The Safety and Effectiveness of Laparoscopic Total Extraperitoneal (TEP) Repair for Recurrent Inguinal Hernia After Open Hernioplasty

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Abstract

Background: Many studies have reported that laparoscopic total extraperitoneal (TEP) repair for recurrent inguinal hernia after an open hernioplasty was safe and effective. This study was conducted to evaluate TEP repair for recurrent inguinal hernia through a retrospective analysis of our data.

Materials and Methods: We performed a retrospective analysis of the medical records of patients who were scheduled for laparoscopic TEP repair from December 2000 to December 2008. A total of 1065 cases of laparoscopic TEP repairs were performed for 944 patients by a single surgeon, and 100 cases of recurrent inguinal hernias were enrolled.

Results: The mean operation time was longer in the recurrent hernia group than that in the primary hernia group ($P < 0.001$), and peritoneal tearing occurred more frequently in the recurrent hernia group ($P < 0.001$). Direct hernia was more frequent in the recurrent hernia group ($P < 0.001$). The mean number of hospital days and complications, such as seroma and postoperative pain, were similar in both groups. Three cases of recurrence occurred (0.28%): 2 occurred in the recurrent hernia group (2%) and the other occurred in the primary hernia group (0.1%).

Conclusions: Laparoscopic TEP repair is safe and effective for treating recurrent inguinal hernia after an open hernioplasty, because the recurrence rate was low (2%) and other complications were similar for both groups. Direct inguinal hernia was more frequent in patients who had recurrent inguinal hernia.

Introduction

INGUINAL HERNIA REPAIR is one of the most commonly performed elective general surgical procedures worldwide. Laparoscopic total extraperitoneal (TEP) repair gains access to the preperitoneum without the associated pain and morbidity of a larger incision, and it potentially allows for a more rapid recovery.¹⁻⁴ Recurrent hernia had previously been considered to be more challenging to manage than primary hernia, since performing a dissection for a recurrent hernia is more difficult due to the hard scar tissue and the frequently altered anatomy.⁵ Schiller⁶ reported recurrence rates for open procedures of up to 20% or more for primary hernia and up to 30% for recurrent hernia repair. On the other hand, some researchers have reported that the rerecurrence rate after the laparoscopic TEP repair of a recurrent hernia is low.^{5,7-9} We designed this study to determine the safety and effectiveness of performing laparoscopic TEP repair for recurrent inguinal hernia.

Materials and Methods

A retrospective analysis of the medical records was performed for patients who were scheduled for laparoscopic TEP repair from December 2000 to December 2008. A total of 1065 cases of laparoscopic TEP repairs were performed by a single surgeon for 944 patients. All the data were prospectively collected and retrospectively reviewed.

Laparoscopic technique

Laparoscopic TEP repair was performed by the three-port technique. To create the preperitoneal space, a 12-mm skin incision was made on the inferior edge of the umbilicus, and the incision was continued down to the anterior rectus sheath. A small incision was then made on the anterior rectus sheath to expose the rectus abdominis muscle. A channel between the rectus muscle and the posterior sheath was created by using blunt endopeanuts, and these endopeanuts were aimed toward the symphysis pubis so that a small tunnel was made in

TABLE 1. PATIENTS' DEMOGRAPHICS AND TYPE OF HERNIA

	Recurrent hernia (n = 100)	Primary hernia (n = 965)	P-value
Mean age (years)	51.22 ± 15.70	49.28 ± 16.98	
Male/female	96/4	889/76	
Operation time (minutes)	28.31 ± 17.04	24.39 ± 17.76	<0.001
Hernia type			<0.001
Indirect	40	723	
Direct	55 (55%)	174 (18%)	
Femoral	3	3	
Complex	2	65	
Left/right hernia	41/59	401/564	0.915
Peritoneal tearing	30 (30%)	76 (7.8%)	<0.001

the direction to the pubis between the rectus muscle and the peritoneum. A preperitoneal space was obtained from using a 45-degree telescope and carbon-dioxide (CO₂) gas pressure. Finally, two accessory 5-mm ports were made: one at 2 cm above the symphysis pubis in the midline and the other at the middle between the previous two ports. After reduction of the hernia sac and parietalization of the spermatic cord, a 13×8 cm Surgipro mesh (Covidien, Mansfield, MA) was placed at the hernia site.

The operative time was checked from the time of making the skin incision to skin closure. After the operation, the patients who needed more than two administrations of analgesics were recorded. Seroma was defined as the presence of a palpable fluid collection over the operation site or scrotum during follow-up. Length of hospital stay was defined as the total number of nights spent in the hospital after the operation. The patients were regularly followed up at out patient hernia clinic.

