5-Millimeter Trocar-Site Bowel Herniation Following Laparoscopic Surgery

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ABSTRACT

Background and Objectives: This is a case report of a 5-mm trocar-site large bowel herniation following laparoscopic tubal sterilization. During laparoscopic sterilization, the 5-mm port site was closed initially. Large bowel herniation was recognized at the end of the case and managed immediately by laparoscopically reducing the hernia and closing the port site without any short- or long-term complications. Trocar-site bowel hernia is a rare complication after laparoscopic surgery. It is usually associated with trocar size >10mm. We describe a case of bowel herniation through a 5-mm trocar site, which was managed after laparoscopic surgery.

Case Report: A 36-year-old multigravid patient underwent a laparoscopic tubal fulguration. Two 5-mm ports were used for the procedure. At the end of the procedure, the lateral trocar site was found to have fat protrusion that looked like appendices epiploicae. A laparoscopic camera was reintroduced into the abdominal cavity that showed a large bowel herniation through the 5-mm lateral port site. The hernia was reduced laparoscopically, and the fascial defect was repaired.

Conclusion: Bowel herniation can occur through a 5-mm port. All port sites should be closed to avoid such complications.

Key Words: Laparoscopy, Bowel hernia, Trocar, Sterilization.

INTRODUCTION

Port-site hernias occur when the trocar site is >10mm in size.[1] The trocar sites <10mm in size are usually not repaired.[2] The incidence of incisional hernias increases with trocar size. In cases of bowel involvement, the patient presents some days later with signs and symptoms of bowel obstruction or injury.[3–5] Bowel herniation immediately after surgery is almost never recognized and rarely reported.[2] We describe a case of a large bowel herniation through a 5-mm laparoscopic port using a VersaStep (VersaStep, Covidien, Mansfield, MA) needle that was recognized immediately after surgery and was corrected avoiding any short- or long-term complications.

CASE REPORT

A 36-year-old multigravid female underwent a laparoscopic bilateral tubal fulguration. She had no medical problems and no prior surgeries. Her body mass index was 33.1kg/m^2. A 5-mm incision was made with a scalpel at the umbilical area. This was followed by a 5-mm radially expanding sheath placed inside the abdomen at the infra-umbilical area by the direct insertion technique. A 5-mm zero-degree camera was placed inside the abdomen for visualization. Once in the abdomen, CO_2 insufflation was performed. A 5-mm skin incision was made in the left lower quadrant with the knife. A 5-mm VersaStep port (VersaStep, Covidien, Mansfield, MA) was inserted inside the abdomen under direct visualization. This port was used for the bipolar device for tubal fulguration, which was then performed using the device. Both tubes were fulgurated 3 times on each side without any complications. The whole procedure was uncomplicated without any excessive manipulation of the lateral trocar. Total time for the whole procedure was 15 minutes. Following the fulguration of the fallopian tubes, the bipolar device was removed under visualization. This action was followed by the removal of the left trocar obturator thus collapsing the sheath surrounding the trocar under direct visualization. The Vera point sheath was then removed under direct visualization. The fascial defect at the lateral port site was not closed. The insufflation was stopped and the camera was removed. While closing the skin defects on the left

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lateral port site, a piece of fat was noticed that looked like appendices epiploicae. Large bowel herniation was suspected and a plan was made to explore the abdomen again. The same 5-mm umbilical port was placed again followed by a 5-mm 0-degree laparoscope camera. The descending colon was noted to be protruding through the lateral port site **(Figure 1)**.

A right lateral 5-mm port was then placed using the VersaStep. The viscera were reduced gently with laparoscopic graspers. There was no obvious evidence of any bowel perforation except for a serosal tear. The serosa of the bowel that had herniated was oversewn with 3-0 PDS (polydioxanone Ethicon) to prevent any occult or delayed bowel injury. The fascia on port sites was then closed by using 3/0 Vicryl (polyglactin 910). The patient was kept overnight for observation. She had active bowel sounds and denied any nausea or vomiting during that stay. She was discharged home the next morning. The patient was seen in the office one week later without any complaints.

