



Review

Effective, simple, easy procedure for laparoscopic port closure in difficult cases



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HIGHLIGHTS

- The complete fascial closure of port site is essential for good outcome of laparoscopic surgery.
- Port site herniation is serious complication leading to loss all mini-invasive surgery advantages.
- Our technique is done under direct visualization and trocar sheath in its position.
- Our procedure is effective, easy to produce complete fascial closure at any port site type and in any case.

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ABSTRACT

Background: Laparoscopic and rebotic surgery is widely practiced in modern medicine. The operative procedure is not complete until the port sites are closed with a fascial closure. Good fascial closure still represents problem, especially in difficult obese patients. This study reported simple technique is suitable in such cases.

Material and methods: We herein describe a simple technique for fascial closure after Laparoscopic surgery using percutaneous transabdominal approach by using two looped needles in 87 obese patients. This technique was done while the trocar sheath in its position.

Results: The procedure was used in 87 patients (69 females and 18 males) after laparoscopic cholecystectomy with mean body mass index 35.5 kg/m² and mean age 47.1 years from May 2013 through June 2015. No intra-operative incidents and no port sites hernias were reported during a mean follow up of 18 months.

Conclusion: The procedure is easy to perform, safe, and effective for fascial port site closure in difficult obese (thick abdominal wall and oblique port wound) cases.

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Contents

1. Introduction	37
2. Patients and methods	37
3. Results	37
4. Discussion	38
5. Conclusion	39
Ethical approval	39
Sources of funding	39
Author contribution	39
Conflicts of interest	39
Guarantor	39
Trial registry number	39

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Unique identifying number	39
References	39

1. Introduction

New technical challenges have emerged since the introduction of the laparoscopic approach in surgery. One of these is fascial closure at port sites, which is necessary especially when large trocars are used or after dilatation of port site for organ extraction. New development, such as single port laparoscopic surgery, and the need for small esthetic incisions render fascial closure is a current issue [1,2]. Closure of these wounds generally is quite difficult, especially in obese patients (thick abdominal wall and oblique port wound). Complete fascial closure was difficult to achieved in such cases [3]. An incisional hernia at the site of trocar entry is a serious complication of laparoscopic surgery because all advantages of mini-invasive surgery will be lost and most trocar site herniation requires further surgery [4]. Herniation associated with laparoscopic trocar sites can occur with incisions as small as 3 mm [5]. It is recommended that all 10 mm or more trocar sites in adults and 5 mm or more port sites in children must be closed, incorporating the peritoneum into the fascial closure [6]. Complete closure of fascia at the port site can be tricky and frustrating, often requiring blind suturing of the fascial defect (with the risks of incomplete closure and injury to the intraperitoneal organs) or larger skin incisions [7]. In this study, a new method is proposed for safe, complete, easy closure of the abdominal fascia in port site especially in difficult obese patients.

2. Patients and methods

Eighty seven (69 females and 18 males) with chronic calculous cholecystitis in obese patients were selected for this study, from May 2013 through June 2015. All information about this technique was discussed with all patients and all patients gave writing consent for inclusion of their data in this study. The age of the patients ranged from 21 to 63 years (mean = was 47.1 years). The instruments used in this technique were 2 looped needles, which prepared by corresponding author for this study. The looped needle is formed of two pieces. First piece, outer sheath which formed of long needle about 20 cm long, has sharp proximal end and allows to metal stent with its loop to go inside. Second piece, is formed of metal stent about 25 cm and has large loop of fine plastic wire at proximal end. This stent can be pushed and withdraw through the needle to put the loop outside or inside the proximal needle end during the procedure Fig. 1. After finishing of laparoscopic procedure and with trocar sheath in its position, the trocar site of 10 mm or larger was closed by this technique. First looped needle and slowly absorbable suture No. 0 (braided coated glycolide homopolymer violet) inside it passes through the skin about 2 cm from one side of the trocar site and appears from the abdominal cavity. Second looped needle passes through the skin about 2 cm from other side of trocar site to appear from abdominal cavity. Then, the thread end from first needle is put inside the loop of the second needle and the stent withdraw to hold the thread end inside the needle. The stent of the first needle is pushed to make the thread free through the loop. Then, both needles with thread are withdrawn until the needles tips become at the subcutaneous plane. The trocar sheath is removed, and both needles are redirected and pushed through the subcutaneous plane to bring the two ends of thread at the

port wound. The both thread ends are detached from the looped needles and hold by tissue forceps. At this point, one suture is complete, where one strand of suture passes from port wound through the subcutaneous plane, through abdominal fascia, abdominal cavity, pierces the peritoneum on other side of the port site, abdominal fascia, and subcutaneous plane from other side of port site to come out from the wound Fig. 2A–E and Fig. 3a–c. Then, the suture strands are tied through the port site to produce good closure of fascial defect. This procedure is done under direct visualization. Follow up period ranged from 2 to 24 months (mean = 18 months) for any complications at a port site which was closed using this technique by clinical examination, ultrasound, and CT scan if needed.

