

Outcome of Laparoscopic (TEP) Versus Open (Lichtenstein) Inguinal Hernia Repair: Six-year Follow Up

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Abstract

Objective: To compare the results of laparoscopic totally extraperitoneal procedures (TEP) and Lichtenstein inguinal hernia repairs.

Patients and Methods: Inguinal hernia repairs performed between January 2008 and December 2013 at Maharat Nakhon Ratchasima Hospital were reviewed. The only exclusion criterion was obstructed hernia. All patients were followed at 2 weeks, 6 weeks, 6 months and every year until 5 years.

Results: A total of 286 patients were included; 178 cases underwent open Lichtenstein technique, and 108 cases underwent laparoscopic TEP. There were no significant differences between groups in gender ($P = 0.186$), type of hernia ($P = 0.250$), hospital stay ($P = 0.162$), complications ($P = 0.491$), and recurrence rate ($P = 0.999$). Laparoscopic TEP repair was advantageous in terms of less postoperative pain and faster return to normal activity ($P < 0.001$), but open Lichtenstein repair was superior in terms of shorter operative time ($P < 0.001$).

Conclusion: Laparoscopic TEP inguinal hernia repair is safe, and more advantageous in terms of less postoperative pain and faster return to normal activity when compared with the open Lichtenstein inguinal hernia repair, while no differences in terms of complications and recurrent hernia could be detected.

Keywords: Laparoscopic, TEP, Lichtenstein, Inguinal Hernia, Complications, Recurrence

INTRODUCTION

Inguinal hernia repair is one of the most common operations in general surgery^{1,2,27}. Traditionally, open Lichtenstein hernia repair is generally accepted as a safe, well-understood technique with a high success rate³. The use of mesh prosthesis to reinforce the abdominal wall has reduced the recurrence rate dramatically^{2,4,12,24,25}. Laparoscopic repairs have recently been introduced and are increasingly popular. The proportion of inguinal hernias treated laparo-

scopically has increased from about 6% between 2002 and 2003 to about 18% between 2008 and 2009⁵.

Laparoscopic inguinal hernia repairs include the transabdominal preperitoneal (TAPP), totally extraperitoneal (TEP) approaches, and intraperitoneal on lay mesh (IPOM), the latter being the least popular^{6,13,14}. The technique of TEP allows the surgeon to work within the preperitoneal space without entering the peritoneal cavity, decreasing the risk of intraabdominal organ injuries^{2,18,19,20}. TEP is the

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author's preferred technique.

Although several studies have demonstrated the advantages of laparoscopic techniques in terms of less pain and faster recovery time compared with open repairs, many surgeons are not familiar with these techniques, because of the steep learning curve^{7,21,22,23}. Hence, the use of laparoscopic hernia repairs in practice is still uncommon, with many general surgeons uninterested in performing these procedures. The present study reports the comparison of outcomes and complications arising from laparoscopic TEP compared with those from open Lichtenstein hernia repairs.

PATIENTS AND METHODS

Inguinal hernia repairs performed between January 2008 and December 2013 were included in this study. All hernia repairs were performed by the author or by doctors under the author's supervision. The open Lichtenstein technique (LT) was performed under spinal anesthesia. Laparoscopic repairs were performed under general anesthesia. Prior to January 2011, most inguinal hernias were repaired using LT. Subsequently, most hernias were repaired via the laparoscopic (TEP) approach, unless patients were unsuitable for general anesthesia. Patients were excluded from the study if they had obstructed hernia. The TEP repair was begun with a transverse incision at level of the umbilicus and the placement of a 10 mm trocar, followed by the creation of the extraperitoneal space by a balloon. Two 5 mm trocars were placed under direct vision. Dissection and retraction of the hernia sac was done as bloodlessly as possible. A 10 x 15 polypropylene mesh was used to repair the hernia

defect, and 4 to 5 tacks were used to fix the mesh in place. The hernia sac would be hung above the mesh and tacked to the abdominal wall. After the removal of all trocars, the periumbilical fascial defect was closed and subcuticular closure of skin was done.

Pain score (based on the visual analogue scale, measured from 1 to 10) was checked at 8, 24, and 48 hours postoperative. All patients were followed at the outpatient's clinic at 2 weeks, 6 weeks, 6 months, and every year until 5 years. Chronic pain was defined as persistent pain for at least 3 months following surgery. Data were analyzed using descriptive statistics, test, Fisher's exact test and Mann Whitney U test. P-values < 0.05 were considered statistically significant.