Statistical analysis

Demographic features and postoperative data were compared by using chi-square tests. All the data collected in the database were analyzed by using SPSS software (version 12.0; (SPSS, Inc., Chicago, IL). A P-value less than 0.05 was considered to be statistically significant.

Results

Among the 1065 cases of laparoscopic TEP repair, there were 100 cases (9.4%) of laparoscopic TEP repair for recurrent inguinal hernia and 965 repairs for primary inguinal hernia. All the recurrent inguinal hernias had been previously repaired by the open technique. The mean age of the patients in both groups was 49.46 ± 16.87 years, mean operation time was 24.76 ± 17.72 minutes, and mean hospital day was 0.95 ± 0.62 days. Four patients in the recurrent hernia group had bilateral recurrent inguinal hernia.

As shown in Table 1, mean operation time was longer ($P < 0.001$) for the recurrent hernia group (28.31 ± 17.04) than that for the primary hernia group (24.39 ± 17.76), and peritoneal tearing occurred more frequently in the recurrent hernia group ($P < 0.001$). The proportion of direct hernia was higher in the recurrent hernia group ($P < 0.001$). Table 2 shows the postoperative data of both groups. The mean number of hospital days and complications, such as seroma and postoperative pain, were similar for both groups. Three cases of recurrence (0.28%) occurred: 2 in the recurrent hernia group (2%) and the other occurred in the primary hernia group (0.1%), and the difference was statistically significant ($P = 0.001$).

Discussion

The recurrence rate after primary inguinal hernia repair has been reported to be 8–25%,^{10–12} and the recurrence rate was 9.4% in our study. The recurrence rate after laparoscopic TEP repair for recurrent inguinal hernia was not higher than that after primary hernia repair, and it even reached 0% in some studies.^{5,13,14} Lowham et al.¹⁵ reported that a major cause for recurrence after laparoscopic TEP repair was technical errors, including inadequate dissection of the space, an insufficient size of the prosthesis, and incorrect mesh positioning. Dissection and making a space are more difficult in patients with recurrent inguinal hernia due to adhesion and the hard scar tissue, and the recurrence rate after hernioplasty could be higher for recurrent inguinal hernia than that for primary inguinal hernia. Schumpelick et al.¹⁶ suggested that the 5-year recurrence rate of modern inguinal hernia repairs has reached 1–3% for primary hernias and 3–5% for recurrent hernias. Three cases of recurrence (0.28%) occurred in our study: 2 in the recurrent hernia group (2%) and the other in the primary hernia group (0.1%). Rerecurrence was more frequent in the recurrent hernia group than that in the primary hernia group, yet the recurrence rate in the recurrent hernia group was still low.

TABLE 2. COMPARISON OF POSTOPERATIVE DATA IN EACH GROUP

	Recurrent hernia (n = 100)	Primary hernia (n = 965)	P-value
Mean hospital stay (days)	0.94 ± 0.56	0.95 ± 0.63	0.972
Postoperative pain	14 (14%)	90 (9.3%)	0.134
Seroma	8 (8%)	62 (6.4%)	0.545
Recurrence	2	1	0.001

The treatment for recurrent inguinal hernia is substantially more complicated than the treatment for primary inguinal hernia. This is due to the need for a tension-free repair and closure of all potential hernia sites, the difficult dissection of scar tissue, and the altered anatomic situation. Because of these difficulties, the operation time could be longer for recurrent hernias than that for primary hernias. Some researchers¹³ have reported that the operation time was similar for both groups, and other¹⁴ have reported it was longer for the recurrent hernia group. In our cases, the operation time was longer for the recurrent hernia group than primary hernia group ($P < 0.001$).

Peritoneal tearing results in loss of the working space, and this prolongs the operative time for closure of the defect.¹⁷ According to our results, peritoneal tearing occurred more frequently in the recurrent hernia group than that in the primary hernia group, and the operation time was longer in the recurrent hernia group. One hundred and six cases of peritoneal tearing occurred (30% in the recurrent hernia group and 7.8% in the primary hernia group), but this was similar or even lower, compared to the rate of peritoneal tearing, in other studies (26% in the adhesions group versus 18% in the no-adhesions group⁵ and 46% in the recurrent hernia group versus 28% in the primary hernia group¹³).

Lau¹³ reported that the high incidence of direct recurrent hernia reflected an inadequate reinforcement of the posterior wall by suture herniorrhaphy, and technical error and tension on the repair were possible contributing factors. Several studies have suggested that the potential causes for indirect recurrence included missed hernia, incomplete dissection or low ligation of the sac, as well as incomplete restoration of the internal ring.^{18,19} In our study, direct hernia was observed more often in the recurrent hernia group. Further investigation is required, since our data were insufficient to correctly describe whether the type of previous operation employed the sutured technique or Lichtenstein's hernioplasty.