3. Results

This technique was used in 87 obese patients with no intra-

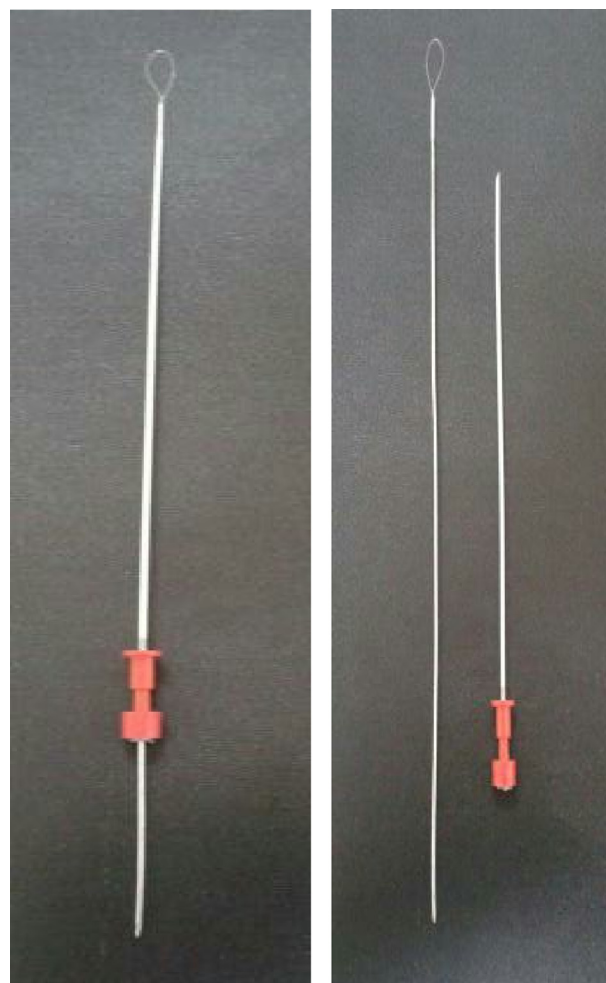


Fig. 1. Looped needle formed of Long needle (20 cm outer sheath) and metal stent (25 cm put inside the outer sheath needle) has large loop (plastic wire). The metal stent can be pushed or withdraw through the outer sheath needle to put the loop outside or inside the needle tip. On right, the metal stent removed from outer sheath needle. On left, the metal stent put inside the outer sheath needle.

