



Case report

Single-incision laparoscopic preperitoneal mesh repair of supra-pubic incisional hernia: A case report

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ABSTRACT

Introduction: Repair of supra-pubic incisional hernia is still challenging because of the highest pressure at the lower abdominal wall in the erect position. Recently, laparoscopic preperitoneal mesh repair has been gradually reported.

Case presentation: A 77-year-old woman underwent single-incision laparoscopic preperitoneal mesh repair under a diagnosis of a supra-pubic incisional hernia, measuring 7 × 4 cm. A single, 2.5-cm, intraumbilical incision was made, followed by creation of the preperitoneal space. Then, the posterior rectus sheath and peritoneum were opened, and laparoscopic exploration was performed. After dissection of the supra-pubic hernia content, the tube for degassing the abdominal cavity was inserted into the abdominal cavity, and the peritoneum and the posterior sheath were closed. The preperitoneal space was dissected gradually, and circular dissection of the hernia sac was performed. The proximal sac (peritoneum) was sutured continuously. A 15 × 10 cm mesh was placed in the preperitoneal space and fixed securely with absorbable tacks at the pubic bone, Cooper's ligament, and the rectus abdominis muscle, respectively. After degassing the preperitoneal space, a second laparoscopic exploration was performed to confirm the secure suture of the peritoneum and no injury of the abdominal organs. At 4-month follow-up, the patient remained well with no signs of recurrence.

Discussion: Single-incision laparoscopic preperitoneal mesh repair could minimize the recurrence of supra-umbilical incisional hernia and perioperative complications.

Conclusion: Single-incision laparoscopic preperitoneal mesh repair, offering good cosmetic results, might be useful for repair of supra-pubic incisional hernia.

1. Introduction

Repair of supra-pubic incisional hernia is still challenging, and it is prone to recur because of the highest pressure at the lower abdominal wall in the erect position. Furthermore, it is difficult to fix meshes at the desired position or there is inadequate overlapping of the defect due to the presence of important anatomical structures, such as the urinary bladder, iliac vessels, etc. In a previous report, preperitoneal mesh positioning using the Rives-Stoppa principles was considered one of the preferred approaches in open repair of supra-pubic hernias [1]. The Rives-Stoppa technique has the advantages of preperitoneal mesh placement along with abdominal closure, showing good results, with minor complications and low recurrence rates. Recently, laparoscopic preperitoneal mesh repair that could combine the advantages of the minimally invasive surgery approach with the standard open Rives-Stoppa technique has been gradually reported [2–5]. In addition,

single-incision laparoscopic surgery (SILS) is considered to achieve better cosmetic outcomes than conventional multi-port laparoscopic surgery [6,7]. In this report, a case of a supra-pubic incisional hernia that was successfully repaired by single-incision laparoscopic preperitoneal mesh repair that offered a good cosmetic result is presented. This work has been reported in line with the SCARE criteria [8].

2. Case presentation

2.1. Patient

A 77-year-old woman was admitted to our hospital because of a painful swelling in the lower abdomen (Fig. 1). She had a history of endometrial cancer and underwent a hysterectomy with bilateral salpingo-oophorectomy at the age of 76 years. She also had a previous history of open cholecystectomy and open appendectomy. Computed

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Fig. 1. Supra-pubic incisional hernia in the standing position.

tomography showed the incisional hernia orifice, measuring 7 × 4 cm, above the pubic bone. Under a diagnosis of an incisional hernia, the patient underwent single-incision laparoscopic preperitoneal mesh

repair.

2.2. Surgical technique

Under general anesthesia, the patient was placed in a supine position with both arms adducted. A single, 2.5-cm-long, intraumbilical incision was made, followed by dissection of the subcutaneous tissue down to the rectus abdominis sheath. The anterior sheath was opened infraumbilically through the intraumbilical incision, and blunt dissection was performed between the muscle and the posterior sheath to create a preperitoneal space. After creating a preperitoneal space to some degree, the posterior sheath and peritoneum were opened. After placing a Lap-Protector Mini (Hakko Co., Nagano, Japan) in the abdominal cavity, three 5-mm trocars (one for a 5-mm flexible scope and two for surgical devices) were inserted through a single-port access device (EZ Access; Hakko). The EZ access with three trocars was attached to the Lap-Protector Mini to maintain the inflation of the preperitoneal space with carbon dioxide (CO₂) gas (Fig. 2a), and laparoscopic exploration was performed. There was a supra-pubic incisional hernia with mild adhesion of the omentum to the hernia sac, and dissection of the adhesion was safely performed. After the tube for degassing the abdominal cavity was placed in the abdominal cavity (Fig. 2b), the peritoneum and the posterior sheath were closed by 2–0 absorbable suture. After placing a Lap-Protector Mini in the preperitoneal space, the EZ access with three 5-mm trocars was attached to

