Aberrant Mesoappendix Vasculature: A Unique Cause of Partial Small Bowel Obstruction

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ABSTRACT

Small bowel obstructions are most frequently caused by hernias or adhesive bands. However, there have been several rare reported cases of mechanical small bowel obstructions caused by loops of bowel or vascular bands. We describe a case of a 30-year-old woman with a clinical presentation suggestive of appendicitis. Laparoscopic evaluation showed an aberrant vessel looping around the small bowel extending from the lateral anterior abdominal wall to the mesoappendix, resulting in a partial small bowel obstruction. We review the literature relating to bowel obstructions resulting from bowel knots and vascular bands. To our knowledge, this is the first reported case of a small bowel obstruction caused by an aberrant intraabdominal vessel.

Key Words: Mesoappendix, Intestinal obstruction/etiology, Mesentery/abnormalities, Appendix/abnormalities.

INTRODUCTION

Small bowel obstructions (SBO) are most commonly caused by either adhesions or hernias. However, there have been several reported cases of mechanical SBO caused by other loops of bowel forming knots and by vascular bands. We describe the case of a 30-year-old woman with a 1-week history of abdominal pain and presenting with signs and symptoms mimicking appendicitis. On diagnostic laparoscopy, an aberrant vessel was visualized looping around the small bowel from the anterior abdominal wall to the mesoappendix, resulting in a partial SBO. We review the literature related to bowel obstructions resulting from bowel knots and vascular bands.

CASE REPORT

A 30-year-old woman presented with a 1-week history of progressively worsening colicky right lower quadrant abdominal pain. Over the counter analgesics did not relieve her pain. She admitted to nausea, but denied fever, chills, and emesis. Her last bowel movement was 2 days prior to admission, and was normal per her report.

Past medical and surgical history was insignificant. The patient's medications included oral contraceptives and acetaminophen as needed for pain. She denied tobacco, alcohol, and intravenous drug use. At the time of presentation, she was afebrile and in mild distress. Her abdominal examination was significant for tenderness at McBurney's point with voluntary guarding and borborygmi. Laboratory results revealed a negative urine β -human chorionic gonadotropin and a normal white blood cell count of $6.6 \times 10^3/\mu\text{L}$. Computed tomography (CT) of the abdomen without contrast revealed mildly dilated loops of small bowel and questionable periappendiceal inflammation.

The patient was taken to the operating room for diagnostic laparoscopy with intended appendectomy. To minimize the risk of injury to the patient's distended small bowel, she was mobilized in the reverse Trendelenburg position, and the Hasson technique for peritoneal entry was performed. Blunt 5-mm trocars were placed, under direct visualization utilizing a zero-degree laparoendo-

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scope, in the suprapubic area and slightly left of midline halfway between the umbilicus and pubis.

During laparoscopy, the appendix was macroscopically normal in appearance and was therefore not prophylactically resected, in accordance with modern approaches¹⁻⁴ to minimize potential intraabdominal contamination. However, an aberrant vessel originating from an epigastric vessel (**Figure 1**) and extending from the lateral anterior abdominal wall to the mesoappendix was visualized. This vessel was distinct from the ureter, ovarian vessels, and primary appendicular blood supply. The positioning was not consistent with an omphalomesenteric duct remnant, which would persist as a Meckel's diverticulum extending from small bowel proximally from the ileocecal junction to the umbilicus. The vessel was noted to be looped around the small bowel, causing a partial small bowel obstruction (**Figures 2 and 3**).

The vessel was ligated with a laparoscopic stapler, freed from the bowel, and then excised. Histologic examination revealed a vessel 11.9 cm long with a 5 mm diameter and perivascular fibrosis. The patient made an unremarkable recovery and was discharged on postoperative day one. The patient has continued to be asymptomatic for the last 6 months following her operation.