DISCUSSION

Incidence and Risks Factors

The incidence of port-site hernias >10mm is well documented in the literature.[1–6] Port size >10mm should be closed when possible. Although port-site hernias have been documented, the actual incidence is difficult to estimate. Based on a PubMed literature search (Key Words: 5mm port, bowel hernia, hernia, laparoscopic surgery) visceral herniation through a 5-mm port site is only documented as case reports.[1,7–15]

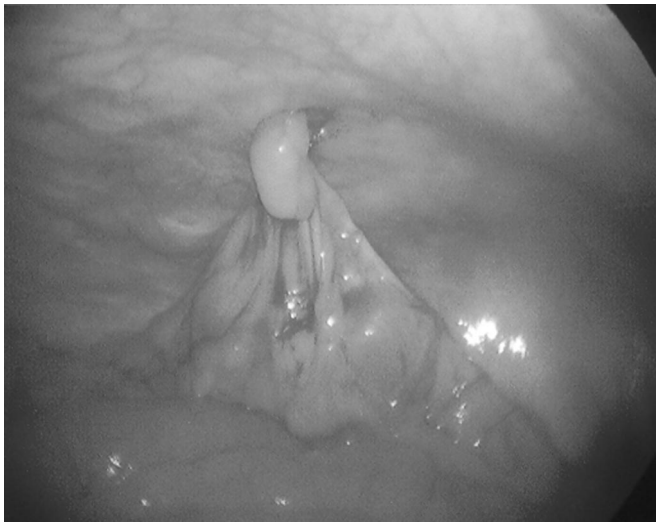

Figure 1. Laparoscopic view of large bowel herniation through 5-mm trocar site.

Risks for developing a trocar-site hernia include advanced age, increased BMI, smoking status, uncontrolled diabetes mellitus, port-site infection, peritoneal defect greater than the trocar size, midline insertion of the port especially near the umbilicus, excessive manipulation of the trocar site, site of trocar placement (lower quadrant port sites are more prone to hernia due to the absence of posterior rectus sheath), size of trocar, number of trocars used and type of trocar tip (bladed, nonbladed, radially expanding). The incidence of hernias is lower with radially expanding trocar sheaths.[1,7–15]

A survey of the American Association of Gynecologic Laparoscopists published by Montz and colleagues[9] demonstrated a total of 933 hernias from 4,385,000 laparoscopic procedures (an incidence of 21 per 100,000). Of these, 167 occurred in women who had fascial closure. Six hundred sixty-five patients (71.3%) underwent surgical repair. Of the 840 hernias in which the size of the original fascial defect was noted, 725 (86.3%) occurred in port sites ≥10mm in diameter.[9] Nezhat et al[16] reported on 5,300 patients who underwent laparoscopy from January 1988 through June 1996. Ten women were evaluated for incisional hernias, and 11 hernias were found (incidence of 0.2%), omentum herniated in 7 cases and bowel herniated in 4 cases. In one case, the sigmoid epiploicae irreducibly herniated through the peritoneum and not the fascia. The hernia occurred through a 5-mm trocar incision site in 5 cases. Delayed recognition of bowel hernia through 5-mm trocar sites in adult patients was reported in 3 patients only.[16] Kader et al[17] reported a 0.17% of port-site hernia in a multicenter report of 3,560 operative laparoscopies. The risk of hernia through a 12-mm trocar site (3.1%) was approximately 13-fold greater than that for a 10-mm trocar site (0.23%). No comment on 5-mm port sites was given. In a Bioke et al[18] study and review of the literature, bowel herniation occurred when a ≥10mm trocar site was used. Lateral ports were the most common sites of hernia. None of the patients in the above studies were diagnosed with hernia the same day of surgery as described by us.

Signs and Symptoms of Bowel Involvement

Patients can have a port-site hernia, but without bowel involvement and without symptoms. Once bowel or omentum gets involved, patients may present with gastrointestinal symptoms (nausea, vomiting, port-site pain, abdominal pain, fever). Either small or large bowel can be

involved depending on the site of hernia. Bowel involvement can occur in the form of incarcerated bowel, bowel obstruction, or bowel evisceration. All of these are considered surgical emergencies that can present a few days to weeks after surgery. For patients who present with gastrointestinal symptoms after recent laparoscopic surgery, the differential diagnosis should include internal bowel hernia with or without incarceration/strangulation. The workup should include a computed tomographic scan (CAT scan), which is usually helpful in the diagnosis. Bowel evisceration is an obvious diagnosis and should be managed aggressively. Bowel or omental evisceration, incarceration, and obstruction can be managed via laparoscopy or laparotomy, depending on surgeon's preference.

There is no clear consensus that all port sites must be closed. Based on PubMed and Google literature searches (Key Words: bowel herniation, laparoscopy, port site hernia) the following case reports were analyzed **(Table 1)**.[1–30] Based on the available data in **Table 1**, it appears that herniation tends to occur in the lateral lower abdomen.