RESULTS

A total of 286 patients were included in the present study. Open hernia repairs (LT) were performed in 178 cases (174 men, 4 women). The median age was 67.5 years (range: 15 to 90 years). Types of hernia included unilateral (106 cases), bilateral (38 cases) and recurrent inguinal hernias (34 cases). In the laparoscopic group, 108 cases were successfully performed (102 men, 6 women). The median age was 62 years (range: 19 to 86 years). Types of hernia included unilateral (55 cases), bilateral (32 cases) and recurrent inguinal hernias (21 cases). Two cases were converted to open repair and excluded from this study because of tearing of peritoneum and loss of working space in 1 case, and severe adhesions around the hernia sac in 1 case. There were no significant differences in gender ($P=0.186$), age ($P=0.496$), and type of hernia ($P=0.250$) between groups (Table 1).

Table 1 Comparison of demographic data between open and laparoscopic (Lap) inguinal hernia repairs

Variable	Open: Number	Lap: Number	Total Number (%)	P-value
Sex				
Men	174	102	276 (97%)	0.186
Women	4	6	10 (3%)	
Type				
Unilateral	106	55	161 (56%)	0.250
Bilateral	38	32	70 (25%)	
Recurrence	34	21	55 (19%)	

Table 2 Comparison of outcomes between open and laparoscopic (Lap) inguinal hernia repairs

Variable	Open:	Lap:	P-value
	Mean (range)	Mean (range)	
Operative time (min)	45 (25 to 110)	75 (35 to 150)	< 0.001
Hospital stay (day)	2 (1 to 5)	2 (1 to 5)	0.162
Post-op pain score (1 - 10)			
8 hr	7 (0 to 10)	3 (0 to 10)	< 0.001
24 hr	4 (0 to 8)	0 (0 to 5)	< 0.001
48 hr	1 (0 to 5)	0 (0 to 4)	< 0.001
Return to normal activity (day)	14 (7 to 30)	10 (5 to 24)	< 0.001

Table 3 Comparing complications and recurrence between open and laparoscopic (Lap) hernia repairs

	Open: Number	Lap: Number	P-value (Fisher's exact test)
Complication			
Infection	1	0	0.999
Bleeding	0	1	0.378
Injury	1	0	0.999
Seroma	3	1	0.999
Urinary retention	13	3	0.120
Numbness	6	1	0.260
Chronic pain	10	5	0.999
Hyperesthesia	2	1	0.653
Recurrent hernia	2	1	0.999

The mean operative time in the open repair group was 45 min (25 to 110 min), and in the laparoscopic repair group was 75 min (35 to 150 min). This difference was statistically significant ($P < 0.001$). Laparoscopic repairs have longer operative time than open repairs. Hospital stay was not significantly different between the two groups ($P = 0.162$). There was a significant difference between laparoscopic and open groups in terms of post operation pain at 8, 24, and 48 hours ($P < 0.001$). Laparoscopic repair was associated with less pain than the open repair. Time to return to normal activity was significantly shorter in the laparoscopic group (Table 2). The mean follow up time was 38 months (1.5 to 60 months) in the open repair group, and 40 months (6 to 60 months) in the laparoscopic group.

In open repairs, the rate of complications was 7.3% and in laparoscopic repairs, it was 4.6%. Urinary retention seemed to be higher in open group than the laparoscopic group, although not statistically significant (Fisher's exact test=0.491) There was no significant

difference in recurrent hernias between both groups (Fisher's exact test =0.999), i.e., 2 in the open group (1.1%) and 1 in the laparoscopic group (0.9%); see Table 3.

DISCUSSION

Inguinal hernia repairs have usually been done using the open method (LT). Before the introduction of mesh prosthesis, open anterior inguinal hernia repairs were performed by closing the defect using only sutures, such as in the Bassini, Shouldice, and McVay repairs. These procedures became less popular because of high recurrence rates (6 to 11.2%)⁶. The introduction of Lichtenstein tension-free repair markedly reduced the recurrence rates to consistently low levels (0.2 to 2%)^{4,6}.

Other advantages of Lichtenstein hernia repair include the relative ease of learning, and less postoperative pain and discomfort than in the open tissue repair²⁶. But up to 40% of patients after

Lichtenstein repair will experience chronic pain, as was recently reported⁸.

