Clinics in Surgery

Case Report
Published: 12 Oct, 2018

Suture or not to Suture? Trocar- Site Bowel Herniation as a Rare Complication after Trocar Placement in Laparoscopic Surgery: Case Report and Review

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Abstract

Laparoscopic surgery became gold standard procedure in numerous indications but despite of minimal invasiveness it could result in added complications specific to the laparoscopic approach. In this study, we present the case of 63 year-old patient who underwent a total laparoscopic hysterectomy with adnexa for preinvasive cervical cancer complicated by the occurrence of small bowel herniation at the 5-mm trocar site.

Trocar Site Hernia (TSH) is rare but potentially dangerous complication which can be asymptomatic or requires emergency surgery. It should always be included in the different diagnosis of bowel obstruction when the patients complain of gastrointestinal symptoms after laparoscopy. In this case, patient required relaparotomy which confirmed the diagnosis.

Keywords: Minimally Invasive Surgery; Trocar Site Hernia; Laparoscopy

OPEN ACCESS

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Received Date: *12 Sep 2018*
Accepted Date*: 10 Oct 2018*
Published Date*: 12 Oct 2018*

Citation:
Gogacz M, Kamińska A, Winkler I, Adamiak A, Rechberger T, Philippe K. Suture or not to Suture? Trocar-Site Bowel Herniation as a Rare Complication after Trocar Placement in Laparoscopic Surgery: Case Report and Review. Clin Surg. 2018; 3: 2158.

Introduction

Laparoscopic surgery is widely practiced and became the gold standard procedure in numerous indications. It may offer more benefits than conventional surgery but despite of minimal invasiveness it could resulted in added complications specific to the laparoscopic approach. Some of them can be directly attributed to abdominal access with laparoscopic trocars. One of these is Trocar Site Hernia (TSH), a rare problem that can be encountered during regular and robot-assisted laparoscopic procedures. TSH is rare but potentially dangerous complication. It can be asymptomatic or presents with bowel obstruction, requiring emergency surgery [1,2].

TSHs are well- known postoperative complication associated with laparoscopic surgery which can occur in wounds of any size, ranging from 2 mm to 15 mm. The majority of reported cases are in wound larger than 10 mm. The TSH occurred in a wound smaller than 10 mm – defined as a small wound, are extremely rare [3,4]. Incidence of the complication has been evaluated at 0.8% to 1.2 %, but the true incidence of herniation may be higher because many patients are asymptomatic or do not return to the primary surgeon [2,4]. Some authors suggested that the prevalence of herniation is 0.5% (ranging 0% to 5.2%) [4].

Hysterectomy is the most common surgical intervention on the female genital tract following cesarean section. The first Total Laparoscopic Hysterectomy (TLH) was performer in 1989 by Harry Reich [5].

Since then the advent of minimally invasive techniques has allowed a substantial decrease in the rate of open abdominal hysterectomies, with shorter postoperative hospital stay, faster return to daily activities and reduced overall costs. However, as a consequence of the frequency with which this surgery is needed, even uncommon complications can affect large number of patient [6]. Here, we describe a rare case of trocar site bowel herniation at the 5-mm port site which occurred after laparoscopic total hysterectomy and bilateral salpingo-oophorectomy.

Case Presentation

A 63 year-old patient with a body mass index of 25 and history of craniotomy due to the aneurysm

of the right internal carotid artery, underwent a total laparoscopic hysterectomy with adnexa for preinvasive cervical cancer.

After safety tests and in sufflation through a Veress needle, a 10-mm laparoscope was inserted through a 10-mm umbilical port. One 10-mm port was inserted in the right lower abdominal quadrant and one 5-mm port was inserted in the left abdominal quadrant. The procedure went without any complications; the total duration of the procedure was 100 mis and the blood loss about 70 ml.

