Drucker et al. presented a case in which hydrating the patient and placing a nasogastric tube was the preferred treatment[10], albeit surgical intervention can also be an option. In the study by Spektor et al., they found that gastric pneumatosis plus elevated serum creatinine and lactic acid levels were associated with higher mortality, and so those elements should be taken into account in the management decision[3,9]. Nevertheless, it is necessary to evaluate the status of each patient and be aware that the extension of the ischemia, risk factors, and tomographic findings play a role in deciding on the treatment to be followed[2,3,9].

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Conflict of interests

The authors declare that they have no conflict of interest.

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Small bowel volvulus after laparoscopic appendectomy☆

Vólvulo de intestino delgado tras apendicectomía laparoscópica

Small bowel volvulus (SBV) is defined as the torsion of a small bowel loop around its mesentery axis. It may result in partial or complete obstruction. That condition after laparoscopic appendectomy has rarely been described. The diagnosis of SBV may be suggested by an abdominal computed tomography (CT) scan that shows the ''whirlpool sign'', which is caused by twisting of the small bowel, mesentery, and mesenteric vessels[1].

A 19-year-old man with no past medical history was admitted to the emergency department on postoperative day 6, after an uneventful laparoscopic appendectomy for a suppurative appendix. The appendectomy was performed with a 3-trocar technique and the appendiceal stump and mesoappendix were secured with an EndoGIA™ stapler (Ethicon Endosurgery, Cincinnati, OH, USA), with no complications. The patient presented with severe diffuse abdominal pain, accompanied by nausea, with no vomiting. Physical examination revealed normal vital signs, mild diffuse abdominal tenderness, and reduced bowel sounds.

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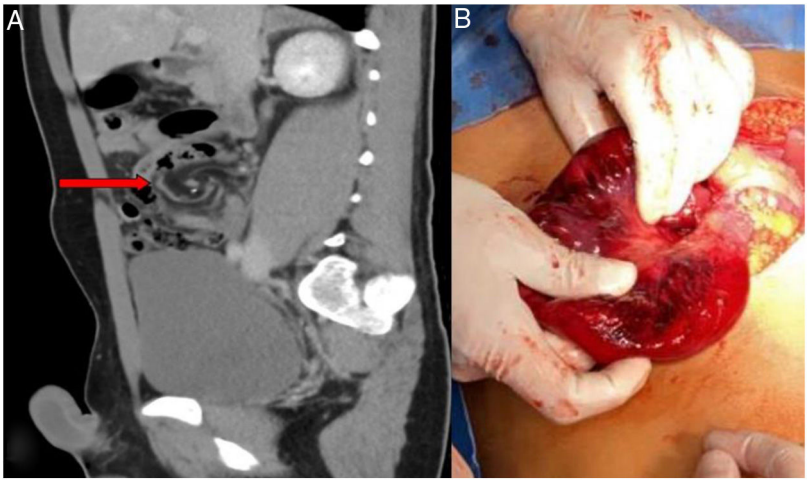

Figure 1 (A) Sagittal view of the CT scan. The red arrow indicates the whirlpool sign in the mesentery of the terminal ileum. (B) Intraoperative image showing bowel ischemia.

The laboratory work-up showed normal hemoglobin of 13.7 g/dl and elevated white blood count of 14.5×10^{10}. There were no other abnormal lab results. An abdominal X-ray showed no abnormalities, but an abdominal CT scan identified free fluid in the perihepatic and perisplenic regions, as well as a whirlpool sign on the mesentery of the terminal ileum, in the sagittal view, suggesting SBV (Fig. 1A). Diagnostic laparoscopy was performed, visualizing free hematic fluid and necrosis of the terminal ileum, secondary to a volvulus at that site. The procedure was converted to open surgery and the terminal ileum volvulus was then devolvulated. Necrosis was found 10 cm from the ileocecal valve, compromising 40 cm of the terminal ileum (Fig. 1B). A loose staple was observed on the peritoneal surface of the small bowel mesentery, 7 cm from the distal region of the necrotic bowel. A 50 cm intestinal resection was completed, followed by a stapled side-to-side anastomosis, using GIA™ 60 blue (Covidien, Mansfield, Massachusetts, USA). The patient had a satisfactory immediate postoperative outcome, referring only to mild pain during the first postoperative day. Oral diet was reintroduced on postoperative day 3. He was discharged home on the fifth postoperative day, with adequate oral intake and regular bowel movements.