DISCUSSION

Small bowel obstructions are common, with typical causes including adhesions, hernias, and cancer. Less frequent causes of obstruction include loops or knots of nonherni-

ating bowel,⁵⁻⁸ as well as mechanical obstructions from fibrous bands⁹⁻¹² distinct from the adhesions caused by intraabdominal surgeries or infections. Found primarily in the pediatric population, several types of fibrous bands have been described, but few have been reported to contain vascular structures.

There are several reports in the literature of intestinal knots (ileal-ileal, ileo-sigmoid, or appendico-ileal), causing partial or complete small bowel obstruction.⁵⁻⁷ In many cases, a particularly long or inflamed appendix

Figure 2. Laparoscopic view of vessel looping around small bowel.

Figure 1. Laparoscopic view of vessel originating from the anterior abdominal wall lateral epigastric vessel.

Figure 3. Laparoscopic view of vessel looping around small bowel.

loops around the ileum, and this constriction results in a mechanical obstruction. A lengthy appendix is required for this mechanism, and although appendico-ileal knots are uncommon, lengthy appendices are not. A study of 100 cadavers in Nigeria reported an average vermiform appendix length of 9.5cm in males and 8.7cm in females, with a maximum measured length of 17.6cm.⁸ The symptoms of this band may mimic appendicitis or cause symptoms of a partial or complete small bowel obstruction. Even after appendectomy, the mesoappendix can cause obstructions if not properly ligated. Heffernan¹³ described 4 cases of the mesoappendix creating a noose for small bowel obstructions, either via formation of adhesions on the cut surface after appendectomy or because of the length of the residual mesoappendix.

Adhesions are a very common cause of small bowel obstruction, responsible for up to 54% to 75% of all cases.^{14,15} In a long-term study of over 2700 laparotomies at Westminster Hospital in the London,¹⁵ 1% of patients developed an adhesional obstruction requiring an additional procedure within one year of surgery, and another 0.7% required conservative management. Although fibrous bands are frequently related to prior abdominal surgery, they also occur in the virgin abdomen, although the reported incidence is widely varied. In a cadaveric study by Weibel and Manjo,¹⁶ de novo adhesions were found in 28% of those without a prior abdominal operation, whereas Butt et al¹⁷ calculated an incidence of 3.3% in a retrospective analysis. In a prospective cohort study by Ellis,¹⁵ 10.4% of the surgically naïve population undergoing laparotomy were found to have intraperitoneal adhesions. Most of these were inflammatory in nature, while less than 1% were determined to be of congenital origin.

Obstructions in both the pediatric and adult populations may result from congenital fibrous bands, such as the remnants of the omphalomesenteric or vitelline ducts.⁹⁻¹¹ A singular case report by Maeda et al¹² describes a segment of ileum strangulated by an anomalous loose connective tissue band. The fibrous band was 2mm in diameter, contained many mature arteries, veins, and nerves, and was felt to be of congenital origin. The band extended between the antemesenterium of the terminal ileum and the mesoappendix, strangulating an 85-cm segment of ileum trapped between this band and the mesentery.

The normal anatomy of the vermiform appendix is not conducive to vessel formation extending from the anterior abdominal wall. The appendicular blood supply is usually via the main appendicular artery arising from the ileocecal artery. Frequently, accessory appendicular arteries

branch from the anterior or posterior cecal arteries or from arterial loops formed by the ileo-cecal artery branches. A review of the medical literature, including cadaveric anatomical studies, reveals no instances of vasculature connecting the mesoappendix with the anterior abdominal wall.⁸ In our patient, this unique vascular anomaly of the mesoappendix caused a small bowel obstruction, which clinically resembled appendicitis.

CONCLUSION

The symptoms of appendicitis may be mimicked by other intraabdominal processes. To the best of our knowledge, this is the first reported case of an intestinal obstruction caused by a single intraabdominal vessel. This case illustrates that intestinal obstructions can be caused by anomalous vasculature, may appear in the adult population, and may be a rare cause of abdominal pain otherwise not apparent on radiological examinations.

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