The initial postoperative course passed normally. At the day 3 she started to present an occlusive syndrome-abdominal pain and vomiting with clinical signs of ileus. However no obstructive features have been demonstrated in X-ray, computed tomography and Ultrasonography (US). The results of the laboratory test were normal. After the surgical consultation, pharmacological stimulation of bowel motility was implemented with good results. Due to vomiting, an attempt was made to put the probe into the stomach, obtaining about 500 ml of liquid content. During all this time, despite the bloated abdomen, the peristalsis was preserved. At the day 9 because of persistent symptoms despite pharmacological treatment it was decided to perform US again. Diagnosis of small bowel herniation in the left trocar site was made and patient underwent an emergency mini-laparotomy which confirmed the diagnosis. There was no digestive resection because the herniated bowel was viable. The fascia was closed with absorbable sutures. The patient was discharged from the hospital at the day 4 after second intervention and recovered without any incident.

Laparoscopic surgery is modern surgical approach and widely practiced. It may offer more benefits that conventional surgery but it could result in added complications specific to the laparoscopic approach such as port- site incisional hernia. More than 70% of small wound trocar site hernias occurred after gynecologic laparoscopic surgeries. Nearly 90% of them occurred at the lateral abdomen when were left open the fascial layers [3].

Larger port size and increasing numbers of ports needed to perform more complex laparoscopic procedures are likely to increase the incidence of port site hernias which tend to develop more frequently at umbilical and midline port sites due to the thinness of the umbilical skin and weaknesses in the line a alba [7].

Trocar-site hernias are postoperative complication associated with laparoscopic surgery, especially when the trocar site is bigger than 10 mm in size. The incidence of port-site hernias >10 mm is well documented in literature and the port sizes >10 mm should be closed with sutures to prevent herniation. The trocar sites <10 mm in size are usually not repaired. Many surgeons do not routinely repair port sites of 5 mm because it is believed that such iatrogenic fascial defects are not large enough to presuppose hernia [4].

The first case of bowel herniation after laparoscopic surgery was described in 1968 by Fear [10]. Incidence of TSH has been evaluated at 0.0% to 5.2% [2-4].

The incidence of the complication increases with trocar size. In ports less than 10 mm in diameter, such as 5 mm and 8 mm are difficult to estimate because it is rarely reported. Trocar site hernia on a 8-mm port site following robotic- assisted surgery are very rare. The occurrence of hernia in smaller trocar sites is up to 0.09%.

The classification of trocar port-site hernias was suggested/ proposed in 2004 [8].

There are 3 types of hernias:

a. The early onset trocar port hernia type (the 80% of them) was defined as having dehiscence of fascia and peritoneum within 2 weeks, most commonly with small bowel obstruction followed by the omentum.

b. The late onset type port- site hernia type was defined when it occurs after 2 weeks and has dehiscence of fascial plane with sac consisting of peritoneum; only a small part of late onset hernias present with intestinal obstruction. The late-onset type has often been recognized as a complication of the trocar insertion and this type of hernia almost always develops in the late stages several months after surgery.

c. The special types of hernia which have dehiscence of the whole abdominal wall. Protrusion of the intestine and other tissue such as greater omentum is recognized.

In morbidly obese patients, a thick preperitoneum predisposes the development of the Richter hernia, despite adequate fascial closure. Clinical character of this type is just like the early-onset type [11]. According to the literature explorative laparotomy is often used to repair the trocar site hernias [3]. In cases of bowel hernias, the symptoms of bowel injury or obstruction could be presented after couple of days. They are almost never recognized immediately after surgery.

Patients can have a port-site hernia without bowel involvement and without symptoms. When bowel or omentum gets involved, patients may present symptoms like nausea, vomiting, port-site pain, abdominal pain, fever. Depends on the site of hernia, small or large bowel can be involved and 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 different diagnosis should include internal bowel hernia with or without incarceration or strangulation [1,4]. In the past, hernias were most frequently evaluated with small bowel oral contrast studies. Radiography and ultrasonography along with clinical examination may enable the diagnosis although this needs the radiologists' awareness of this rare complication. Radiographic features include apparent encapsulation of distended loops of small intestine, arrangement or crowding of small bowel loops within the hernia sac, evidence of obstruction with segmental dilation and stasis with features of apparent fixations and reversed peristalsis during fluoroscopic evaluation. Recently, the first-choice imaging technique used in these patients is abdominal CT with characteristic mesenteric vessel abnormalities with engorgement, twisting, crowding or stretching of these vessels [9].

