

Postoperative Bowel Herniation in a 5-mm Nonbladed Trocar Site

Marilyn Huang, MD, Fernanda Musa, MD, Caroline Castillo, Kevin Holcomb, MD

ABSTRACT

Background: Incisional hernias are a rare complication of laparoscopic surgery, with a reported incidence of <1%.

Case Report: We describe a case of bowel herniation and strangulation involving a 5-mm trocar site.

Conclusion: Although there is growing literature supporting fascial closure of abdominal port sizes ≥ 10 mm, there is sparse data to suggest closure of 5-mm port sites. Our case illustrates that in appropriate clinical scenarios, the possibility of a strangulated hernia involving a 5-mm port site warrants consideration.

Key Words: Bladeless trocar, Strangulated bowel, Hernia.

INTRODUCTION

Complications from laparoscopic surgery occur in 0.1% to 10% of procedures. The most common complications are vascular and bowel injuries.¹ Incisional hernias are a rare complication of laparoscopic surgery, with a reported incidence of <1%. Most complications arise in trocar sites >10mm.² We describe a case of bowel herniation and strangulation involving a 5-mm trocar site.

CASE REPORT

GM is a 63-year-old woman initially treated in 1998 for ductal carcinoma in situ of the left breast with lumpectomy and local radiation therapy. In 2006, she developed a pleural effusion that subsequently revealed recurrent metastatic breast cancer. The recurrence was successfully treated with an aromatase inhibitor. She had no evidence of disease until surveillance PET/CT scan in December 2008 showed hypermetabolic nodules in the left perirectal and retrocaval areas. CT-guided biopsy of the left pelvic nodule demonstrated a high-grade adenocarcinoma consistent with recurrent breast cancer. She underwent a laparoscopic bilateral salpingo-oophorectomy and right paracaval lymph node biopsy. An infraumbilical nonbladed 10-mm trocar (Ethicon Endo-Surgery) and two 5-mm nonbladed trocars were inserted in the right and left lower quadrants along the mid-axillary line. A 5-cm soft-tissue mass was visualized arising from the fimbriated end of the left fallopian tube with no evidence of adenopathy or carcinomatosis. All specimens were removed through the umbilical port site by using endoscopic bags. The patient tolerated the procedure well with an operative time of 90 minutes and estimated blood loss of 10 mL. She was discharged home in stable condition.

Over the next 24 hours, she developed abdominal pain over the right incision accompanied by nausea and vomiting. She presented to the emergency department on postoperative day 1. On examination, a prominent 5-cm mass at the right lower quadrant trocar site was palpable with minimal tenderness. CT scan of the abdomen and pelvis revealed a small bowel herniation through the right trocar site. The fascial defect measured 15.93 mm in diameter (**Figure 1**).

New York Presbyterian Hospital-Weill Cornell Medical Center, Department of Obstetrics & Gynecology, Division of Gynecology Oncology, New York, New York, USA (all authors).

Address correspondence to: Marilyn Huang, MD, or Kevin Holcomb, MD, 525 East 68th Street, Suite J 130, New York, NY 10021, USA. Telephone: (212) 746-7553, Fax: (212) 746-8402, E-mail mhuang2@mdanderson.org

DOI: 10.4293/108680810X12785289144845

© 2010 by JSLS, *Journal of the Society of Laparoendoscopic Surgeons*. Published by the Society of Laparoendoscopic Surgeons, Inc.

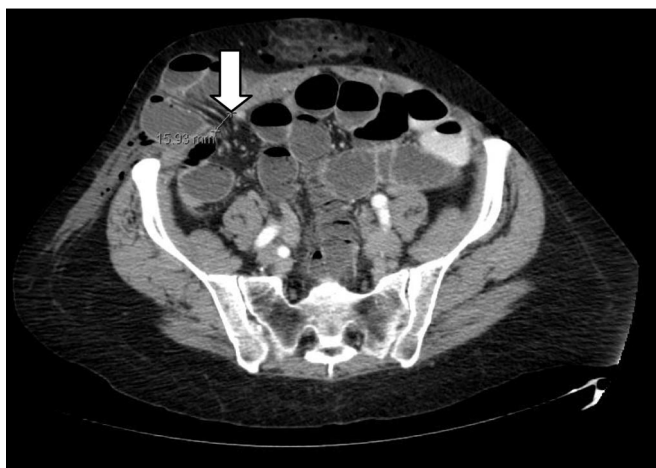


Figure 1. Computed tomographic scan demonstrating bowel herniation.