We cannot be sure of the exact mechanism of our patient's volvulus. However, a few similar cases have been reported in the literature (Table 1). Page et al.[2] and Nottingham[3] described a 13-year-old patient and a 34-year-old patient, respectively, each of whom underwent laparoscopic appendectomy, employing a linear cutting stapler. They presented with abdominal pain on their third and tenth postoperative days, caused by SBV. In both cases, the volvulus was thought to be the result of a loose linear cutter staple in the abdominal cavity. In each case, the staple was caught in the peritoneal surface of the small bowel mesentery. Other theories of SBV after a laparoscopic appendectomy include patient positioning, inclination, bowel mobilization, and changes in the pneumoperitoneum. Nonetheless, those theories have not been well studied[4]. Similar to the two cases just described, we found a free staple snagged in the peritoneal surface of the small bowel mesentery, with no adhesion bands nearby. Given the widespread use of stapler/cutter devices, staples are likely becoming one of the most common foreign bodies in the abdominal cavity but only a few reports have described surgical staples causing adhesion-like complications, such as bowel obstruction or volvulus[2].

Diagnosis can be made through several modalities. For instance, a plain abdominal X-ray can appear normal, or reveal some bowel distension. Our patient's initial x-ray revealed no abnormalities. Ultrasound has been previously used in the pediatric population to identify duodenal obstruction with SBV[5]. However, that imaging study is somewhat vulnerable due to the dependence on operator experience. A CT scan can detect the whirlpool sign, which is highly suggestive of intestinal volvulus, showing the twisting of the mesenteric vessels. However, the study's sensitivity and specificity have not been evaluated[6]. In our case, the whirlpool sign was only seen in the sagittal view of the CT scan, and with the aid of a radiologist, we made the final diagnosis. The fact that the sign was not visible in the axial view made the diagnosis a challenge. Furthermore, a CT scan can be used to detect bowel infarction or ischemia (bowel-wall thickening or pneumatosis), so the study is more sensitive in the advanced stage of the disease. It can also be used to rule out other severe intra-abdominal diseases[7].

In conclusion, we presented the case of a young adult patient that underwent laparoscopic appendectomy and presented with SBV, six days after his procedure. Even though we cannot be absolutely certain, we hypothesized that the volvulus resulted from a loose staple in the abdominal cavity that acted as a ''hook'' in the mesentery, causing rotation around its axis. As laparoscopic bowel stapling becomes more customary, there may be more reports of problematic staples that have been left *in situ*. We suggest removing all staples left *in situ* at the end of a laparoscopic procedure, to prevent any complication a loose staple could cause[8].

Ethical considerations

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Table 1 Reported cases of small bowel volvulus, following laparoscopic appendectomy.

