LESS

Original Article

Laparosc Endosc Surg Sci 2021;28(4):192-198
DOI: 10.14744/less.2021.46034

Comparison of early and late period outcomes of transabdominal pre-peritoneal technique and Lichtenstein technique in repair of bilateral inguinal hernia

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ABSTRACT

Introduction: The aim of this study is to compare the early and late period outcomes of transabdominal pre-peritoneal (TAPP) technique and Lichtenstein technique (LT), which are two different methods used in the surgical treatment of bilateral inguinal hernia.

Materials and Methods: Patients who were operated for bilateral inguinal hernia at Erzurum Regional Education and Research Hospital between January 2015 and January 2021 were selected for the study retrospectively. The patients were divided into two groups according to the surgery performed: TAPP technique group and LT group. Complications occurred in the first 30 days of the post-operative period were defined as early period outcomes, and complications occurred after the first 30 days postoperatively were defined as late period outcomes. The outcomes differences between TAPP technique and LT were evaluated with appropriate statistical tests, and p=0.05 was considered statistically significant.

Results: During the study period, 110 patients underwent bilateral inguinal hernia surgery. One hundred and nine patients (99.1%) were men. The mean age of all patients was 56.6±14.27 years (20-84). TAPP technique group had 28 (25.5%) patients. Overall morbidity rate and length of hospital stay were higher in LT group, p=0.029 and p<0.001, respectively. There was no difference between the groups in terms of recurrence (p=0.255).

Conclusion: Comorbid diseases and age of the patients are important factors in the selection of surgical method. TAPP technique, which reduces the overall morbidity and shortens the duration of hospital stay and does not have a significant increase in terms of recurrence, can be performed safely in bilateral inguinal hernia cases.

Keywords: Bilateral inguinal hernia, lichtenstein technique, morbidity, recurrence, transabdominal pre-peritoneal

Introduction

Inguinal hernia operation is one of the most common surgeries performed by general surgeons. While the incidence of unilateral inguinal hernia is high, the exact incidence of bilateral inguinal hernia, is predicted between 8% and 30%, is unknown.[1]

In the past, it was believed that bilateral inguinal hernias could not be corrected in the same operation, due to the increased likelihood of recurrence.[2] However, there is a consensus on single-stage repair nowadays. The surgery type to be preferred in the treatment of bilateral inguinal hernia is evaluated under two main headings: Open surgery tech-

Received: 05.07.2021 **Accepted:** 21.10.2021
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niques and laparoscopic surgery techniques. The main purpose of hernia surgery is to provide a tension-free hernia repair. Tension-free repair can be achieved with or without the use of mesh. Lichtenstein technique (LT) is one of the most common surgical techniques used in open surgery. On the other hand, tension-free repair can be achieved with laparoscopic surgery. Due to technological developments and widespread use of laparoscopic surgery, laparoscopy has also begun to be preferred in bilateral inguinal hernia. Transabdominal pre-peritoneal (TAPP) technique is one of the common laparoscopic techniques used in bilateral inguinal hernia repair.

In this study, it is aimed to compare the early and late period outcomes of TAPP technique and LT, which are two different methods used in the surgical treatment of bilateral inguinal hernia.

Materials and Methods

Patients who underwent bilateral inguinal hernia surgery with LT and TAPP technique at Erzurum Regional Education and Research Hospital, Erzurum, Turkey, between January 2015 and January 2021 were selected for the study retrospectively. Each patient's data were retrieved from the hospital's computer system and the imaging archives in the patient's medical records.

Patients under 18-year-old age, pregnant patients, and patients who were operated due to unilateral inguinal hernia were excluded from the study. Age, gender, and comorbidity of the patients, type of anesthesia, type of hernia, operation length, the need to place a drainage catheter in the surgical field, length of hospital stay, and post-operative outcomes were searched. Hernias were classified according to Nyhus classification.

Complications occurred in the first 30 days postoperatively were classified as early outcomes, and complications occurred after the first 30 post-operative days were classified as late outcomes. While detecting the presence of early and late outcomes, the electronic archive of our hospital as well as the e-Nabiz Personal Health System of the Ministry of Health of the Republic of Turkey were also used. Early and late outcomes of TAPP technique and LT were compared statistically.