Laparoscopic exploration demonstrated multiple dilated loops of small bowel with a transition point at the right lower quadrant fascial defect. The skin incision over the trocar site was extended to reveal a 2.5-cm fascial defect. A 20-cm loop of strangulated ischemic bowel was in the subcutaneous space. The necrotic bowel was resected leaving an ample side-to-side anastomosis by utilizing a staple technique. Zero Prolene sutures reapproximated the fascial defect to create a tension-free closure. An adynamic ileus complicated the postoperative course but responded to conservative medical management. The patient was discharged 10 days after her second surgery tolerating a regular diet. Final pathology displayed a primary serous fallopian tube adenocarcinoma.

DISCUSSION

Advancement of laparoscopic equipment and surgical techniques has made minimally invasive surgery feasible in increasing numbers of clinical scenarios that previously required laparotomy. Laparoscopy has many advantages over laparotomy, such as less pain, smaller incisions, shorter recovery time and hospital stay, decreased blood loss, and faster return of bowel function.³ The understanding of the risks involved with laparoscopic surgery has amplified with the increased volume. Conditions that increase the risk of complications include previous surgeries, extensive bowel distention, endometriosis, pelvic inflammatory disease, and cardiopulmonary disease.^{4,5}

The reported incidence of trocar-site hernia in diagnostic laparoscopic procedures is approximately 0.2%. These hernias largely occur at the umbilical port site. Kadar et al⁶

reviewed 3560 operative gynecologic laparoscopies to determine the incidence of incisional hernias. They found 6 incisional hernias (0.17%), all at extraumbilical sites occurring in 10-mm and 12-mm trocars. Based on these findings, the authors recommended fascial closure for only extraumbilical port sites >10 mm.

In 1994, Montz et al⁷ published results of a large survey from the American Association of Gynecologic Laparoscopists, regarding their experience with laparoscopic trocar-site hernias. Of approximately 4 385 000 reported laparoscopic procedures, there were 933 hernias yielding an incidence of 0.021%. Interestingly, they reported 23 hernias (2.7%) that arose in port sites <8 mm in size. Although inherently biased, this survey was the first to estimate the incidence of trocar-site hernia for port sizes <8 mm. Since 1994, there have been a few case reports describing 5-mm port-site hernias presenting with bowel incarceration or small bowel obstruction. Nezhat et al⁸ examined 5 300 laparoscopies, 11 of which were complicated by incisional hernia (incidence of 0.2%). Of the 11 hernias, 5 (45%) occurred at 5-mm trocar sites, leading the authors to suggest routine fascial closure of ports >10 mm and of 5-mm ports with extensive operative manipulation. Few case reports describe 5-mm port-site hernias presenting with bowel incarceration or obstruction but suggest routine fascial closure of 5-mm ports with extensive operative manipulation.

Tonouchi et al⁹ examined pathogenesis and clinical manifestations of trocar-site hernia. They determined that a large trocar size, leaving the fascial defect open, and stretching the port site were all risk factors for postoperative hernia. Additionally, the authors examined the timing of presentation, classifying the hernias as early and late onset. The early onset group developed symptoms immediately after the operation (16/21, 76.2%) and mostly presented with symptoms of small bowel obstruction. The defect in this group was characterized by dehiscence of the anterior and posterior fascial plane and peritoneum. The late-onset group developed symptoms several months after surgery (median of 5.5 months) and presented with a distended abdomen (28/32, 87.5%) without small bowel obstruction. Tonouchi et al⁹ also advocated for fascial closure in ports >10 mm and for 5-mm ports that had been extensively manipulated.

