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Recurrent abdominal pain due to small bowel volvulus after transabdominal preperitoneal hernioplasty: A case report and review of literature

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Abstract

BACKGROUND

Compared with open mesh repair, transabdominal preperitoneal (TAPP) hernioplasty results in less chronic postoperative inguinal pain and faster postoperative recovery. However, it may still lead to rare but serious complications. Here we report a case of intestinal volvulus with recurrent abdominal pain as the only clinical symptom, which occurred 3 mo after TAPP repair for bilateral inguinal hernia.

CASE SUMMARY

A 50-year-old male patient underwent laparoscopic TAPP for bilateral inguinal hernias. After the operation, he experienced recurring pain in his lower right abdomen around the surgical area, which was relieved after symptomatic treatment. Three months after the surgery, the abdominal pain became severe and was aggravated over time. The whirlpool sign of the mesentery was seen on contrast-enhanced computed tomography (CT). Laparoscopic exploration confirmed that a barb of the V-Loc™ suture penetrated the peritoneum, which caused the adhesion of the small intestinal wall to the site of peritoneal injury, forming intestinal volvulus. Since there was no closed-loop obstruction or intestinal ischemia, recurrent abdominal pain became the only clinical manifestation in this case. After laparoscopic lysis of adhesions and reduction of intestinal volvulus, the patient recovered and was discharged.

CONCLUSION

The possibility of intestinal volvulus should be considered in patients who experience recurrent abdominal pain following TAPP surgery during which barbed V-Loc sutures are used for closing the peritoneum. Contrast-enhanced CT and active laparoscopic exploration can confirm the diagnosis and prevent serious complications.

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Core Tip: This case provides surgeons guidelines for the management of small bowel volvulus with only recurrent abdominal pain as a clinical manifestation after transabdominal preperitoneal (TAPP) hernioplasty. It highlights that the possibility of intestinal volvulus should be considered in patients who experience unexplained abdominal pain following TAPP surgery during which barbed V-Loc™ sutures are used for closing the peritoneum. Additionally, contrast-enhanced computed tomography and active laparoscopic exploration can help confirm the diagnosis and prevent more serious complications.

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INTRODUCTION

Transabdominal preperitoneal (TAPP) hernioplasty is a commonly used technique for the repair of adult inguinal hernias. Its benefits are fast recovery, low risk of chronic pain, and high cost-effectiveness. Therefore, it is particularly feasible for bilateral inguinal hernias and recurrent inguinal hernias after open hernia repair[1-3].

The TAPP procedure requires peritoneal opening and suturing[4]. As the integrity of the peritoneum is destroyed, abdominal adhesions may still occur after TAPP, leading to serious complications such as intestinal obstruction, strangulation, and necrosis. It has been reported that the incidence of such complications following TAPP ranges from 0.2% to 0.5%[5,6]. Complications often occur within 2 wk after surgery, with abdominal pain and vomiting being the typical clinical manifestations[7]. These complications are rare but require a second operation. Here we report a case of intestinal volvulus with recurrent abdominal pain as the only clinical symptom, which occurred 3 mo after a TAPP procedure for bilateral inguinal hernia, and review the literature regarding complications after TAPP.

CASE PRESENTATION

Chief complaints

A 50-year-old male patient who underwent a TAPP procedure for symptomatic bilateral inguinal hernia presented with repeated pain in the right lower abdomen around the surgical site for 3 mo and worsened on the day before admission (Table 1).

History of present illness

The patient experienced repeated pain in the operation area of the right lower abdomen within 3 mo after TAPP repair of bilateral inguinal hernia. He had no nausea/vomiting, chills, or fever. His anal exsufflation and defecation were smooth. The abdominal pain was relieved after symptomatic treatment with antispasmodics and analgesics. One day before his admission, the patient suddenly felt severe pain in the right lower abdomen, with no nausea/vomiting, chills, or fever; his anal exsufflation remained unobstructed.

History of past illness

The patient denied any history of hypertension, type 2 diabetes, coronary heart disease, cerebrovascular disease, or hepatitis. He underwent a Lichtenstein hernia repair for the right inguinal hernia 7 years ago, and there was no history of other

