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Case Report

An eventful course of a routine laparoscopic appendectomy: case report

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ABSTRACT

Acute appendicitis is one of the most common surgical emergencies in the world. Appendectomy can be done through an open technique, but the laparoscopic approach has become the gold standard for surgical treatment of acute appendicitis. This technique has been found to be associated with decreased postoperative pain, morbidity and length of stay when compared to open appendectomy. However, complications from laparoscopic appendectomy can still occur. We present a case of an internal hernia causing a small bowel obstruction, from adhesions due to loose staples after a laparoscopic appendectomy. Laparoscopic linear cutting staples and automatic clip applier are commonly fired across the appendiceal stump. At the end of the laparoscopy, if the free intraperitoneal staples are not removed with grasper or suction, it can lead to bowel obstruction. We report the clinical presentation, diagnostic work up, treatment and management of mechanical small bowel obstruction caused by loose staples in a pediatric patient.

Keywords: Adhesions, Herniation, Obstruction, Staples, Laparoscopy, Appendectomy

INTRODUCTION

Acute appendicitis is one of the most common surgical emergencies around the world. Some authors report that appendectomy has 8 to 11% complication rate depending on the technique used.[1] Laparoscopic appendectomy has become the gold standard procedure as it is associated with a shorter length of stay, faster recovery and decreased complication rate. However, as laparoscopic procedures become more prevalent with the use of linear stapler, new complications are arising. We report a case of a laparoscopic appendectomy for an acute appendicitis, complicated postoperatively by a small bowel obstruction (SBO) from an internal hernia caused by an adhesion due to a retained loose staple.

CASE REPORT

A 14-year-old female with no past medical or surgical history presented to the emergency department (ED), with a one day history of abdominal pain, nausea, vomiting, and anorexia. The abdominal pain was reported as periumbilical at first, and then migrated to the right lower quadrant (RLQ). A computed tomography (CT) scan confirmed acute appendicitis. A non-perforated appendix was found and the patient underwent an uneventful laparoscopic appendectomy using a linear stapler and was discharged in stable condition the next day. She was seen one week later at her postoperative visit, and was doing well, except for some constipation attributed to her around the clock intake of opioid analgesics, despite having no pain.

Three days later the patient returned to the ED, with new onset intense abdominal pain, vomiting, and constipation. On physical exam her abdomen was soft, mildly distended and diffusely tender to palpation, with voluntary guarding. The initial plain abdominal radiograph (X-ray) showed a large amount of stool with a nonspecific gas pattern and no evidence of free air (Figure 1). The patient was admitted for observation, kept nil per os (NPO), on intravenous (IV) fluids, and a nasogastric tube (NGT) was placed. Her pain improved at first and she had three bowel movements on hospital day one.

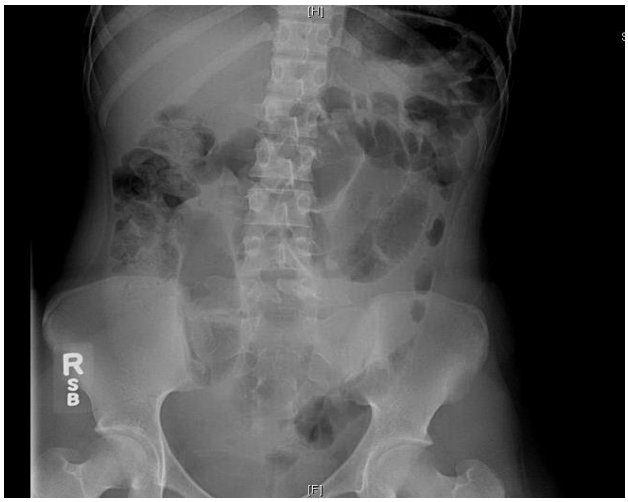

Figure 1: Abdominal X-ray showing nonspecific bowel gas patterns and several dilated small bowel loops.

The pain returned the next day, a CT scan with oral and IV contrast was performed, and it showed findings consistent with distal SBO (Figure 2).The assessment was that of an early postoperative small bowel obstruction (EPSBO). Since the patient remained stable, afebrile, and without leukocytosis, it was decided to continue conservative management with IV fluids, partial parenteral nutrition and NGT decompression.

Figure 2: Coronal CT with contrast of the abdomen and pelvis showing SBO as denoted by the arrow.

