

Case Report

Closed loop small bowel obstruction due to mid urethral sling mesh

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ABSTRACT

Closed loop small bowel obstruction is a surgical emergency, which when left untreated leads to vascular compromise resulting in intestinal ischemia, necrosis and perforation. We report the case of a 61 years old female with past surgical history of hysterectomy and a mid-urethral sling, who presented to the emergency department for abdominal pain and obstipation. She was found on imaging to have a closed loop small bowel obstruction. An exploratory laparotomy revealed an adhesive band encompassing the distal terminal ileum, visceral peritoneum and the Mid-urethral slings mesh. This is a rare complication that, to our knowledge, has not been reported in the surgical literature. This paper will discuss the clinical presentation, diagnostic studies, therapeutic intervention and outcome of this unique case.

Keywords: Closed loop small bowel obstruction, Mid urethral sling mesh, Adhesion, Retropubic space, Intraperitoneal, Extraperitoneal

INTRODUCTION

Small bowel obstruction (SBO) has an incidence of 350,000 per year in the United States with the most common etiologies being twist of mesentery, hernias neoplasms and overwhelmingly postoperative adhesion bands.^{1,2} Closed loop obstruction is a subtype of SBO with two points of obstruction.² It requires timely surgical intervention for the preservation of bowel viability. Mortality rates for bowel obstruction when left untreated reaches 100% and with treatment, it is as low as 2-8%.¹ One of the complications of SBO is bowel ischemia which has a mortality rate of 25%.¹

Stress urinary incontinence (SUI) is a debilitating problem for up to 46% of women.³ While normal continence is achieved when the bladder, urethral sphincter, pelvic muscles and nervous system work in tandem, in SUI a moderate increase in intra-abdominal pressure is transmitted to the bladder causing the leakage

of urine.³ The most common etiologies of SUI are weakness of pelvic organs, direct trauma, pregnancy, increasing age, obesity and post menopause.³ When SUI is left untreated it increases the patient's risk for infections, sexual dysfunction and leads to an overall reduction in their psychological and social well-being.³ While SUI can be managed conservatively with lifestyle modification and pharmacotherapy, the gold standard treatment for SUI is mid-urethral slings (MUS) placement.^{3,4} We present to you a rare case of MUS related SBO.

CASE REPORT

A 61 years old female presented with worsening lower abdominal pain associated with nausea, vomiting, constipation and obstipation for three days. Her past surgical history was significant for an open hysterectomy, sub-urethral bladder sling 2 years prior and an open appendectomy 30 years ago. A physical exam revealed a hemodynamically stable patient, moist mucous

membranes, non-specific generalized abdominal tenderness most prominent in the right lower quadrant tenderness, without distension, rebound, guarding or rigidity. Digital rectal exam revealed no abnormalities. The patient had leukocytosis (14.5 cells/mcl), hypokalemia (3.4 mEq/l) and normal lactate (1.2 mmol/l). Contrast enhanced computed tomography (CT) of the abdomen and pelvis showed two points of bowel narrowing with mesenteric swirling near the terminal ileum (Figure 1).

The patient was fluid resuscitated and emergently taken to the OR for diagnostic laparoscopy. The distal terminal ileum was found to be tightly adherent to a tight adhesive band in the right lower quadrant. A rolled-up piece of mesh was identified from the area of placement of the bladder sling. The ileum was freed and there were concerns about the integrity of 45 centimeters (cm) of small bowel, and the decision was made to convert to an open laparotomy. The bowel was found to be necrotic and a resection and end-to-end anastomosis of terminal ileum was done. The patient tolerated the procedure well and had an uneventful postoperative course, with resolution of her symptoms prior to her discharge on postoperative day four.



Figure 1: Axial CT with contrast image of abdomen. The arrow denotes a closed loop obstruction with mesenteric swirling near the terminal ileum.

