

Laparoscopic transvaginal ventral hernia repair: a case and review of the literature

Reparación laparoscópica transvaginal de hernia ventral: un caso y revisión de la literatura

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Abstract

A 52-year-old female underwent laparoscopic repair for recurrent epigastric hernia by hybrid natural orifice transluminal endoscopic surgery. Three 5-mm abdominal trocars and a 15-mm transvaginal trocar were used. The defect was closed by intracorporeal suturing before mesh fixation. She was discharged uneventfully on the 2nd post-operative day. Intracorporeal closing the defect may reduce the bulging of the mesh in laparoscopic ventral hernia repair. This case is the first hybrid transvaginal ventral hernia repair using defect closure technique.

Key words: Abdominal wall. Laparoscopy. Vagina. Natural orifice

Resumen

Una mujer de 52 años se sometió a reparación laparoscópica por razón de una hernia epigástrica recurrente mediante cirugía endoscópica transluminal de orificio natural híbrido. Se utilizaron tres trócares abdominales de 5 mm y un trócar transvaginal de 15 mm. El defecto se cerró mediante sutura intracorpórea antes de la fijación de la malla. Fue dada de alta sin incidentes. El cierre intracorpóreo del defecto puede reducir el abultamiento de la malla en la reparación laparoscópica de la hernia ventral. Este caso es la primera reparación de hernia ventral transvaginal híbrida que utiliza la técnica de cierre de defectos.

Palabras clave: Pared abdominal. Laparoscopia. Vagina. Orificio natural

Introduction

Minimally invasive surgery has now become the standard approach for many surgical procedures. Laparoscopic ventral hernia repair does not increase recurrence rate while providing lower surgical site infection and less hospital stay than conventional open

methods¹. However, using 12-15 mm abdominal trocars for mesh introduction creates new potential hernia areas. The ratio of trocar site hernias after laparoscopic ventral hernia repair is between 0.3% and 2.2%² and increases depending on the mesh size³.

Natural orifice transluminal endoscopic surgery (NOTES) is a new method of minimally invasive

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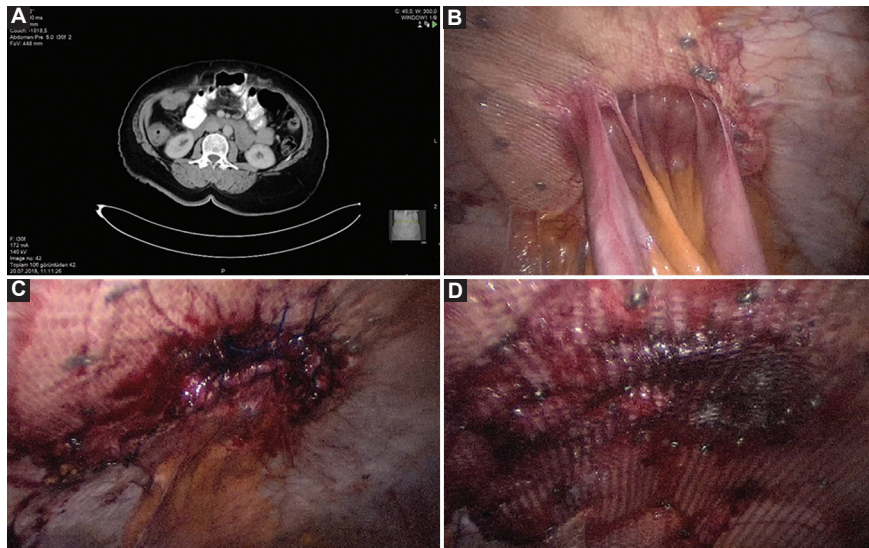


Figure 1. A: ventral defect and herniated small bowel in computed tomography. B: transvaginal view of the previous mesh and the adhesions of the small bowel. C: transvaginal view of the defect following closure. D: transvaginal view of the defect following mesh placement.

surgery which has become popular after 2000's. In this concept, transgastric, transrectal and transvaginal accesses are used without additional incision in the abdominal wall. NOTES provides less post-operative pain and faster recovery in addition to the benefits of laparoscopic methods⁴.