Statistical evaluation was made with SPSS v22.0 (IBM, Armonk, NY, USA). The normality distribution was checked with Shapiro–Wilk test. Independent T-Test or Mann–Whitney U-test was used according to the results of the Shapiro–Wilk test. In addition, Chi-square test, Fisher's exact test, and likelihood ratio test were used to compare qualitative variables. P=0.05 was considered statistically significant.

Ethics Committee approval was received from Non-invasive Clinical Research Ethics Committee of Erzurum Regional Education and Research Hospital, Erzurum, Turkey (Decision No: 2021/08-158).

Results

During the study period, 110 patients were operated due to bilateral inguinal hernia. One hundred and nine patients (99.1%) were men. The mean age of all patients was 56.6±14.27 years (20-84). Fifty-eight patients (52.7%) had comorbid diseases: 51 patients (46.3%) had one comorbid disease, and 7 patients (6.4%) had two and more comorbid diseases. Five of all patients had a previous hernia surgery. While LT was used in 82 (74.5%) patients, TAPP technique was used in the remaining patients.

Forty-one patients (37.3%) were operated under general anesthesia; 28 were at TAPP technique group and 13 were at LT group. Mean operation time was 100.44±19.40 (60–155). The type of hernia detected intraoperatively is seen in Table 1. In 47 patients (42.7%), a drainage catheter was used during the operation.

Mean length of hospital stay was 2.5±1.78 days (1–15). Morbidity rate of the study was 26.4% with no mortality. The most common complication was surgical site infection in 11 patients. Other complications were as follows: hematoma in 7, chronic pain in 3, deep vein thrombosis in 3, seroma in 2, and rare complications (arterial thrombosis in one, atelectasis in one, and globe vesicle in one) in three patients. One recurrent hernia, which is at TAPP technique group, was seen at this study. The clinical factors of the patients are shown in Table 1.

LT was preferred in older ages (p=0.001) and patients with comorbid diseases (p=0.037), while TAPP technique was preferred in recurrent cases (p=0.015). In addition, general anesthesia was preferred more in TAPP technique cases (p<0.001), and drainage catheter was only used in LT group (p<0.001). Overall morbidity rate and length of hospital stay were higher in LT group, p=0.029 and p<0.001, respectively. There was no difference in the post-operative follow-up period, post-operative recurrence was observed only in the TAPP technique group with no difference between groups (p=0.255). Comparison of patients' data according to surgery type is shown in Table 2.

Table 1. Preoperative, operative and postoperative factors of the patients

Clinical Parameters	Value or n (%)
Preoperative Factors	
Age (mean±sd, years) (min-max)	56.60±14.27 (20-84)
Gender	
Male	109 (99.1)
Female	1 (0.9)
Comorbid Disease	58 (52.7)
One comorbid disease	51 (46.3)
Hypertension	21(19.1)
Benign prostatic hyperplasia	10 (9.1)
Coronary artery disease	7 (6.4)
Chronic obstructive pulmonary disease	5 (4.5)
Asthma	2 (1.8)
Hypothyroidism	2 (1.8)
Diabetes mellitus	2 (1.8)
Lung cancer	1 (0.9)
Esophageal cancer	1 (0.9)
Two and more comorbid disease	7 (6.4)
Operative Factors	
Type of Anesthesia	
General	41 (37.3)
Regional	69 (62.7)
Type of Surgery	
Transabdominal pre-peritoneal (TAPP)	28 (25.5)
Lichtenstein Technique	82 (74.5)
Hernia Type (Right)*	
Type II	52 (47.3)
Type III A	57 (51.8)
Type III B	1 (0.9)
Hernia Type (Left)*	
Type II	48 (43.6)
Type III A	59 (53.6)
Type III B	3 (2.7)
Preoperative Recurrent Hernia	5 (4.5)
Operative Time (mean±sd, minutes) (min-max)	100.44±19.40 (60-155)
Drainage Catheter	47 (42.7)
Postoperative Factors	
LOS (mean±sd, days) (min-max)	2.5±1.78 (1-15)
Overall Morbidity	29 (26.4)
SSI	11 (10)
Hematoma	7 (6.4)
Seroma	2 (1.8)
Pain	3 (2.7)
DVT	3 (2.7)
Rare complications	3 (2.7)
Follow-up Length (mean±sd, months) (min-max)	16.67±5.99 (3-27)
Postoperative Recurrence	1 (0.9)

SSI: Surgical Site Infection, DVT: Deep Vein thrombosis, LOS: Length of Stay; *According to Nyhus Classification.