The advancement in laparoscopic equipment has included the development of nonbladed trocars that utilize a muscle and fascia separating technique. Most of the literature is in general surgery gastric bypass procedures. Liu et al¹⁰ examined 180 laparoscopic nonbladed trocar

insertions, including 110 10-mm and 12-mm ports where the fascial defects were not closed. On removal of the large trocar ports, the fascial defect was noted to be <6 mm to 8 mm, and the muscles of the abdominal wall covered the defect. The anterior and posterior fascial defects did not align. At a median follow-up of 11 months, none of the patients had developed a hernia. Similarly, Johnson et al¹¹ with the VersaStep and Rosenthal et al¹² with the Endopath demonstrated comparable results in larger patient populations (747 and 849, respectively). The former had 1 494 12-mm and 2 241 5-mm trocars, none of which had a hernia despite lack of suture closure. In 3 744 12-mm and 5-mm trocar placements, Rosenthal et al¹² found only 2 trocar-site hernias (0.2%). The authors concluded that the blunt-tipped tissue-separating trocar avoids tearing and cutting that occurs with previously used cutting trocar. This obviates the need for time-consuming fascial closure and decreases the risk of incisional hernia development.

The present case is a unique addition to the literature, because the hernia was found in a 5-mm port site that had been utilized only for grasping and cutting tissue with a Harmonic scalpel and not for specimen retrieval. The fascial defect was most likely due to weak fascial tissue, potentially secondary to malignancy. Furthermore, the initial small fascial defect was probably extended by the herniated bowel to reach the larger 2.5-cm dimension. Despite a relatively benign presentation, without evidence of bowel ischemia on physical examination or suggestive findings on CT scan, a large segment of necrotic small bowel required bowel resection. While incisional hernia following laparoscopy is a rare occurrence, growing literature supports fascial closure of port sizes ≥ 10 mm. However, there remains sparse data supporting routine closure of 5-mm port sites secondary to the low reported incidence of herniation. The possibility of strangulated hernia in a 5-mm port site warrants consideration in the appropriate clinical scenario. Immediate surgical intervention may avoid the need for bowel resection and potentially life-threatening sepsis.

References:

1. Magrina JF. Complications of laparoscopic surgery. *Clin Obstet Gynecol.* 2002;45(2):469-480.
2. Boike GM, Miller CM, Spirtos NM, et al. Incisional bowel herniations after operative laparoscopy: a series of nineteen cases and review of the literature. *Am J Obstet Gynecol.* 1995; 172(6):1726-31; discussion 1731-1733.
3. Bongard F, Dubecz S, Klein S. Complications of therapeutic laparoscopy. *Curr Probl Surg.* 1994;31(11):857-924.
4. See WA, Cooper CS, Fisher RJ. Predictors of laparoscopic complications after formal training in laparoscopic surgery. *JAMA.* 1993;270(22):2689-2692.
5. Shirk GJ, Johns A, Redwine DB. Complications of laparoscopic surgery: How to avoid them and how to repair them. *J Minim Invasive Gynecol.* 2006;13(4):352-359;quiz 360-361.
6. Kadar N, Reich H, Liu CY, Manko GF, Gimpelson R. Incisional hernias after major laparoscopic gynecologic procedures. *Am J Obstet Gynecol.* 1993;168(5):1493-1495.
7. Montz FJ, Holschneider CH, Munro MG. Incisional hernia following laparoscopy: a survey of the American Association of Gynecologic Laparoscopists. *Obstet Gynecol.* 1994;84(5): 881-884.
8. Nezhat C, Nezhat F, Seidman S, and Nezhat C. "Incisional Hernias After Operative Laparoscopy." *Journal of Laparoendoscopic & Advanced Surgical Techniques.* 1997;7(2):111-115.
9. Tonouchi H, Ohmori Y, Kobayashi M, Kusunoki M. Trocar site hernia. *Arch Surg.* 2004;139(11):1248-1256.
10. Liu CD, McFadden DW. Laparoscopic port sites do not require fascial closure when nonbladed trocars are used. *Am Surg.* 2000;66(9):853-854.
11. Johnson WH, Fecher AM, McMahon RL, Grant JP, Pryor AD. VersaStep trocar hernia rate in unclosed fascial defects in bariatric patients. *Surg Endosc.* 2006;20(10):1584-1586.
12. Rosenthal RJ, Szomstein S, Kennedy CI, Zundel N. Direct visual insertion of primary trocar and avoidance of fascial closure with laparoscopic Roux-en-Y gastric bypass. *Surg Endosc.* 2007; 21(1):124-128.