The mesh use in hernia surgery is an accepted approach because it reduces recurrence rates especially in large defects⁵. In laparoscopic ventral hernia repair, the mesh is usually placed without defect closure. Recently, it has been reported that mesh placement after defect closure reduces seroma and other side effects⁶.

In this report, we present a hybrid NOTES ventral hernia repair with mesh placement and defect closure. Thus, we aimed to reduce postoperative pain, abdominal fascial trauma, and the recurrence risk.

Case report

A 52-year-old female was admitted with periumbilical pain, nausea, and vomiting, which had occurred for a long time, especially after meals. Her body mass index was 32.9 kg/m². Her medical and surgical history included primary hypertension, type 2 diabetes mellitus, 5 times epigastric hernia repair with mesh (four conventional and one laparoscopic), and laparoscopic Roux-en-Y gastric bypass. Physical examination revealed an approximately 5 cm defect at the epigastrium. On computed tomography, a 5-cm fascia defect was

observed (Fig. 1A). The details of the technique were explained to the patient and the appropriate content was obtained. Prophylactic intravenous antibiotics were administered 1 h before the operation and postoperatively for 2 days.

Under general anesthesia, the patient was placed in the modified lithotomy position with 30° Trendelenburg, the abdomen and the vagina were sterilized with 10% polyvidone-iodine. The bladder and the stomach were drained with urinary and nasogastric catheters. Laparoscopic monitor was placed on the left shoulder side of the patient. The surgeon sat in between the patient's legs or stood on the right side of patient when required. The first assistant and scrub nurse stood on the left side, while the second assistant sat in between the patient's legs when necessary. Pneumoperitoneum was created through a Veres needle from the left upper quadrant and the pressure was maintained between 10 and 14 mm-Hg during surgery. Two 5-mm trocars were inserted to the abdomen in the level of the right and left mid-clavicular lines just above the umbilicus, and then a 5-mm rigid laparoscope was used for exploration. After the visualization of the cul-de-sac, a 15-mm trocar was placed through the posterior fornix under laparoscopic view and the laparoscope was passed to the transvaginal trocar. At the exploration, there was a defect in the epigastrium, bulging of the previous mesh into the defect and the adhesions of the small bowel to the previous mesh were seen (Fig. 1B). An extra 5-mm trocar was inserted in the

Table 1. Previously published transvaginal ventral hernia repairs

Reference	Number of patients	Age	Technique	Mesh	Defect closure	Operating time (min)	Complications	Hospital stay	Follow-up (months)	Rec.
Horgan <i>et al.</i> ⁹	3	NA	Hybrid	Biologic	No	93 (81-121) ^a	No	1 day ^a	12 ^a	0
Panait <i>et al.</i> ⁸	2	NA	Pure	NA	No	90 ^a	No	NA	NA	NA
Wood <i>et al.</i> ²¹	6	38 (29-53) ^a	Pure	Synthetic	No	107 (76-181) ^a	Vaginal granulation (n = 1) Urinary retention (n = 2) Rectal injury (n = 1) Nausea (n = 1)	Outpatient (n = 3) 4(4-3) days (n = 3) ^b	9 (4-18) ^b	0
Kayaalp <i>et al.</i> ⁴	2	43 and 46	Hybrid	Synthetic	No	120 and 180	Seroma (n = 1)	2 days	7 and 13	0
Descloux <i>et al.</i> ¹⁴	6	50 (33-62) ^b	Hybrid	Synthetic	No	67 (30-90) ^b	Skin burn to the labia majora (n = 1)	3 (2-6) days ^b	15 (5.5-20) ^b	1
Present Case	1	52	Hybrid	Synthetic	Yes	147	Small bowel serosal injury	2 days	20	0

^aData are mean (range) values.^bData are median (range) values.

NA not available, Rec. Recurrence.