Table 1 Timeline of the events of this case

Timeline	Date	Events/past illnesses	Interventions
Past history	March 6, 1970	Birth	
	January 23, 2013	Right inguinal hernia	Lichtenstein hernia repair
	January 10, 2020	Right inguinal hernia recurred and left inguinal hernia diagnosed	TAPP
Presenting concerns	January-March, 2020	Repeated abdominal pain	Symptomatic treatment
Chief complaints	April 10, 2020	Abdominal pain worsened	Readmission
Diagnoses and exam	April 10, 2020	Small bowel volvulus	Contrast-enhanced CT
Treatment	April 11, 2020	Small bowel adhesion to the site of peritoneal flap closure	Laparoscopic exploration and separation of the adhesion
Outcome	April 12, 2020	Abdominal pain was relieved	Antimicrobials, acid suppression, and liquid diet
	April 13, 2020	Discharge	
Follow-up	October 13, 2020	Normal	

CT: Computed tomography; TAPP: Transabdominal preperitoneal hernioplasty.

abdominal surgeries. Three months ago, the right inguinal hernia recurred, and a left inguinal hernia was also found. A diagnosis of bilateral inguinal hernia was made after clinical physical examinations and color Doppler ultrasonography. The patient voluntarily requested surgical treatment. He signed the informed consent form and then underwent TAPP using the surgical method described in the literature[2]. Briefly, the peritoneum was opened, the bilateral inguinal hernia sacs were reduced into the peritoneal cavity, and the mesh was placed. The peritoneum was then closed with a V-LoC™ 180 continuous suture, and a return suture was placed to prevent suture loosening[8]. Postoperative recovery was uneventful and the patient was discharged 1 day after surgery.

Personal and family history

His family history was not remarkable.

Physical examination

Physical examination found a body temperature of 36.3 °C, heart rate of 80 beats/min, respiratory rate of 20 breaths/min, and a blood pressure of 130/70 mmHg. No yellowing of the eyes or skin was present. The abdomen was flat, without varicose veins on the abdominal wall. No peristaltic waves were recorded. His abdomen was soft except for the pain in the right lower abdomen when pressed, and there was no rebound tenderness or abdominal rigidity. Murphy's sign was negative. The liver and kidney areas were not sensitive to percussion. He had no shifting dullness, and the bowel sounds were about 4 times/min. No high-pitched bowel sound or gurgling sound was heard.

Laboratory examination

All laboratory results were within the normal ranges. The white blood cell count was $4.4 \times 10^9/L$, the percentage of neutrophils was 55.7%, the percentage of lymphocytes was 34.3%, the blood amylase level was 42 U/L, and the lipase level was 62 U/L.

Imaging examinations

Contrast-enhanced CT revealed the whirlpool sign of the mesentery, dilated bowel, and normal bowel migration on the right side of the middle and lower abdomen (Figure 1A-C), suggesting the possibility of small bowel volvulus.

