

The Feasibility of Laparoscopic Total Extraperitoneal (TEP) Herniorrhaphy after Previous Lower Abdominal Surgery

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Purpose: We retrospectively reviewed the medical records to estimate the feasibility and surgical outcome of laparoscopic herniorrhaphies in patients with previous lower abdominal surgery.

Methods: Between December 2000 and December 2008, a total of 1,101 cases of laparoscopic herniorrhaphies were performed in 974 patients, among them 47 cases (4.27%) of laparoscopic herniorrhaphy in 40 patients who had undergone previous lower abdominal surgery were enrolled to this study.

Results: Most patients (23 of 24) who had a history of appendectomy successfully underwent laparoscopic totally extraperitoneal (TEP) repair. Six patients who had history of a prostatectomy and 2 patients with a Pfannenstiel incision underwent an intraperitoneal only mesh (IPOM) repair after a failed TEP repair. Five patients had lower midline incisions due to panperitonitis, among them TEP repairs were performed in 3 patients and IPOM was performed after failed TEP repairs in 2 patients who had undergone surgery due to trauma-induced rupture of the bladder.

Conclusion: Laparoscopic TEP hernia repair could be possible and reasonable in patients after an appendectomy; however, it is difficult in patients with previous pelvic surgeries. Additional studies are needed to determine whether or not laparoscopic TEP repair for inguinal hernias is feasible in patients who have undergone other general surgical procedures. (*J Korean Surg Soc* 2010;78:405-409)

Key Words: Laparoscopy, Operative scar, Lower abdominal surgery, Inguinal hernia

INTRODUCTION

Inguinal hernia repair is one of the most common elective general surgical procedures, and laparoscopic Inguinal hernia repair has become very popular, accounting for 15~20% of hernia operations worldwide.(1) Among the types of laparoscopic hernia repair (total extraperitoneal [TEP], intraperitoneal onlay mesh [IPOM], and transabdominal preperitoneal [TAPP]), laparoscopic TEP repair is the most frequently used procedure because the preperitoneum is accessed without the associated pain and morbidity of a larger incision, and it potentially allows

more rapid recovery.(2-5) However, inguinal hernia is not always suitable to perform laparoscopic TEP repair, especially in patients who have undergone previous lower abdominal surgery. Indeed, some prospective studies of hernia repairs have excluded patients who have had prior bladder or prostate procedures.(6-8) To evaluate the feasibility of laparoscopic TEP repair after previous lower abdominal surgery, we have retrospectively reviewed our entire data set involving inguinal herniorrhaphy in patients who have had previous lower abdominal surgery.

METHODS

Between December 2000 and December 2008, a total of 1,101 cases of laparoscopic hernia repairs were performed in 974 patients by 1 surgeon; a retrospective analysis of the medical record was conducted. There were 1,065 TEP

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repairs, 33 IPOM repairs, and 3 TAPP repairs. Forty-seven cases (4.27%) of laparoscopic hernia repair in 40 patients who had undergone previous lower abdominal surgery were enrolled in this study. We performed laparoscopic TEP repairs as a standard method for hernia repair, but in case which it was failed, IPOM was performed in these patients.

1) Laparoscopic technique

(1) TEP technique: Our TEP approach for inguinal hernias is performed using a 3-port technique. The patient is placed in the supine position, with a slight Trendelenburg tilt and to create the pre-peritoneal space, a 12 mm transverse skin incision is made at the inferior edge of the umbilicus, and the incision is carried down to the anterior rectus sheath. A small incision is then made in the anterior rectus sheath, exposing the rectus abdominis muscle. A channel between the rectus muscle and the posterior sheath is created with blunt endopeanuts (Tyco Healthcare, Norwalk, CT, USA) directed toward the symphysis pubis. A small tunnel is made in the direction of the pubis between the rectus abdominis muscle and the peritoneum. Using a 45 degree telescope and 12 mmHg CO₂ gas pressure, the pre-peritoneal space is developed. After creation of preperitoneal space, 2 accessory 5 mm ports are placed (the one port at 2 cm superior to the symphysis pubis in the midline and the other is in the middle between the existing 2 ports). After reduction of the hernia sac and parietalization of the spermatic cord, a 13×8 cm Surgipro mesh (Covidien, Mansfield, MA, USA) is placed over the myopectineal orifice. If the hernia was bilateral, other side was repaired with same method using trocars which were inserted previously.