Figure 2. Post-operative view at 20th months.

right lower quadrant of the abdomen to facilitate manipulation and adhesiolysis. Adhesions were then released through abdominal trocars using scissors or a LigaSure™ vessel sealing system (Covidien, Mansfield, MA). Meanwhile, two iatrogenic serosal defects on the small bowel were occurred and were repaired with vicryl sutures. After complete adhesiolysis around the hernia, the defect size was measured with the help of laparoscopic equipments and it was 6 cm in diameter. The defect was intracorporeally closed with non-absorbable monofilament sutures (Fig. 1C). A circular-shaped, synthetic, 15 ×

15 cm mesh (Parietex™ composite; Covidien) was prepared and was rolled for abdominal insertion. The mesh was placed into the abdomen through the vaginal trocar, and no bag was used. Mesh fixation was completed by tacker using the double-crown technique (Fig. 1D). Vaginal defect was closed with absorbable sutures. The operative time was 147 min and there was no bleeding.

On the 1st and 2nd days postoperatively, the patient's visual analog scores (VAS) were 5 and 0, respectively. She needed analgesics only on the 1st day postoperatively. The avoidance of sexual intercourse for 1 month was advised and she was discharged without any additional problems on the 2nd day postoperatively. She is now in the 20th month of follow-up and has no complication or recurrence (Fig. 2).

Discussion

NOTES has continued to be popular since its introduction in 2000s. Nowadays, appendectomy, cholecystectomy, hernia repair, nephrectomy, adrenalectomy, and sleeve gastrectomy can be performed with transvaginal approach⁷⁻⁹.

Although NOTES has advantages over conventional and laparoscopic surgery, there are disadvantages such as risk of organ injury, prolongation of operating time, and mesh infection¹⁰. Zorron *et al.*¹¹ found a complication rate of 9.6% in 319

transvaginal NOTES cases. Wood et al.⁷ also found similar complication rate and stated that organ damage was higher in pure NOTES than hybrid NOTES and major complications were more in the learning period. We also think that hybrid NOTES is safer than pure NOTES about complications. We have experience more than 200 cases of natural orifice surgery for several procedures and we always prefer hybrid techniques for transvaginal access. Therefore, we again chose to place the vaginal trocar under laparoscopic view. We think that the operative time is normal considering the severe adhesions. Although we placed the mesh through the vaginal trocar, we did not face any additional infective problems in the early post-operative period. Previously, it was shown that the vaginal canal can be safer than the skin incision for abdominal imaging, peritoneal and liver biopsy, and insertion of a synthetic mesh^{12,13}.

The patient-related factors for the occurrence of trocar site hernias are advanced age, diabetes mellitus, and obesity¹⁴. Recurrent hernia repair, surgical site infection, and the extending the trocar site are also other surgical risk factors for the recurrence^{15,16}. In particular, the use of 10-mm and larger trocars increases the risk of trocar site hernia¹⁷. The largest trocar we used in the abdominal wall in this case was 5-mm in diameter. We think that the adequation of smaller trocars in hybrid NOTES method can reduce the trocar site hernia rates especially in patients with high risks such as our patient.

In general, defect closure is not preferred in addition to the use of mesh in laparoscopic ventral hernia repairs. This may be because the defect closure is a difficult and time-consuming procedure during laparoscopy¹⁸. It was previously shown that the defect closure reduces adverse hernia-site outcomes and seroma formation⁶. Bulging in wide defects can disturb the patient both cosmetically and functionally. The herniated mesh toward the skin may become infected or erode the skin, but defect closure reduces these risks¹⁹. However, it is thought that fascial sutures may increase postoperative pain and cause neuralgia²⁰. In our patient, we closed the defect before placing the mesh since there was both a large defect and bulging. Fortunately the VAS score was 0 at the 2nd post-operative day. In the literature, we could not find any publications about the defect closure before mesh placement at NOTES (Table 1).

Conclusions

Laparoscopic ventral hernia repair with defect closure may reduce side effects and recurrence. Hybrid NOTES ventral hernia repair is a worthwhile procedure due to its advantages such as less post-operative pain and less trauma to the abdominal wall. These two techniques can be successfully combined.

Conflicts of interest

The authors have no conflicts of interest or financial ties to disclose.

Ethical disclosures

Protection of human and animal subjects. The authors declare that no experiments were performed on humans or animals for this study.

Confidentiality of data. The authors declare that they have followed the protocols of their work center on the publication of patient data.

Right to privacy and informed consent. The authors have obtained the written informed consent of the patients or subjects mentioned in the article. The corresponding author is in possession of this document.

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