Table 1.
Summary of all 5-mm Visceral Herniations

Source	Original Surgery[a]	Symptoms	Days After Laparoscopic Surgery	Clinical Manifestation	Hernia Site	Size	Trocar Site Closure
Patrick R Reardon et al[25]	Fundoplication with posterior gastropecxy	Slow return to bowel function	25	Mid-jejunum herniation	Left trocar	5mm	No
Moreaux G et al [26]	TLH + PLD	Abdominal pain, vomiting after removal of drains from 5mm trocar site	4	Small bowel necrosis	Right lower quadrant	5mm	Not closed Drains placed at this port site
Moreaux G et al[26]	TLH + PLD	GI symptoms after removal of drains from 5mm trocar site	6	Small bowel henia	Right lower quadrant	5mm	Not closed. Drains placed at this site
Eltabbakh GH[27]	LAVH BSO LND	Nausea, vomiting	7	Small bowel obstruction	Right	5mm	Not closed
A. Thapar et al[28]	Left ovarian cystectomy	Nausa vominting	4	Small bowel obstruction	Rightlower quadrant	5mm	Not closed
Matter et al[29]	Cholecystectomy	Nausea, vomiting	10	Richeter's hernia	R upper quadrant	5	Not closed
Waldhaussen[30]	Fundoplication	Nausea, vomiting	5	Richeter's hernia	L lower quadrant	5mm	Not closed
Nakajima et al[31]	Nissen procedure	Nausea, vomiting	6	Richter's hernia	L side	5mm	Not closed
Nizzat et al[17]	Total Hystrectomy + BSO	Not available	2	Small bowel	L lower quadrant	5mm	Not closed
Toub et al[32]	Radical hysterectomy	Leaking of peritoneal fluid	4	Incarcerated omentum	L lower quadrant	5mm	Not closed
Bergemann et al[33]	Tubal ligation	Abdominal pain	2	Omental hernia	Umbilical area	3mm	Not closed
Nauman Khurshid current case	Tubal sterilization	None hernia diagnosed at end of case	0	Large bowel hernia	L side	5mm	Not closed

[a]TLH=total laparoscopic hysterectomy; PND=pelvic node dissection; BSO= bilateral salpingo-oophorectomy; LAVH=laparoscopic assisted vaginal hysterectomy.

However, since there is no denominator as to the number of port sites placed in the upper vs. lower abdomen, the true incidence is unknown. As a general approach to laparoscopy, an attempt should be made to close all port sites regardless of port size.

Port Closure Options and Tips

Different methods for port-site closure have been described in literature.[19–22] At our institution, we prefer to close port sites using a Carter-Thomson Needle-Point suture passer. This provides the advantage of closing the fascia and the peritoneum en bloc under visualization and does not take a long time to perform. This is not done on the camera port site. On the camera port, the fascial defect is closed under direct visualization.

Tips to help prevent port-site hernias may include

1. Close all port sites despite trocar size, especially if the surgery was long and excessive manipulation of the trocars was done.
2. Remove all ports under visualization.
3. Deflate the abdomen carefully when removing ports. If this is not done, escaping CO_2 can draw the bowel or omentum into the port sites.
4. Remove ports before deflation of CO_2. Deflating the CO_2 before trocar removal will compromise trocar removal under laparoscopic visualization.
5. Examine all port sites carefully before closing the skin defect for any potential visceral herniation.
6. Obese patients need close attention to closure. Blind closure of the trocar site risks failed closure or visceral injury.
7. Slow return of bowel function should alert the physician to a possible bowel hernia.
8. Tunnel drains rather than placing them through the same 5-mm port sites, because a few cases of bowel hernias have been reported when drains were removed.

In our case, although the CO_2 gas was evacuated at the end of the case after the trocar was taken out under direct visualization, we hypothesize that the positive pressure in the abdomen with CO_2 evacuating could be the reason why the large bowel herniated through the 5-mm port site. Although the large bowel was not perforated and only had serosal tears, the chance of a delayed injury due to ischemia was thought to be high enough to place 2 imbricating 3/0 PDS stitches laparoscopically in the bowel. Although bowel herniation through a 5-mm port is rare, any trocar site should be repaired by the surgeon's method of choice, whether by using a blunt or bladed trocar. For smaller trocar size closure, one can use surgical plugs or laparoscopic suture closure with ease. In our case, large bowel herniation was diagnosed by careful observation of the surgical field during the end of the case. Although this technique is only applicable to thin patients, it does not take a lot of time and could potentially save a patient from a life-threatening event.

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