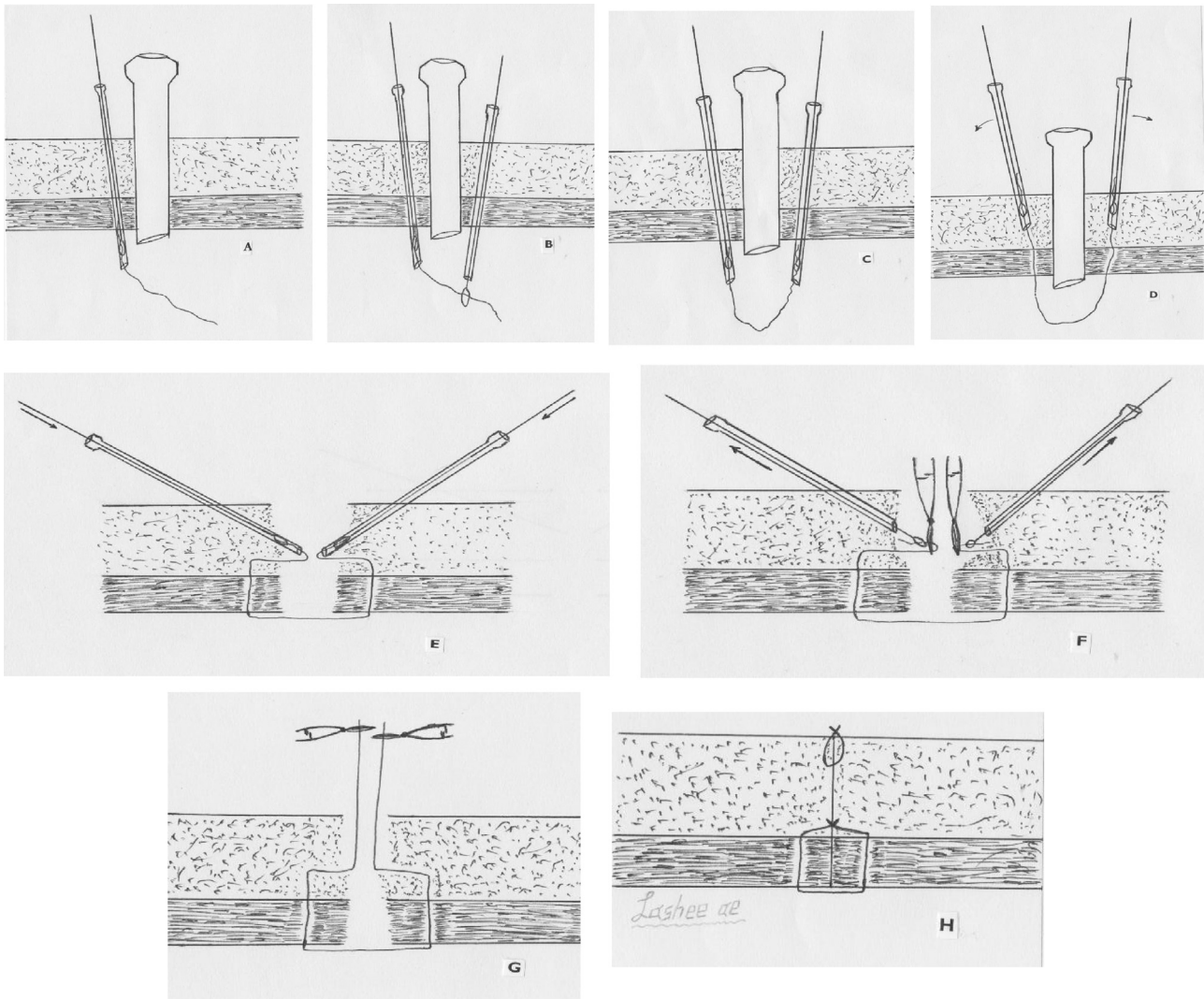


Fig. 2. A: After of finish of laparoscopic procedure and the trocar sheath is in its position. The one looped needle holed the thread and passed at one side of port to appear at the peritoneal cavity. Fig. 2B: The other looped needle passed on the other side of port to appear from peritoneal cavity. The two looped needles were directed to put other thread end inside the loop of second needle and its stent was withdraw to hold the thread end inside the needle. Fig. 2C: Each thread end is holed by one looped needle. Fig. 2D: The two looped needles and thread (Vicryl No. 0) ends inside them were withdraw until the needles ends reached at the subcutaneous plane of abdominal wall. Fig. 2E: The trocar sheath at this point was removed and the plane of two needles made more horizontal with abdominal wall. Then, the two needles were pushed to appear their ends and both thread ends from the port wound. Fig. 2F: The both thread ends (Vicryl No. 0) were holed by tissue forceps and the looped needles removed by withdraw backward. Fig. 2G: The two looped needles were removed and both thread ends holed by tissue forceps outside the port wound. Fig. 2H: The suture strands were tied through the port site to produce good fascial closure, then closed the skin incision.

operative incidents. This technique was done with trocar sheath in its position to maintain on pneumoperitoneum and direct visualization. No intraperitoneal assistant from other port is needed for this procedure. A trocar site of 10 mm needed one suture and one that was more than 10 mm needed two sutures to produce good fascial closure. The mean time to place one suture using technique was 3 min. No port site hernia occurred during a mean follow up of 18 months. The median body weight was 121 kg (range, 103–137 kg) and the median body mass index was 35.5 kg/m² (range, 29.3 kg/m² to 36.1 kg/m²).

4. Discussion

Port site hernias are a well known postoperative complication associated with laparoscopic surgery [8]. Studies show that the incidence of port incisional hernia ranges from 1 to 6% [9,10]. Trocar diameter and design, preexisting fascial defects, certain surgical

procedures and patient related factors have been identified as risk factors for port site hernias [11]. Meticulous closure of laparoscopic ports is important to prevent the incidence of port site incisional hernia, incorporation of bowel in port site closures, and their complications. Failure to adequately suture the fascial defect, infection or suture disruption may lead to an incisional hernia or to ascetic fluid leakage in the case of patients with cirrhosis [12,13]. The port closure techniques were classified by Shafer [3] into 3 groups: (a) techniques that use assistance from inside the abdomen (requiring 2 additional ports), (b) techniques that use extracorporeal assistance (requiring 1 additional port), and (c) closure techniques that can be performed with or without visualization (without additional ports). Some surgeons recommend the use of fascial closure devices such as spinal needle [14], hypodermic needle [15], Deschamps needle [9], Berci's needle [16], and aneurysm needle [17] to close the fascial defect with 0%–1% port site herniation incidence [18]. But, all these procedures are not suitable