DISCUSSION

Closed loop small bowel obstruction (CL-SBO) occurs when two points in the bowel are obstructed leading to the formation of a closed loop.² The most common causes are adhesions, neoplasms, twist of the mesentery, internal hernias such as para-duodenal hernia, herniation into the foramen of Winslow, diaphragmatic hernias and mesenteric defects post Roux En Y Gastric bypass.⁵ CL-SBO produced by a twist can rapidly progress to arterial occlusion and ischemia if left untreated leading to bowel perforation and peritonitis.^{5,6} As intra-luminal pressure increases in the closed loop due to continued intestinal secretions, a decrease in mucosal blood flow occurs.^{5,6} The venous stasis induces the extravasation of blood and

plasma both in the excluded loop and in the adjacent mesentery, thereby increasing the intestinal distension.⁵

The diagnosis of CL-SBO is based on clinical history, physical examination and imaging. Most patients clinically present with abdominal pain, nausea, vomiting and constipation progressing to obstipation.¹ On physical exam hyper or hypo active bowel sounds are appreciated depending on the time of presentation and extent of obstruction along with abdominal tenderness with or without peritoneal signs.¹ There are no laboratory tests that are reliable in detecting strangulation of small bowel.⁷ Laboratory tests may be more useful to estimate the grade of systemic illness, rather than to confirm clinical suspicions or facilitate the decision regarding which patients are to be managed conservatively versus surgically. The number one in the differential diagnosis of a CL-SBO is an adhesive band. A literature review of twenty-five articles between January 1990 and July 2011, reporting on the incidence, distribution, weighted that the mean rate of adhesions after abdominal surgery was 54%, of which 66% were after gastrointestinal surgery, 51% after obstetric and gynecological surgery and 22 % after urological surgery.⁸

Imaging plays an important role in diagnosing CL-SBO. An abdominal radiograph supine and erect will show a gasless small bowel indicating CL-SBO.^{9,10} Supine radiograph will show a paucity of small-bowel gas while the upright radiograph may show string of beads sign.¹⁰ Contrast enhanced CT scan is the best modality to detect site of obstruction, cause, transition points and vascular compromise.⁶ Whirl sign is very specific (specificity 83%) with a U or C shaped distended fluid filled loop.¹¹ Nevertheless the whirl sign has a low sensitivity and clinical assessment of the patient trumps all diagnostic modalities for the final decision to operate on the patient.¹¹ Management of CL-SBO includes fluid resuscitation, bowel rest and decompression, followed by urgent laparoscopy or laparotomy.^{1,9}

MUS is minimally invasive surgery with the goal of providing support at the sub-urethral level.³ There are two main types of MUS placement: retropubic or trans-obturator.³ A small polypropylene mesh tape is inserted through an incision in the suprapubic region or inguinal region and manually guided into the retropubic space or through the obturator foramen, respectively.^{3,4} The mesh tape is positioned to sit under the urethra and secured around the pubic bones with enough tension.^{3,4} When the patient coughs the tape closes the urethra and bladder neck preventing the leakage of urine.^{3,4}

CL-SBO is an unusual complication of MUS due to the fact that the standard technique for placing meshes is usually via an extraperitoneal approach, with no communication with intraperitoneal structures. In our patient, a retropubic MUS mesh led to the formation of a CL-SBO in the right lower quadrant, secondary of an adhesion between the mesh and the bowel. The adhesion

likely formed due to the intraoperative microtrauma to the peritoneum during the placement of the mesh. Some strategies to prevent adhesions are to minimize the quantity of the mesh placed, minimizing operative time, occasional use of saline solution to reduce dehydration of mesothelial cell surfaces and irrigation of the cavity to reduce blood clots when feasible.¹² Almeida et al reported the only other case of small bowel obstruction after a sling procedure, found to be secondary to an internal hernia of the distal ileum compressed between the visceral peritoneum of the bladder and a loop mesh sling.¹³ MUS has an additional set of complications such as bowel perforation as bits of mesh are chipped away, presented often remotely from the urologic procedure.¹⁴ MUS can also cause infection, voiding dysfunction, detrusor over activity, erosion, supra-pubic and groin pain.⁴

CONCLUSION

The key in the diagnostic approach for any CL-SBO still remains the early recognition of signs and symptoms. When small-bowel obstructions occur after a mesh surgery (MUS related CL-SBO) such as in our case, it is imperative to stress the possibility of adhesions or bowel entrapment caused by the sling. Prompt surgical intervention is imperative, as delay in treatment can be associated with bowel necrosis, perforation, peritonitis and death.

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