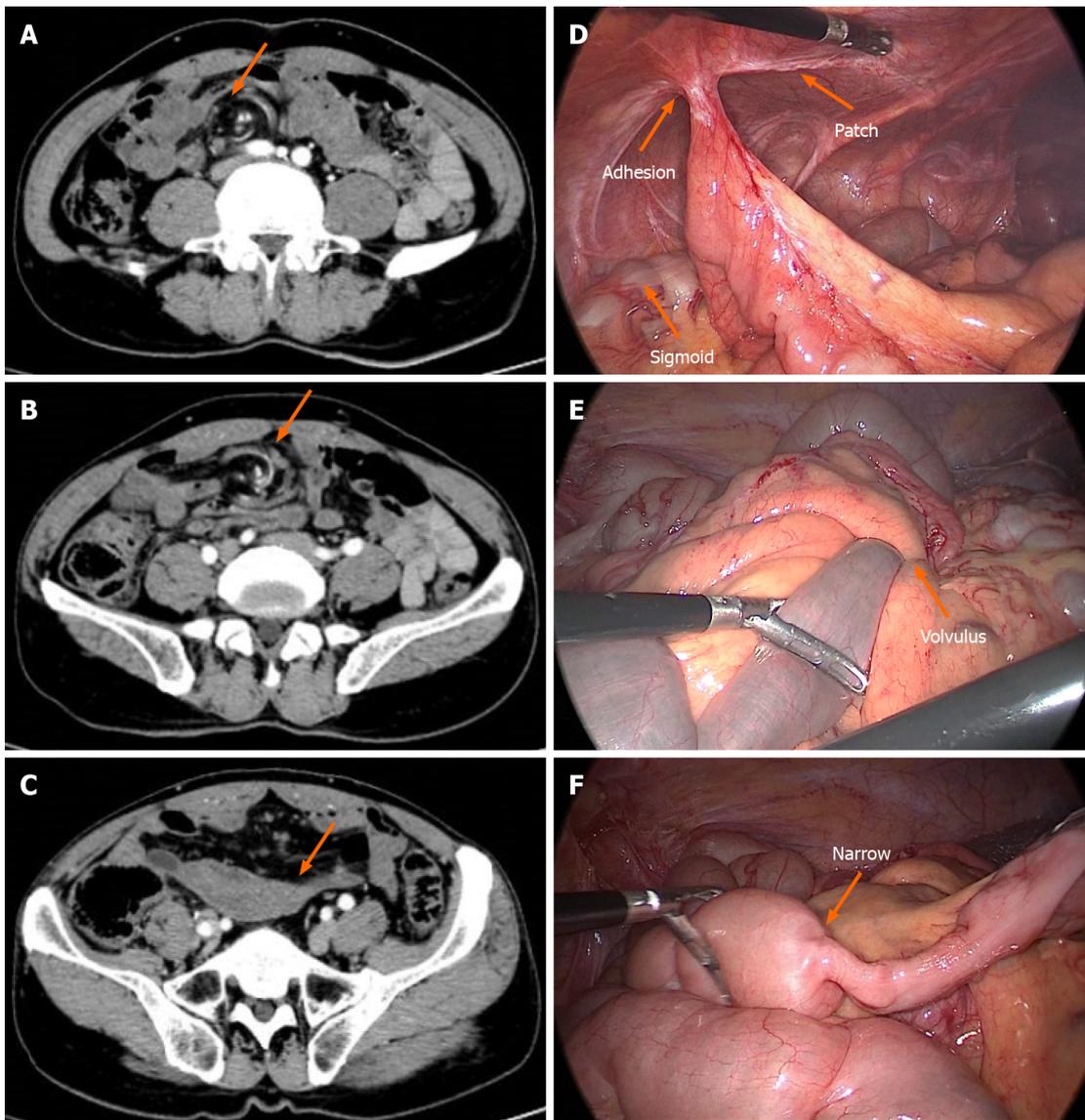


Figure 1 Computer tomography and intraoperative findings. A and B: Computed tomography (CT) reveals the whirlpool sign of the mesentery; C: CT reveals a proximal dilated bowel and distal normal bowel migration; D: Adhesion band on the small bowel; E: Small bowel volvulus; F: Intraoperative exploration found the migration area of proximal dilated bowel and distal normal bowel.

FINAL DIAGNOSIS

Laparoscopic exploration revealed an adhesion band between the peritoneum and the small intestine at the site of repair of the left inguinal hernia in the right lower abdomen. A small intestine volvulus was found 150 cm away from the ileocecal area (Figure 1D-F). The results of intraoperative exploration were consistent with pre-operative CT findings, and the diagnosis of small bowel volvulus was confirmed.

TREATMENT

Interventions after admission included fasting, nasogastric intubation, continuous gastrointestinal decompression, acid suppressive therapy, spasmolysis, and fluid replacement therapy. As the CT suggested the possibility of a small bowel volvulus, after having obtained informed consent from the patient and his family, we performed laparoscopic exploration under general anesthesia.

The adhesion band was separated and the peritoneum was repaired during the operation. Further exploration did not find a leak of the intestinal canal at the adhesion band. The twisted small intestine was reduced. According to the operator, a barb of the V-Loc suture pierced the peritoneum, which caused the adhesion of the small

intestinal wall with the site of peritoneal injury, forming intestinal volvulus.

OUTCOME AND FOLLOW-UP

The patient was not admitted to the intensive care unit after the operation. Instead, he was treated with antimicrobials, acid suppression, and rehydration. On the first postoperative day, the abdominal pain was relieved and the nasogastric tube was removed. On the second postoperative day, flatulence was restored and the patient had no abdominal pain after eating liquid food. He was then discharged from the hospital. At the 6-mo outpatient visit and telephone follow-up, the patient no longer had abdominal pain and his diet and urination/defecation were normal.

DISCUSSION

Although the common complications (*e.g.*, seroma, hematoma, and orchitis) after laparoscopic inguinal hernia repair are mostly minor, rare and serious complications such as neuralgia and intestinal obstruction may also occur. It has been reported that the incidence of intestinal obstruction after TAPP surgery is higher than that after open hernia repair[6]. The incidence of chronic pain after TAPP surgery is markedly lower than that after traditional open surgery; however, TAPP procedures have a higher incidence of chronic abdominal pain than total extraperitoneal procedures because of the separation of the peritoneum[9].

Similar to other laparoscopic techniques, the main causes of intestinal obstruction following TAPP surgery include inadequate closure, port-site herniation, and adhesion band formation[10,11]. Suturing of the peritoneum is the final step of TAPP procedure. When a peritoneal gap is not tightly closed, an adhesion band may form between the small intestine and the mesh, leading to intestinal obstruction[12,13].