The next few days were characterized by alternating periods of clinical improvement and worsening followed with varying NGT output, passage of flatus, and pain resolution. Abdominal x-rays were done daily and there again, there were alternating days of decrease and increase loop dilation, with the patient remaining afebrile, and without peritoneal signs. On day 10 of observation, the intensity of the pain worsened, the NGT output increased significantly, and the decision was made to proceed with exploratory laparotomy.

On exploration, massively dilated loops of small bowls were appreciated. The point of obstruction was found to be an internal hernia, created by an adhesion between two loops with a loose staple at its core (Figure 3). The adhesion was carefully lysed, the bowel was decompressed, and no resection was required as it was found to be viable.

Figure 3: SBO due to adhesion between two loops with a loose staple at its core.

Postoperatively, the patient's bowel function returned on day three. She was started on a clear liquid diet and gradually advanced to regular. She developed pneumonia, which responded well to antibiotics, and she was discharged on postoperative day six. She was seen in follow-up at the outpatient clinic, doing well one week later.

DISCUSSION

In a 16 years study of 16544 cases of acute appendicitis, Ceresoli et al reported that 1.3% of patients needed a second hospitalization after their appendectomy due to small bowel obstruction, requiring further surgical intervention in 60% of cases.[1] Laparoscopic appendectomy has become the gold standard of care for treatment of acute appendicitis. Sealing the appendiceal stump using endoloops or linear staples is a matter of surgeon's preference, both come with their own complications. Although the risk of adhesions exists, Tsao et al showed that the overall incidence of adhesive

SBO after laparoscopy is statistically less common when compared to the open approach.[2] Randomized control trials have shown that the introduction of endoscopic staplers has resulted in decrease in wound infection, postoperative ileus, and foreign body giant cell reaction.[3] However, case reports in the literature suggest that not all loose staples in the abdomen are innocuous.

Nottingham, described a 34-year-old male who returned 10 days after an uneventful laparoscopic appendectomy with diffuse abdominal pain and progressive abdominal distention.[4] On exploratory celiotomy, an adhesion was found between the distal ileum and a loose staple. The band was lysed and the staple was removed.[4] Petersen et al reported a 20-year-old female post laparoscopic appendectomy with linear staples who presented 6 days later to the emergency room with abdominal pain in the periumbilical region, confirmed by CT scan as a SBO with the transition point in the RLQ.[5] On exploration, a staple attached to the appendiceal stump had entrapped a loop of small bowel and mesentery, resulting in an internal hernia of a small bowel loop.[5] The authors suggest that since the appendix is a narrow piece of tissue, staplers can leave some staples free in the abdominal cavity.[5] It is encouraged to carefully inspect the staple line and remove any free staples. Additionally, the edges of the staple line can have staples that are fixed on one end but free on the other end, which makes it possible to get hooked onto other structures and cause complications.

The presence of abdominal pain and distention one week after surgery should raise the suspicion for intra-abdominal pathology instead of postoperative ileus.[6] EPSBO could be hard to differentiate from postoperative ileus. EPSBO should be suspected when the patient shows signs of clinical deterioration and new peritoneal signs. Exploration is recommended if the patient does not respond to expectant management within six days.[7]

In the pediatric population, the published data on small bowel obstruction is scant. Tsao et al compared 477 open to 628 laparoscopic appendectomy and found a 0.7% rate of small bowel obstruction, 87% in procedures performed for perforated appendicitis. The majority of the intestinal obstructions required surgery.[2] Young et al demonstrated that while older children can be managed with bowel rest alone if the obstruction occurs within 12 weeks of the index procedure, surgery is more likely to be required. Children younger than one year of age on the other hand will most likely require surgery to resolve any postoperative bowel obstruction.[8]

CONCLUSION

Laparoscopic appendectomy is a common procedure, considered the gold standard for the treatment of acute appendicitis. Early postoperative obstructive picture is often a conundrum, especially in children, and after a laparoscopic approach, as it is less often associated with adhesions. However, it is important to remember that, when stapling devices are used, loose staples should not be considered innocuous, such as in our case. An adequate technique during firing of the device to decrease the showering of loose staples, and attempts at retrieval should be encouraged, to prevent adhesions, secondary internal hernias, and worsened outcomes.

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