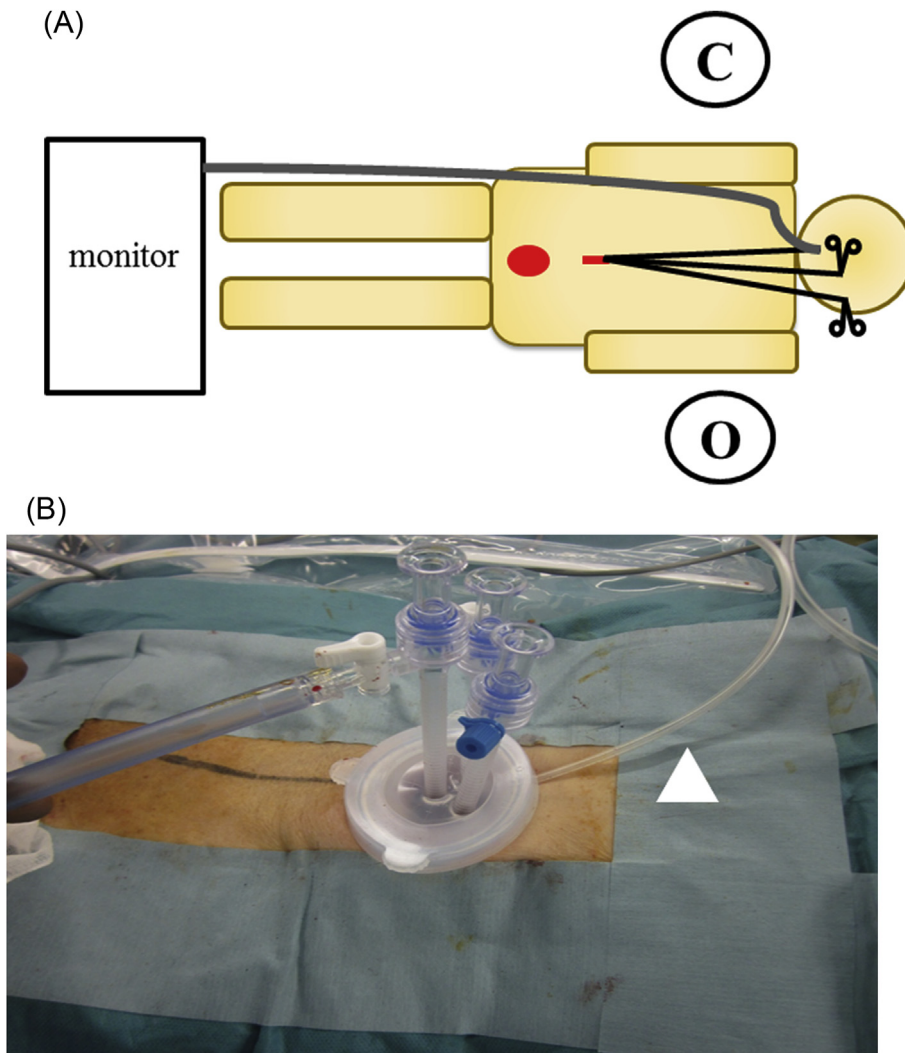


Fig. 2. a: Operative setting for supra-pubic incisional hernia, O: operator, C: Camera operator, b: Degassing tube (arrow head).

