstrated a raised alanine transaminase level (86iu/l) but normal haemoglobin (14.7g/dl), white cell count (7.8×10^9 cells/l) and C-reactive protein (5mg/l). His abdominal radiography was unremarkable and an erect chest x-ray did not demonstrate pneumoperitoneum. The impression formulated by the senior surgical review was that of a possible perforated peptic ulcer.

The patient underwent a diagnostic laparoscopy, which revealed an internal herniation of the jejunum through a tear in the middle of the falciform ligament (Fig 1). The jejunum was grossly dilated and strangulated, with evident small bowel obstruction (Fig 2). The jejunum was reduced and checked for any perforation. The defect in the falciform ligament (Fig 3) was closed with two 2/0 Vicryl®

sutures ((Ethicon, Somerville, NJ, US); haemostasis was secured and the abdomen deflated.

Postoperatively, the nasogastric tube was removed after six hours and intravenous fluids were continued in addition to intravenous analgesia and antiemetics. A soft diet was permitted after 24 hours. The patient was discharged home the following day with paracetamol and he attended a follow-up appointment at six weeks as an outpatient.

Discussion

Internal hernias are commonly asymptomatic and often only discovered at postmortem examination. Rarely, internal hernias can cause intra-abdominal bowel obstruction, with a reported incidence of up to 5.8% of all cases of intestinal obstruction.¹ The symptoms of an internal hernia can be non-specific, and range from mild abdominal discomfort to severe abdominal pain and obstruction. Consequently, they are frequently diagnosed intraoperatively. Furthermore, if the bowel is strangulated, there is a significant risk of morbidity and mortality attributed to delayed diagnosis.² Herniation through the falciform ligament is extremely rare and accounts for 0.2% of all internal hernias.²

The majority of cases in the literature have no history of abdominal surgery prior to the hernia and have been attributed to congenital defects involving the malformation, hypoplasia or complete failure of the development of the

Figure 1 Intraoperative laparoscopic image of the strangulated jejunum herniating through the defect of the falciform ligament (arrow)

Figure 3 The falciform ligament defect (arrow) following reduction of the jejunum

Figure 2 Intraoperative laparoscopic image of dilated loop of small bowel (arrows)

falciform ligament. The herniation of bowel through a congenital defect in the falciform ligament may be provoked by external factors such as the gravid uterus during pregnancy and trauma pushing the bowel up into the upper abdomen.¹

In our case, the patient was a 50-year-old man with a recent history of a laparoscopic cholecystectomy, suggesting the likelihood of an iatrogenic source of the defect. There is one previous case of a patient having herniation of small bowel through a falciform ligament defect following a cholecystectomy.⁵ Similar to our case, the patient developed signs of bowel obstruction soon after discharge. The defect in the falciform ligament was attributed to subxiphoid trocar insertion during the previous cholecystectomy.

Likewise, another case report proposed that injury to the falciform ligament was inflicted by placement of a retractor during an open cholecystectomy ten years before the patient presented with obstruction.¹ The other two cases of iatrogenic defects both involved prior Nissen fundoplication procedures.^{4,5} The laparoscopic method for this procedure involves placement of a 10mm trocar in the right upper quadrant. If this trocar is sited too medial or inferior, the retractor may be obstructed by the falciform ligament or interfere with the midline trocar. Consequently, surgeons are sometimes forced to insert their trocar for port insertion through the falciform ligament, leading to the defect.⁴

Prompt preoperative diagnosis may be vital to preserving tissue viability and preventing bowel resection. A review of case literature from 2013 found preoperative computed tomography (CT) to have 35.7% sensitivity in identifying a falciform hernia while no specific diagnoses were made on abdominal radiography or ultrasonography.¹ However, bearing in mind the clinical symptoms of this patient and the surgical history, it is possible that CT may not have influenced the ultimate intervention of laparoscopy and would only have served to delay treatment.

Conclusions

As laparoscopic procedures (particularly cholecystectomies) become increasingly common, it may be appropriate to undertake precautionary measures to prevent iatrogenic herniation through the falciform ligament. For example, the subxiphoid trocar could be placed to the right of the midline and falciform ligament to avoid creating a tear. If an aperture is created during port placement, the surgeon could consider dividing the inferior leaf of the free edge of the falciform ligament including the ligamentum teres. Similarly, the subxiphoid port should be removed under direct vision prior to peritoneal deflation.⁵

References

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