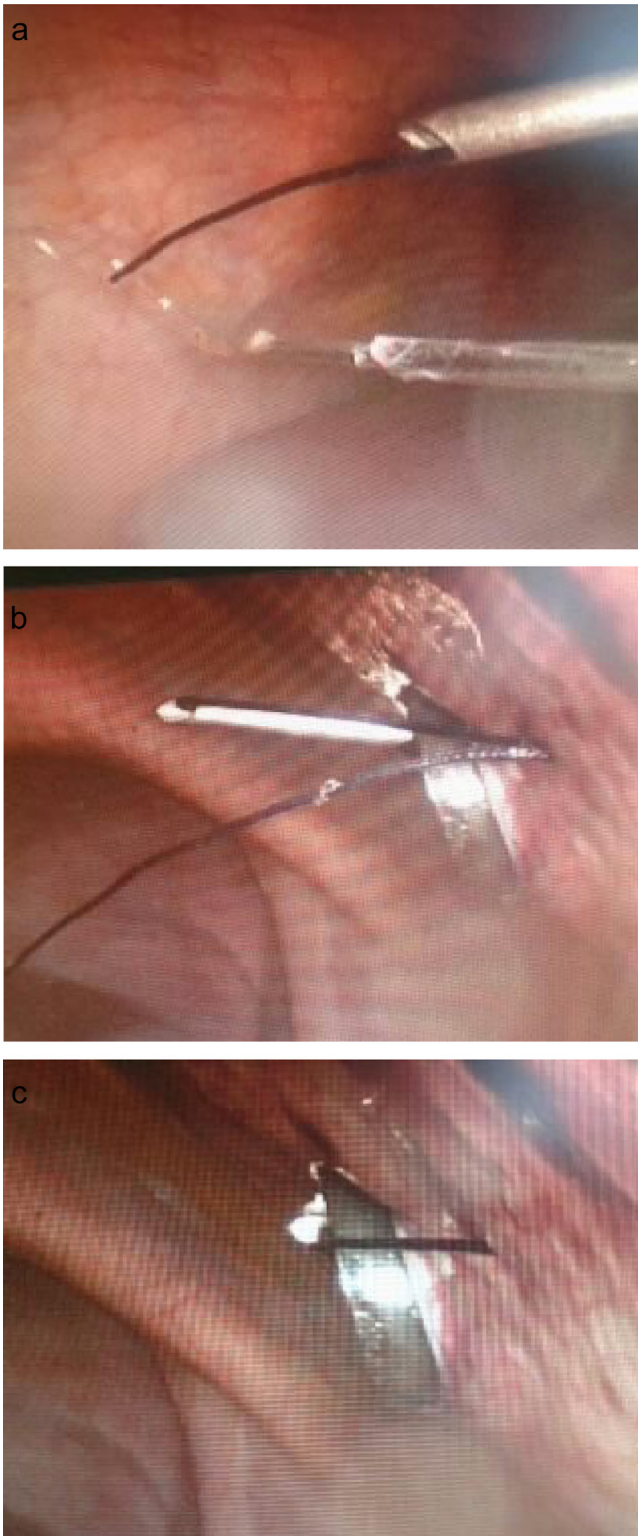


Fig. 3. a: The two looped needles were directed under direct vision to put the thread end from one needle to other needle, then the stent and loop withdraw to hole the thread end inside the needle. Fig. 3b: The thread ends were holed by two looped needles and withdraw until the needles tips reach at the subcutaneous plane of abdominal wall. Fig. 3c: At this point, the trocar sheath is removed and two needles end with thread ends bring to port wound.

in obese cases (thick abdominal wall and oblique wound), need assistance from inside, the suture is placed from the port site, which needs to increase skin incision, and the suture passes near the

edges of the fascial defect. Lasheen et al. [7,19] and others [2] reported percutaneous transabdominal technique for closure of port site with no port site herniation. But, this technique cannot be applied in obese patients. Also, they are more invasive when the two suture strands are bring to port site by redirecting suture hook or by direct subcutaneous dissection. Our technique in this study, is done with trocar sheath in its position to maintain on pneumoperitoneum and under direct visualization. No need for other port to produce intraperitoneal assistance. Also, this technique is less invasive, no need for subcutaneous dissection to bring the suture strands from port wound. The technique is suitable for good closure of any port type (camera, working, single ports) in any case.

5. Conclusion

Our reported procedure for port site closure is effective, safe, easy to perform, less invasive and less time consuming especially in difficult obese cases.

Ethical approval

Yes, from ethical committee of Zagazig University.

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No.

Author contribution

This lasheen idea.

Other co-authors shared the corresponding author in clinical application and in written the manuscript.

Conflicts of interest

No.

Guarantor

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Trial registry number

50.

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