Table 2. Comparison of patients' data according to surgery type

Clinical Parameters	TAPP group (n=28)	LT group (n=82)	p
Age (mean rank)	38.68	61.24	0.001*
Gender			0.255**
Male	27 (24.8%)	82 (75.2%)	
Female	1 (100%)	0 (0%)	
Comorbid Disease			0.037
Yes	10 (17.2%)	48 (82.8%)	
No	18 (34.6%)	34 (65.4%)	
Recurrent Case			0.015
Yes	4 (80%)	1 (20%)	
No	24 (22.9%)	81 (77.1%)	
Anesthesia Type			<0.001**
General	28 (68.3%)	13 (31.7%)	
Regional	0 (0%)	69 (100%)	
Hernia Type (Right)			0.248****
Type II	10 (19.2%)	42 (80.8%)	
Type III A	18 (31.6%)	39 (68.4%)	
Type III B	0 (0%)	1 (100%)	
Hernia Type (Left)			0.401****
Type II	13 (27.1%)	35 (72.9%)	
Type III A	15 (25.4%)	44 (74.6%)	
Type III B	0 (0%)	3 (100%)	
Drainage Catheter			<0.001**
Yes	0 (0%)	47 (100%)	
No	28 (44.4%)	35 (55.6%)	
Operative Time (mean rank)	44.43	59.28	0.032*
LOS (mean rank)	37.61	61.61	<0.001*
Overall Morbidity			0.029**
Yes	3 (10.7%)	26 (31.7%)	
No	25 (89.3%)	56 (68.3%)	
SSI		0.284**	
Yes	1 (3.6%)	10 (12.2%)	
No	27 (96.4%)	72 (87.8%)	
Hematoma			>0.999**
Yes	2 (7.1%)	5 (6.1%)	
No	26 (92.9%)	77 (93.9%)	
Seroma			>0.999**
Yes	0 (0%)	2 (2.4%)	
No	28 (100%)	80 (97.6%)	
Persistent Pain			0.569**
Yes	0 (0%)	3 (3.7%)	
No	28 (100%)	79 (96.3%)	
DVT		0.569**	
Yes	0 (0%)	3 (3.7%)	
No	28 (100%)	79 (96.3%)	
Rare complications			0.569**
Yes	0 (0%)	3 (3.7%)	
No	28 (100%)	79 (96.3%)	
Recurrence			0.255**
Yes	1 (3.6%)	0 (0%)	
No	27 (96.4%)	82 (100%)	
Follow-up Time (mean rank)	54.05	55.9	0.780*

TAPP: Transabdominal pre-peritoneal, LT: Lichtenstein Technique, SSI: Surgical Site Infection, DVT: Deep Vein thrombosis, LOS: Length of Stay; *Mann Whitney-U Test, **Chi-Square Test, ***Independent T Test, **** Likelihood Ratio Test.

Discussion

Inguinal hernia repair is the most frequently performed operation in general surgery. Most cases of inguinal hernia were unilateral. In studies, prevalence of bilateral inguinal hernia is estimated between 8% and 30% of all hernia patients.[3,4] Bilateral hernias were detected in around 6% of all inguinal hernia cases during physical examination.[5]

Advantages and disadvantages of open and laparoscopic bilateral hernia surgery are still being discussed. Advances in laparoscopic bilateral hernia surgery have gained momentum in recent years. With laparoscopic surgery, patients return to their routine lives faster, post-operative pain is less, and hospital stay is significantly shortened.[6,7] However, laparoscopic repair has been slow to gain acceptance, perhaps due to issues related to surgical technique, indications, learning curve, and reported rare but serious complications.[6] The ideal approach is still controversial with no large studies available comparing different approaches of bilateral hernia repair. However, The Hernia Surgery Group recommended single-stage surgery with prosthetic material in bilateral inguinal hernias.[8] Although laparoscopic bilateral inguinal hernia surgery has been started in the past 2–3 years, clinically, we have not yet completed the learning curve for bilateral inguinal hernia surgery. We need to make accurate comparisons with a larger case series by making more laparoscopic cases. Therefore, the majority of our patients are patients who underwent open inguinal hernia surgery.