(2) IPOM technique: The patient is placed in the supine position, with a slight reverse-Trendelenburg tilt. After insertion of a 12 mm trocar below the umbilicus through the previous incision using an open technique, a 10~12 mmHg pneumoperitoneum is established. In the case of a unilateral hernia, a 5 mm trocar is inserted at McBurney's point or counter to McBurney's point, then second 5 mm trocar is positioned at the both lateral to the midclavicular line 1 cm below the umbilicus. Two 5 mm trocars are

inserted at the lateral to the midclavicular line 1 cm below the umbilicus for bilateral inguinal hernias. All trocars were reused for IPOM.

A 15×10 cm Proceed mesh (Ethicon, Somerville, NJ, USA) is inserted into the abdomen via the 12 mm trocar. Other possible hernia defects; direct, indirect, and femoral hernias are covered by the mesh and fixed with 5 mm Tacker (Tyco Healthcare, Norwalk, CT, USA) and suture. The superior portion of the lateral side and the inferior portion of the medial side are fixed with tackers, and the inferior portion of the lateral side was fixed to the fascia by non-absorbable materials using a suture passer device. If there was any hernia in other side, a new Proceed mesh was inserted into the abdomen and covered defect of other side and fixed with same method.

Operative time was recorded from the time of skin incision until skin closure. Length of hospital stay was defined as the total number of nights spent in the hospital after surgery. Seroma was defined as the presence of palpable fluid collection over the operation site or scrotum during follow ups. After operation, patients who needed more than 2 times of analgesics for operative site pain were recorded. Most patients were discharged on the day after surgery. The patients were followed through the outpatient hernia clinic.

RESULTS

There were 47 cases of laparoscopic hernia repairs in 40 patients who had undergone previous lower abdominal surgery. The mean operative time was 26.46±13.26 minutes in TEP repair group and 44.69±23.4 minutes in the IPOM repair group. Mean hospital stay was 0.96±0.43 days in TEP repair group and 1.31±0.63 days in IPOM repair group. In 5 cases (10.6%), seroma was occurred; 3 out of 35 cases (8.5%) in TEP repair group and 2 out of 12 cases (16.6%) in IPOM repair group. Postoperative pain was occurred in 5 cases (10.6%); 2 out of 35 cases (5.7%) in TEP repair group and 3 out of 12 cases (25%) in IPOM repair group. Twenty-five patients (62.5%) had right inguinal hernias, 8 patients (20%) had left inguinal hernias,

Table 1. Patients' demographics, hernia sites and types of hernia

Variable	No. of patients (%) (n=40)
Age (years)	55.17±14.72
Male/Female	38/2
Site of hernia	
Right	25 (62.5)
Left	8 (20)
Bilateral	7 (17.5)
Primary hernia	35 (87.5)
Recurrent hernia	5 (12.5)
Type of hernia	
Indirect hernia	33 (70.2)
Direct hernia	10 (21.2)
Pantaloon	3 (6.5)
Femoral	1 (2.1)

and 7 patients (17.5%) had bilateral hernias. Five patients (12.5%) had a history of recurrent hernias. As Table 1 shows, the mean age was 55.17±14.72 years, and there were 38 male patients and 2 female patients. Thirty-three were indirect hernias and 10 were direct hernias, and there were 3 cases of pantaloon hernias and 1 case of a femoral hernia.

Table 2 shows the types of previous lower abdominal surgery and the types of herniorrhaphy. Total 28 patients were performed laparoscopic TEP repair, and 12 patients were performed IPOM after failed TEP repair. There were 24 patients who had appendectomies (4 patients had left inguinal hernias, 17 patients had right inguinal hernias, and 3 patients had bilateral inguinal hernias). Laparoscopic TEP repair was possible in most of the patients (23 of 24) who had appendectomies (including 1 laparoscopic appendectomy and 2 appendectomies through a paramedian incision); TEP repair could not be performed in 1 patient who had a twice-recurrent hernia and an appendectomy. Six patients who had prostatectomies (including 2 cases of robot surgery) and 2 patients who had Pfannenstiel incisions underwent IPOM repair after failure of TEP repairs. A TEP repair was performed successfully in 1 patient who had undergone a laparoscopic low anterior resection due to rectal cancer. Five patients had lower midline incisions due to panperitonitis; TEP repairs were failed in 2 patients who had a history of traumatic rupture of the bladder. In 1 case of right inguinal hernia with a right extended