Article	Sex	Age	Time interval after surgery	Presentation	Imaging study	Appendicular stump management	Intraoperative findings	Treatment
Kim et al.[9] (2019)	F	27	8 days	Severe epigastric abdominal pain	CT: large amount of free air, some air tracking along the staple line, and small bowel mesenteric edema	EndoGIA™ purple 45 mm load (Covidien, Mansfield, MA, USA)	Volvulus ileum, murky fluid, and a clearly necrotic small bowel segment	The bowel was detorsed 360° counter-clockwise and resected using side-to-side anastomosis, with a purple GIA™ cartridge
Nottingham[3] (2002)	M	34	10 days	Colicky diffuse abdominal pain, nausea, vomiting, and abdominal distension	X-ray: distal mechanical small bowel obstruction	EndoGIA™ stapler (Ethicon Endosurgery, Cincinnati, OH, USA)	Volvulus of terminal ileum, adhesion of the distal ileum to a loose linear cutter staple in the lateral abdominal wall, far from the appendiceal stump	The band was lysed, and the staple removed
Page et al.[2] (2009)	M	13	3 days	Sudden acute abdominal pain	CT: abnormally thickened intestinal loops	Nonspecified staplers	Small bowel volvulus Two surgical staples with their exposed tips caught in the peritoneal surface of the mesentery, forming a tether around the volvulus	Staples were removed, and the volvulus was reduced
Macedo and Velhote[4] (2012)	M	13	2 days	Sudden acute abdominal pain	CT: loop distension and a large amount of free fluid	Not specified	Volvulus of the terminal ileum with necrosis along 100 cm of the small bowel	Resection of necrotic bowel and an entero-entero-anastomosis
Kakaty et al.[10] (2018)	F	18	10 days	Acute onset of periumbilical abdominal pain	CT: loop distension and a large amount of free fluid	Not specified	Volvulus of the terminal ileum with necrosis along 60 cm of the small bowel. 6-mm metal clip, dislocated and migrated along the small bowel	Ileocecal resection, with enteroenteric anastomosis.
Hedge et al.[6] (2019)	M	10	2 days	Ileus with persistent vomiting	X-ray: small bowel obstruction	Not specified	Volvulus that involved a segment from the distal jejunum to the proximal ileum	Detorsion of the volvulus and enterotomy to decompress the bowel, followed by stapled closure and oversew of the staple line.
Al Beteddini and Sherkawi[5] (2014)	F	17	1 day	Several episodes of vomiting	CT: dilated small bowel with transition into collapsed small bowel loops within the right lower quadrant of the abdomen	Not specified	Small bowel obstruction due to a clockwise twist of the totality of the bowel on itself, except for the terminal ileum that was fixed in its place	Volvulus was untwisted and no intestinal vascular compromise was observed

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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Laparoscopic left lateral segmentectomy secondary to giant liver hemangioma☆

Segmentectomía lateral izquierda laparoscópica por un hemangioma hepático gigante

Hemangioma is the most common benign liver tumor. Incidence ranges from 0.4% to 20% in the general population and is predominant in females, with a 5:1 female-to-male ratio.

Diagnosis is based on clinical presentation, physical examination, and imaging studies (hepatobiliary ultrasound, intravenous contrast abdominal computed tomography, and/or magnetic resonance imaging). Treatment includes both conservative and surgical management[1]. Surgical treatment is reserved for patients with tumors >5 cm[2] and for patients whose symptomatology compromises their quality of life[3].

Laparoscopic liver resection (LLR) is the preferred surgical **approach**, given that it has the advantages of less intraoperative blood loss, a reduced need for transfusion, and less postoperative pain and morbidity[4].

LLR for giant tumors (>10 cm) that are close to vascular structures or in technically difficult segments, can be performed at referral centers by experienced surgeons, with no increase in postoperative morbidity or mortality[5].

Ban et al. proposed a scoring system for evaluating the difficulty of a given LLR, grading the level of difficulty as low, intermediate, or high. They found that the level of difficulty directly correlated with intraoperative blood loss, surgery duration, and hospital stay ($p < 0.001$)[6].

We present herein the case of a 65-year-old woman that had a past medical history of high blood pressure and allergy to penicillin and a past surgical history of total abdominal hysterectomy secondary to uterine prolapse and laparoscopic cholecystectomy secondary to chronic cholecystitis due to gallstones.

The patient was referred to our hospital for epigastric pain of two-year progression. Liver hemangioma was diagnosed through a tomography scan, with the characteristic

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