Both TEP and open Lichtenstein repair involve the placement of a prosthetic mesh that is essential for a tension free repair and also to make them comparable. Many studies^{29,30,31,32} including several meta-analyses, systematic reviews and randomized control trials show that the TEP results are as good as those of the open Lichtenstein repair. Most studies show TEP repair was associated with longer operative time, but with less postoperative pain, earlier return to normal activity, as compared with the open inguinal hernia repair², while the recurrence rate was similar for both groups.

The present study reviewed a 6-year experience of laparoscopic repairs (TEP), compared with open at a Lichtenstein hernia repairs at tertiary care hospital (Maharat Nakhon Ratchasima Hospital). The results of this study were consistent with those of other studies^{2,5,15,16,17,21}. Thus, laparoscopic (TEP) repair was advantageous in terms of less postoperative pain, and faster return to normal activity, with no significant differences in terms of hospital stay, complication and recurrence rate. But open Lichtenstein hernia repairs were superior in terms of shorter operative time. In a subgroup analysis, for bilateral hernia and recurrent hernia groups, the results were all similar.

The results of the present study showed that the operative time of the TEP group was significantly longer than that of the open Lichtenstein group. This is one important reason why many surgeons avoid laparoscopic hernia repairs. This procedure also requires long, steep learning curve⁶. Some studies recommend a learning curve of 50 to 100 cases^{6,12}, while in the present study, the last 50 TEP cases have operative times more similar to open repairs. The reason for the prolonged operative time may come from the complexity of the TEP procedure.

In terms of postoperative pain, the laparoscopic repair was clearly more advantageous than the open repair. Because the size of the surgical wound in laparoscopic repair is smaller than that of open repair, and the extraperitoneal approach creates a working area in a potential natural space, it requires minimal dissection to reduce hernia sac and to lay down mesh graft. This advantage of less pain is clearly of benefit especially in bilateral hernias.

Postoperative hospital stay was shorter in the unilateral laparoscopic group, with statistical

significance. But this was not so for patients with bilateral and recurrent hernias ($P = 0.375$ and $P = 0.140$, respectively). Most likely, in these patients, more extensive dissection would be required than in the unilateral cases. The lack of a significant difference in overall postoperative hospital stay between the two repair groups in the present study was similar to other studies¹¹.

There was no significant difference in the complication rates between laparoscopic hernia repair and open repairs. Urinary retention seemed to be more frequent in the open repair group, although without statistical significance. This may have been the effect of spinal anesthesia⁹. Other studies, however, found that urinary retention was more frequent after laparoscopic repair^{7,10}. The risk of this complication may be reduced by postoperative intermittent urinary catheterization and asking the patient to void before the surgery¹¹.

Infection, bleeding, and tissue injury were found to occur rarely, so laparoscopic hernia repair should be safe. Numbness, chronic pain, hyperesthesia were also seen in only a few cases after TEP repair (although not statistically different from open repair). One possible reason could be that the laparoscopic approach enters the extraperitoneal potential space with minimal dissection and minimal fixation of the mesh graft, all done under direct vision via laparoscopy which helps avoid nerve injury.

One of the main arguments against the use of laparoscope for inguinal hernia repair is the need to enter the abdominal cavity, with the associated risk of visceral and vascular injury, which would not occur in open repairs. Using the TEP approach, entering the abdominal cavity can be avoided, and the risk of visceral injury reduced^{18,19,20}. A past history of lower abdominal surgery may predispose to adhesions and increase the risk of visceral injury so this is a relative contraindication to laparoscopic inguinal hernia repairs⁶. No organ injury was found in the TEP group in this study.

Seroma at the operative site would usually disappear spontaneously after a few months. Chronic pain, numbness and hyperesthesia have been found in only a few cases in both groups. Some studies have shown that chronic pain can be reduced in the laparoscopic group by using glue to fix, or even not fixing, the mesh instead of using tack⁶.

Laparoscopic inguinal hernia repair was associated with a shorter time to return to normal activity, an advantage which is very important from a socioeconomic point of view, and may overcome the higher cost of operation in some studies⁶.

The rate of recurrent hernia was similar in laparoscopic group as in the open group, 0.9% and 1.1%, respectively, which are consistent with other studies^{3,15,16,17,25,27}.

CONCLUSION

Laparoscopic (TEP) inguinal hernia repair is safe and has advantages in terms of less post-operative pain and faster return to normal activity when compared with the open Lichtenstein inguinal hernia repair, with no clear differences in term of complications and recurrent hernia.

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