In the past, surgery was not recommended in the same session in cases of bilateral hernia, and two-session operation was recommended due to high post-operative complication and recurrence. In addition, operations were recommended at intervals of 2–12 weeks.[9,10] Even more this period was 6 months in our clinic previously. After that, better results have been described using simultaneous anterior mesh repair under local anesthesia or an open pre-peritoneal approach with a large mesh.[11-13] With the increasing use of laparoscopic surgery, both non-randomized and randomized studies showed that laparoscopic surgery in bilateral hernias had lower overall morbidity, shorter recovery time, and faster return to work.[14-17] In a study including 43 patients, there was no difference in the comparison of hernia type according to the Nyhus classification.[15] In a study with a large number of patients including 105 patients, there was no difference in the comparison of hernia type according to the hernia side.[18] According to our study results, we find that we preferred the TAPP technique in young patients who do not have any comorbidities and who have had previous hernia surgery. However, while there was no difference between the groups in terms of age distribution in the study of Mahon et al., there was a significant male sex ratio in both groups.[17]

Anesthesia type is an important factor during surgery. The presence of comorbid diseases, especially lung diseases, also affects the choice of anesthesia. Since the TAPP technique is performed only with general anesthesia, the rate of general anesthesia in the TAPP technique group is an inevitable fact. In the study of Elmessiry and Gebaly, anesthesia type was significantly different. While the general anesthesia rate was 100% in the TAPP technique group, it was 25.5% in the open surgery group. In our study, while the general anesthesia rate was 68.3% in the TAPP technique group, it was 31.7% in the open surgery group.

The operation time of a bilateral hernia is longer than that of a unilateral hernia. The evolution of anesthesia and perioperative care has made operative time no longer a problem. However, it is known that the greater the duration of surgery causes increased trauma and local inflammation. An important issue in laparoscopic surgery is the learning curve. When laparoscopic surgery is performed on a particular subject in increasing numbers, the learning curve is reached, and the operation time decreases. In the literature review of Wauschkuhn et al., the mean duration of operation was 70 min at bilateral inguinal hernia repair.[4] However, the mean duration of operation was longer in our study (100.44 min). In addition, operating time is significantly higher in the LT group compared with TAPP technique group like in the study of Feliu et al.[19] It would be more appropriate to prefer open surgery in patients for whom laparoscopy is contraindicated, such as advanced chronic obstructive pulmonary disease.

In this study, higher mean rank of hospital stay (61.61) found in the LT group as has been reported by other authors.[20-22] However, in the study of Elmessiry and Gebaly,[18] length of hospital stay was same both open surgery group and TAPP technique group, similar result was reported by Talha et al.[23]

Complications after bilateral inguinal hernia surgery were in a range from 2.5% to 26.7%. Early period complications in open surgery such as hematoma, seroma, and surgical site infection were lower at TAPP technique group in the

study of Ielpo et al. (27.38% vs. 8.64%).[20] At a comparative study, rate of wound hematoma/seroma was lower at laparoscopic surgery group (1.9% vs. 17.6%, p=0.026).[18] However, in the study of Schneider et al., both operation time and post-operative complications were statistically similar.[24] In another study, it was shown that there was no difference at overall morbidity and morbidity subgroups.[15] In our study, overall morbidity was 26.4%. However, there was no difference between groups in terms of morbidity subgroups, overall morbidity was lower at LT (10.7% vs. 31.7%).

Late main post-operative complication was recurrence in bilateral hernia surgery. However, our data, together with those in the literature, suggest that after laparoscopic hernia repair with the use of a giant pre-peritoneal mesh patch, the recurrence rate is very low (0% vs. 3.6%).[20] In the study of 3-year recurrence analysis, there is no difference between the surgery groups; 3.7% at laparoscopy group and 2% at open surgery group (0.365).[18]

Conclusion

Bilateral inguinal hernia is a rare topic. Laparoscopic surgery and open surgery are surgery options. Comorbid conditions, age of the patients, and pre-operative recurrence are important factors in the selection of surgery type. Laparoscopic surgery, which reduces the overall morbidity and shortens the duration of hospital stay and does not have a significant increase in terms of recurrence, can be performed safely in bilateral inguinal hernia cases.

Disclosures

Ethichs Committee Approval: Ethics committee approval was received from Non-invasive Clinical Research Ethics Committee of Erzurum Regional Education and Research Hospital, Erzurum, Turkey (Decision No: 2021/08-158).

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Authorship Contributions: Concept – T.K., M.Y.; Design – T.K.; Supervision – T.K.; Materials – T.K., M.Y.; Data collection and/or processing – T.K., M.Y.; Analysis and/ or interpretation – T.K.; Literature search – T.K.; Writing – T.K.; Critical review – T.K., M.Y.

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