Conclusions

Although the recurrence rate was higher in the recurrent inguinal hernia group than that in the primary inguinal hernia group after laparoscopic TEP repair, this laparoscopic technique is safe and effective for treating recurrent inguinal hernia after patients were previously treated with open hernioplasty, because the recurrence rate was acceptably low (2%) and the other complications were similar in both groups. Direct inguinal hernias were more frequent in the patients with recurrent inguinal hernias.

Disclosure Statement

No competing financial interests exist.

References

- Chung RS, Rowland DY. Meta-analyses of randomized, controlled trials of laparoscopic versus conventional inguinal hernia repairs. *Surg Endosc* 1999;13:689–694.
- Heikkinen TJ, Haukipuro K, Koivukangas P, Hulkko A. A prospective, randomized outcome and cost comparison of totally extraperitoneal endoscopic hernioplasty versus Lichtenstein hernia operation among employed patients. *Surg Laparosc Endosc Percutan Tech* 1998;8:338–344.
- Liem MS, van der Graaf Y, van Steensel CJ, Boelhouwer RU, Clevers GJ, Meijer WS, Stassen LP, Vente JP, Weidema WF, Schrijvers AJ, van Vroonhoven TJ. Comparison of conventional anterior surgery and laparoscopic surgery for inguinal hernia repair. *N Engl J Med* 1997;336:1541–1547.
- Smith CD. Laparoscopic totally extraperitoneal inguinal hernia repair. *Oper Tech Gen Surg* 1999;1:185–196.
- Scheuerlein H, Schiller A, Schneider C, Scheidbach H, Tamme C, Kockerling F. Totally extraperitoneal repair of recurrent inguinal hernia: Results from 179 consecutive patients. *Surg Endosc* 2003;17:1072–1076.
- Schiller A. Ergebnisse bei der Versorgung von Rezidivleistenhernien durch TEP. Dissertation Erlangen, 2002.
- Tantia O, Jain M, Khanna S, Sen B. Laparoscopic repair of recurrent groin hernia: Results of a prospective study. *Surg Endosc* 2009;23:734–738.
- Felix EL, Michas CA, McKnight RL. Laparoscopic repair of recurrent hernias. *Surg Endosc* 1995;9:135–138; discussion, 138–139.
- Sandbichler P, Draxl H, Fuchs H, Furtschegger A, Egender G, Steiner E. Laparoscopic repair of recurrent inguinal hernias. *Am J Surg* 1996;171:366–368.
- Aufenacker TJ, de Lange DH, Burg MD, Kuiken BW, Hensen EF, Schoots IG, Gouma DJ, Simons MP. Hernia surgery changes in the Amsterdam region, 1994–2001: Decrease in operations for recurrent hernia. *Hernia* 2005;9:6–50.
- Bay-Nielsen M, Kehlet H, Strand L, Malmstrom J, Andersen FH, Wara P, Juul P, Callesen T. Quality assessment of 26,304 herniorrhaphies in Denmark: A prospective, nationwide study. *Lancet* 2001;358:1124–1128.
- Bisgaard T, Bay-Nielsen M, Christensen IJ, Kehlet H. Risk of recurrence 5 years or more after primary Lichtenstein mesh and sutured inguinal hernia repair. *Br J Surg* 2007;94:1038–1040.
- Lau H. Endoscopic totally extraperitoneal unguinal hernioplasty for recurrence after open repair. *ANZ J Surg* 2004;74:877–880.
- Garg P, Menon GR, Rajagopal M, Ismail M. Laparoscopic total extraperitoneal repair of recurrent inguinal hernias. *Surg Endosc* 2010;24:450–454.
- Lowham AS, Filipi CJ, Fitzgibbons RJ, Jr., Stoppa R, Wantz GE, Felix EL, Crafton WB. Mechanisms of hernia recurrence after preperitoneal mesh repair. Traditional and laparoscopic. *Ann Surg* 1997;225:422–431.
- Schumpelick V, Kupczyk-Joeris D, Töns C, Pflingsten FP. Reparation der Rezidivleistenhernie-Taktik, Technik und Ergebnisse [Repair of recurrent inguinal hernia. Tactics, techniques, and results]. *Chirurg* 1990;61:526–529.
- Lau H, Patil NG, Yuen WK, Lee F. Management of peritoneal tear during endoscopic extraperitoneal inguinal hernioplasty. *Surg Endosc* 2002;16:1474–1477.
- Postlethwait RW. Recurrent inguinal hernia. *Ann Surg* 1985;202:777–779.
- Weinstein M, Roberts M. Recurrent inguinal hernia. Follow-up study of 100 postoperative patients. *Am J Surg* 1975;129:564–569.

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