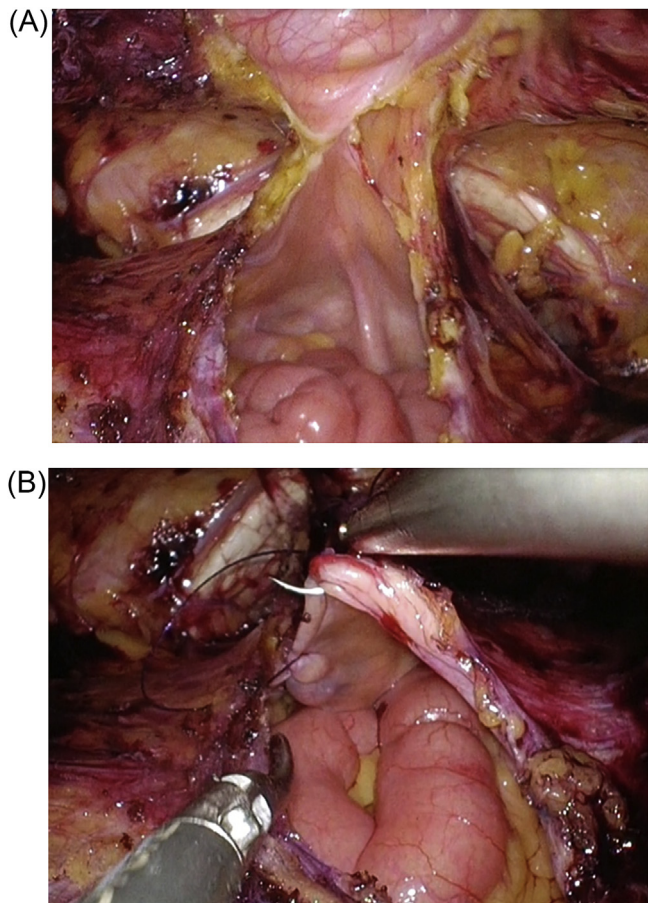


Fig. 3. a: Circular dissection of the hernia sac, b: Suturing of the peritoneum.

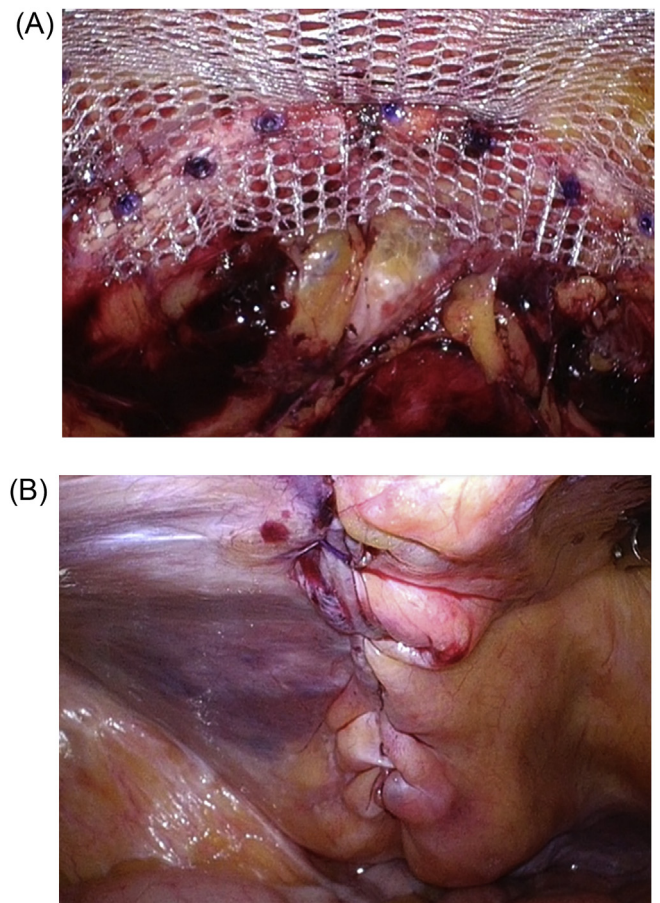


Fig. 4. a: Mesh placement and fixation, b: Closure of the peritoneum.

the Lap-Protector Mini to maintain inflation of the preperitoneal space. The preperitoneal space was dissected gradually, using conventional straight laparoscopic instruments without a dissection balloon. Circular dissection of the hernia sac was performed (Fig. 3a), and the edge of the peritoneum was sutured by 3–0 V-Loc™ (Covidien, Dublin, Ireland) (Fig. 3b). Versatex™ Monofilament Mesh (10 × 15 cm) (Covidien) was placed in this preperitoneal space, covering the hernia orifice, and it was fixed with AbsorbaTack™ (Covidien) at the pubic bone, Cooper's ligament, and the rectus abdominis muscle (Fig. 4a). The preperitoneal space was carefully deflated to avoid displacing the mesh. A second laparoscopic exploration was performed to confirm the secure suture of the peritoneum and no injury of the abdominal organs (Fig. 4b). The peritoneum and the anterior rectus sheath were each closed with 2–0 absorbable suture, and the skin was closed with 4–0 absorbable suture. The operative time was 79 minutes, and the bleeding volume was minimal. At the 4-month follow-up, the patient remained well, with no signs of recurrence (Fig. 5).