Table 2. Types of previous lower abdominal surgery and performing operation

Operation type	No. of conversion cases/ total No. of cases
Appendectomy (transverse incision)	1*/24 (included 1 case of laparoscopic and 2 cases of paramedian incision)
Prostatectomy (Pfannenstiel incision)	6/6 (included 2 cases of robot surgery)
Gynecologic surgery (Pfannenstiel incision)	2/2
Panperitonitis (lower midline incision)	2 (traumatic bladder rupture)/5
Rectal cancer (lower midline incision)	0/1
Renal stone (thoracoabdominal incision)	1/2

*Patient who had 2 times of right recurrent inguinal hernia and appendectomy history.

thoracoabdominal incision for a renal stone, a TEP repair was failed. The follow-up periods were varied from 2 weeks to 56 months, and the mean follow-up periods were 26 months. All of the cases in which TEP repairs were failed were successfully repaired by IPOM, and there were no recurrences.

DISCUSSION

Since the introduction of laparoscopy into the field of general surgery in the early 1990s, the natural evolution of laparoscopic procedures was that as surgeons gained experience, previous contraindications were challenged and the group of patients suitable for the procedure widened.⁽⁹⁾ In field of inguinal hernia, previous lower abdominal surgery was considered as a contraindication to laparoscopic TEP repair, so many surgeons more preferred open repair than TEP repair, although this was not based on any solid data.^(10,11) Laparoscopic hernia repair has several advantages over the conventional open methods; a reduced postoperative pain, a short recovery period, and an earlier return to work.^(12,13)

It has been reported that 4~21.7% of the total number of laparoscopic inguinal hernia repairs are performed on patients who have had previous lower abdominal sur-

gery,(14,15) which is in agreement with our findings (4.27%). In our data, laparoscopic TEP repair was successfully performed in most patients who had undergone a previous appendectomy (including right paramedian incision), whether or not the hernia was on the right, without any complications. Only 1 of 24 cases which had a history of previous appendectomy and a twice-recurrent right inguinal hernia TEP repair was failed, thus necessitating IPOM repair. Therefore, laparoscopic TEP repair can be feasible in patients who have had appendectomies, even it is right inguinal hernia.

Dulucq et al.(16) reported that previous radical prostatectomy should be a contraindication to a laparoscopic TEP repair because of the associated scarring in the preperitoneal space, and some prospective studies of hernia repairs have excluded such patients, especially those involving bladder or prostate procedures.(6-8) In our cases, 6 patients with previous prostatectomy (including 2 cases of robot surgery) and 2 cases of traumatic rupture the bladder were failed by laparoscopic TEP repair due to severe tissue adhesions, and the hernia was subsequently repaired by IPOM repair. Some authors have reported that laparoscopic TEP repair is safe and yields good results after radical prostatectomy or previous lower abdominal surgery,(16) and TEP repair of recurrent inguinal hernias after a primary TEP procedure as well as repair of contralateral hernias after earlier TEP repair are technically feasible and safe.(17) However, it is not easy to perform TEP repair in cases of previous pelvic surgeries such as prostatectomy or bladder injury because of severe tissue adhesions which made difficulty for tissue dissection and even cause tissue bleeding in the pelvic region. Also postoperative complications such as seroma and pain were occurred more frequently in IPOM repair group. These results may be caused by; 1) tissue damage caused by forced dissection of scarring tissue, 2) small number of data. So in our opinion, it is better to perform other procedures such as IPOM, TAPP, or conventional anterior repair than TEP repair in these cases because adhesions can cause intraoperative complications frequently such as peritoneal tearings, bleeding, and cord injuries and postoperative complications.

IPOM repair is easier and faster than other types of inguinal hernia repair, but have not been popular because of some problems; 1) high recurrence rate due to mesh migration, 2) adhesive phenomenon with the bowel.(18,19) However, in these days, there were some reports about successful IPOM repair for inguinal hernia(20); but still it is needed that long term follow up and better designed study about IPOM repair to confirm its safety and feasibility. In our study, fortunately there was no recurrence or intraperitoneal complications yet, however, it seemed that long term careful follow ups are needed.

In conclusion, laparoscopic TEP repairs could be possible and reasonable after appendectomy. However, those are difficult in patients with previous pelvic surgeries and had more complications such as seroma, postoperative pain; so other method (IPOM or TAPP or conventional anterior approach) may be appropriated in such cases. Additional data should be collected and reviewed regarding the feasibility of laparoscopic TEP repair in patients who have undergone other types of surgical procedures.

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