Peritoneal closure can be performed with running sutures, tacks, and staples and glue. Many studies have compared different materials for peritoneal closure during TAPP inguinal hernia repair. Kapisir *et al*[5] described the use of running sutures and stapled closure of the peritoneum[5]. They found that use of Vicryl running sutures reduced the incidence of intestinal obstruction from herniation through the peritoneal closure. However, Fitzgerald *et al*[14] reported a case of small bowel obstruction caused by a displaced spiral tack used during a TAPP procedure. Ross *et al*[15] reported that suture closure of the peritoneum resulted in less early postoperative pain than tacked closure, and improved 2-wk postoperative activity compared with stapled and tacked closures. Subsequently, based on a larger sample size and a 2-yr follow-up, Ross *et al*[16] found that there were no significant differences between the tacked, sutured and stapled techniques. However, a prospective randomized study by Oguz *et al*[17] reported peritoneal closure using tacks increased short-term pain compared with suture closure. Recent studies demonstrated the safety and feasibility of glue for peritoneal closure in TAPP procedures, but further randomized comparative studies are needed to confirm these early results[18,19]. Although the optimal method of peritoneal closure in TAPP remains controversial, the running suture method is widely used[20-22].

Absorbable barbed sutures and Vicryl absorbable sutures are commonly used to perform peritoneal running closures[8,20,21]. Absorbable barbed sutures do not require knots, which simplifies peritoneal suturing and shortens the operating time. In recent years, they have been widely used in TAPP and other procedures[7]. However, if used improperly, the barbs may be attached to the adjacent small intestine, mesentery, or omentum, causing complications such as abdominal adhesions, volvulus, and intestinal obstruction[23]. For instance, Tagliaferri *et al*[24] and Filser *et al*[25] reported cases in which the residual end of the barbed V-Loc suture was hooked to the mesentery and caused small bowel obstruction as a volvulus. In addition, Köhler *et al*[26] reported a case of intestinal obstruction caused by tight adhesion of barbed sutures to the small bowel wall. Therefore, it is important to correctly use V-Loc sutures to reduce the risk of complications of TAPP procedures. The manufacturer of V-Loc sutures recommends that the suture stump should include additional peritoneal tissue surrounding the closure[25]. A literature review found that the end of the suture line seems to be essential[26-29]. Similar small bowel obstructions or volvulus complications following use of V-Loc sutures have been reported in the context of gastrointestinal and gynecological surgery[30,31]. Additionally, all defects of the peritoneal flap that are larger than 5 mm should be carefully

sutured to avoid contact of the mesh with abdominal viscera. Furthermore, if the peritoneum is fragile and thin, peritoneal flap closure with staples may be an alternative[22]. In this patient, after the peritoneal flap was completely closed with V-Loc sutures, a backward stitch was used to prevent suture loosening. That might have led to laceration and gapping of the peritoneum, causing the adhesion of the small intestinal wall to the site of peritoneal injury and the intestinal volvulus. Therefore, the use of V-Loc sutures for peritoneal closure in TAPP procedures along with a backward stitch should be reassessed.

Abdominal pain, vomiting, and bloating are typical symptoms of intestinal obstruction, and CT can assist in the diagnosis of intestinal obstructions. As reported by Clapp *et al*[7], small bowel obstructions following the use of barbed sutures often occurred 2 wk after TAPP surgery. The common symptoms included abdominal pain, vomiting, abdominal distension, oral intolerance, and constipation. Lee *et al*[32] reported a case of small bowel obstruction from barbed suture 6 wk after laparoscopic myomectomy. Unlike previous reports, our patient presented after TAPP surgery only with recurring pain in the surgical area of the right lower abdomen. The abdominal pain was tolerable and no other typical clinical manifestations were noted. It had initially been considered as neuralgia after TAPP surgery, and it was relieved after symptomatic treatment. Three months after the operation, the patient developed acute and intolerable abdominal pain. Contrast-enhanced CT revealed signs of intestinal volvulus that was confirmed by laparoscopic exploration. In the present case, although the small intestine volvulus was caused by abdominal adhesion, it did not cause closed-loop obstruction or blood flow disorder in the small intestine. As a result, recurrent abdominal pain was the only clinical manifestation. Therefore, contrast-enhanced CT can be recommended as the preferred evaluation for small bowel volvulus.

CONCLUSION

The possibility of intestinal volvulus should be considered in patients who experience recurrent abdominal pain following TAPP surgery during which barbed V-Loc sutures are used to close the peritoneum. Contrast-enhanced CT and active laparoscopic exploration can confirm the diagnosis and prevent serious complications.

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