3. Discussion

To the best of our knowledge, this case report appears to be the first to demonstrate the efficacy of single-incision laparoscopic preperitoneal mesh repair for supra-pubic incisional hernia. In this study, there were two important clinical observations. First, single-incision laparoscopic preperitoneal mesh repair minimized the recurrence of supra-umbilical incisional hernia. Second, single-incision laparoscopic preperitoneal mesh repair minimized perioperative complications.

First, single-incision laparoscopic preperitoneal mesh repair minimized recurrence of supra-umbilical incisional hernia. According to the previous reports, the recurrence rate of laparoscopic repair for supra-



Fig. 5. Postoperative scar at 4 months after surgery.

umbilical hernia was around 6% [9–11]. Repair of a supra-umbilical hernia is still a surgical challenge because of the highest pressure at the lower abdominal wall in the erect position. Direct fixation of the mesh in the supra-pubic region might be difficult and hazardous due to the important anatomical structures, such as the urinary bladder and iliac vessels. Single-incision laparoscopic preperitoneal mesh repair could solve this problem by dissecting the preperitoneal space, exposing the pubic bone and Cooper's ligament not to injure the urinary bladder

laparoscopically, and fixing the mesh securely to cover the supra-pubic hernia orifice.

Second, single-incision laparoscopic preperitoneal mesh technique could minimize perioperative complications. The standard intraperitoneal onlay mesh (IPOM) repair with intraperitoneal mesh placement poses a higher risk of adhesion, fistulas, and bowel damage. However, single-incision laparoscopic preperitoneal mesh repair could avoid direct contact between intestine and mesh and minimize these complications. Mesh infection could be a devastating complication that inevitably leads to hernia recurrence if mesh removal is required. Single-incision laparoscopic preperitoneal mesh repair could minimize the possibility of mesh infection because of the small umbilical incision apart from the mesh placed in the preperitoneal space of the lower abdomen.

Laparoscopic exploration might be useful for avoiding bowel injury during surgery. If there were adhesions between the hernia sac and the bowel during laparoscopic exploration, laparoscopic dissection of hernia content by single-incision technique could be safely performed. With the tube for degassing the abdominal cavity, pneumoperitoneum could be avoided, and the operative field of the preperitoneal space could be maintained. Circular resection of the hernia sac from the preperitoneal space could be safely performed after no hernia content was confirmed by laparoscopic exploration.

Single-incision laparoscopic preperitoneal mesh repair for supra-pubic incisional hernia might be a relatively easy procedure for laparoscopic surgeons who are familiar with totally extraperitoneal (TEP) repair for inguinal hernia. After intraabdominal exploration, the preperitoneal space was dissected in the manner of bilateral TEP inguinal hernia repair. However, single-incision suturing of the peritoneum might be technically demanding due to the confined operating space, in-line positioning of the laparoscope, close proximity of the working instruments with limited triangulation, and limited range of motion of the laparoscope and instruments.

Adaptation of single-incision laparoscopic preperitoneal mesh repair to an incisional hernia requiring large mesh placement might be challenging [5]. When dealing with a large defect including the umbilicus, the first port position should be selected carefully to avoid the preperitoneal space that has not been previously violated. Single-incision preperitoneal mesh repair might not be recommended for a large incisional hernia including the umbilicus, because wide dissection of the preperitoneal space and secure fixation of the large mesh through single-incision laparoscopic technique are quite difficult.

4. Conclusions

Single-incision laparoscopic preperitoneal mesh repair, offering good cosmetic results, could minimize the recurrence rate of supra-umbilical hernia and perioperative complications. Further large-scale case series are needed to confirm the outcomes of single-incision laparoscopic preperitoneal mesh repair found in the present study.

Ethical approval

Ethical approval for a case report is not required by our institution.

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None.

Author contribution

Each author participated in writing the manuscript and all agreed to accept equal responsibility for the accuracy of the content of the paper.

Conflicts of interest

The authors declare no potential conflict of interest.

Registration of research studies

It is not applicable because this work is a case report.

Guarantor

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Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.amsu.2018.07.014>

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