Nowadays, for diagnosis and surgical management, laparoscopic exploration of the patient who has symptoms of hernia is the worthwhile procedure. Risk factors for developing a trocar- site hernia include advanced age or preschool age, increased BMI, smoking of cigarettes, uncontrolled diabetes mellitus, port-site infection, peritoneal defect greater than the trocars size, midline insertion of the port especially near the umbilicus, excessive manipulation of the trocar site, site of trocar placement- lower quadrant port sites, size of trocar, number of trocars and type of trocar tip used, extended operative time, comorbidities associated with fascial defect- adjuvant chemotherapy for cervical cancer or breast cancer with abdominal

metastasis, patient history of kidney failure, parietal infection, cortico therapy, chronic bronchitis and use of drains [1,3,4].

The most important risk factor is the size of the trocar. Most of described herniations at the port site involve ports of at least 10 mm, only a few cases are reported at trocar sites smaller than 10 mm. A case of bowel herniation through an 8- mm robotic port site has also been described, even a case of bowel herniation through a 2-mm port site in a 3-month-old infant was described in pediatric surgery [1,10].

The risk of hernia through a 12-mm trocar site (3.1%) is approximately 13-fold greater than for 10-mm trocar site (0.23%). It is said that extensive manipulations with repetitive movements in different directions during operations could enlarged the defect of the fascia and the peritoneum which becomes larger than the skin incision.

It can be possible that 5-mm port sites hernias could happened after drain usage because they may facilitated the herniation because they trap or create a suction effect on the bowel when they are removed. Therefore it is believed that when the drainage is needed, the drain should be set through a new incision, especially when the laparoscopic surgery has been prolonged and we can suspect that the port sites have been enlarged during manipulations.

Closing the wall defect may be considered even for port sites smaller than 10 mm but it cannot provide complete protection from herniation. The possibility of bowel obstruction at the trocars site should be known to avoid complications which can lead to bowel resection and life-threating event [4].

There is no clear consensus that all port sites must be closed. According to literature it appears that herniation tends to occur in the lateral lower abdomen. To prevent port- site hernias all port-sites should be closed especially if the surgery was long and excessive manipulation of the trocar was done. Obese patients need close attention to closure. All ports should be removed under visualization before deflation of CO_2. A few cases of bowel hernias have been reported after removing of drains, so tunnel drains should be placed through the 5-mm port sites [9]. Surgeons who regularly perform laparoscopic procedures generally do not attempt to close the fascia of ports less than 10 mm, including the 8 mm robotic ports, because of the technical difficulties associated with closing smaller port fascia.

Data about TSH at 8-mm port sites are not clear enough to determine whether closure of the fascia is necessary.

Statistically, robotic 8-mm port hernia risk is minimal, but because the medical data are limited on this issue, it is suggested to treat 8-mm incisions in the same way as 10-mm and closed in a similar manner [1,3].

Lambertz et al. [3] conclude that the risk of hernia development after 5 mm trocar placement is so rare that the 5-mm port- sites can be left without sutures because it has turned out that 96% of port site hernias occurred after using of 10-mm trocars [2]. In this context the preferable use of smaller trocars possible helps to reduce the risk of port-sites hernias [2].

Conclusion

Acute herniation through lateral trocar port size is rare complication of laparoscopic surgery. However it should always be included in the different diagnosis of bowel obstruction when the patients complain of gastrointestinal symptoms after laparoscopy. It seemed that closing of the wall defect may be considered for port sites of 10 mm in diameter or more and even for wounds smaller than 10 mm.

Acknowledgement

The study was approved by the Bioethics Committee of the Medical University of Lublin. Patient gave written consent to participate in the study before the surgery.

Author Contribution

Marek Gogacz collected and interpreted of data, wrote the manuscript, conceived and designed the experiments, interpreted of data; Aleksandra Kamińska-wrote the manuscript, collected the data; Izabela Winkler- collected of data, wrote the manuscript; Aneta Adamiak collected the data, wrote the manuscript; Tomasz Rechberger collected of data, giving final approval of the version to be published, Koninckx Philippe- wrote the manuscript, giving final approval of the version to be published.

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