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Laparoscopic inguinal hernia repair: A comparison of transabdominal preperitoneal and total extraperitoneal techniques—Results of initial experiences

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Abstract

AIMS: This study aimed to analyze the results of transabdominal preperitoneal (TAPP) and total extraperitoneal (TEP) repairs performed by two authors and to compare two laparoscopic methods.

MATERIALS AND METHODS: Patients who underwent inguinal hernia surgery in a secondary-care hospital between 2019 and 2022 were evaluated retrospectively. Demographics, hernia side and type, primary or recurrent hernia situation, size of hernia orifice, operation type, postoperative complications, duration of operation, length of hospital stay, recurrence, and follow-up time were examined. Perioperative outcomes were compared between the two groups.

RESULTS: One hundred and eleven patients were analyzed. The mean age was 49.4 ± 13 years, with a male/female ratio of 106/5. About 82% of hernias were unilateral, and 18% were bilateral. Sixty-four TAPP and 47 TEP repairs were performed. Follow-up time (months, mean \pm standard deviation) (range) was 14.2 ± 10 (1–37). About 42.3% of the hernias were direct, 49.5% were indirect, and 8.1% were pantaloon hernias. The recurrence rate was 1.8%. The operation time was significantly lower in the TEP than in TAPP (64.4 ± 23.5 , 96.7 ± 31.9 , respectively, $P < 0.001$). TAPP was preferred in patients with larger hernia orifices ($P = 0.01$). The two groups had no significant difference regarding postoperative complications and recurrence rate.

CONCLUSION: Our study did not detect any significant difference between TAPP and TEP repair regarding recurrence rate and postoperative complication. Laparoscopic inguinal hernia repair, which has advantages such as short hospital stay and less pain, can be safely performed in a secondary-care hospital.

Keywords:

Inguinal hernia, laparoscopic surgery, TAPP, TEP

Introduction

The incidence of inguinal hernia is 27%–43% in males and 3%–6% in women during the course of a lifetime. Since inguinal hernias are mostly treated surgically, inguinal hernia repair is one of the most often done surgeries globally. It is taking up an important place in general surgery practice.^[1-7]

The optimal approach for hernia repair should be simple, quick, and secure, with minimal postoperative pain and low recurrence rates. Compared to open hernia surgery, laparoscopic repair has the advantages of less pain, better cosmetic results, and shorter recovery time. However, problems such as relapse and chronic pain may occur after both techniques. The most commonly used laparoscopic procedures for inguinal hernia repair are transabdominal

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preperitoneal (TAPP) and total extraperitoneal (TEP) repair. Many studies have been done to facilitate the choice between the two procedures, but efforts continue to find the ideal method.^[1-6]

This study aimed to analyze the results of TAPP and TEP inguinal hernia repairs performed by two authors and to compare two laparoscopic methods.

Materials and Methods

In this retrospective research, data from the General Surgery Clinic of Istanbul Sultanbeyli State Hospital patients who underwent inguinal hernia repair between December 2019 and December 2022 were evaluated.

This study was performed in line with the principles of the Declaration of Helsinki. The University of Health Sciences, Sancaktepe Şehit Prof. Dr. İlhan Varank Training and Research Hospital Scientific Research Ethics Committee approved this study (Number: 2023/21).

Patients who underwent elective laparoscopic surgery were included in this study. Excluded from the research were patients with open surgery, emergency surgery, conversion from laparoscopic to open hernia repair, patients under 18 years of age, and those with incomplete data.

Demographic data, American Society of Anesthesiologists (ASA) scores, comorbidities, hernia side (right, left, and bilateral), hernia type (direct, indirect, and pantaloon), primary or recurrent hernia situation, size of hernia orifice, operation type (TAPP, TEP), postoperative complications (seroma, scrotal edema, skin ecchymosis, chronic pain), duration of operation, length of hospital stay, postoperative recurrence, and follow-up time were examined.

The European Hernia Society Groin Hernia Classification was used for hernia classification.^[8] Patient follow-up information until January 2023 was collected with outpatient clinic visits and phone interviews.

TEP and TAPP are two standard techniques for laparoscopic repair, and it is unclear which approach is better. Therefore, the patients were divided into these two groups.^[9] The clinic characteristics, perioperative, and postoperative results of the TAPP and TEP groups were compared.

Chronic postoperative inguinal pain was described as annoying mild discomfort disrupting daily activities lasting at least three months postoperatively and diminishing over time.^[1]

Laparoscopic TAPP and TEP repairs were performed according to the standard technique.^[7,10,11] A 10 cm × 15 cm

polypropylene mesh has been used in all procedures. Two young surgeons with under 5 years of expertise performed all operations. All patients received an antibiotic (intravenous infusion of 2 g of cefazolin) for prophylaxis before surgery.

This study's primary objective was to evaluate our laparoscopic inguinal hernia repair outcomes and compare the TEP and TAPP methods.

Statistical analysis

We conducted the statistical analysis using the Statistical Package for Social Sciences version 25.0 (IBM Corp., Armonk, New York). The descriptive values for continuous variables were the mean and standard deviation. The frequency statistic was used for categorical variables. The Kolmogorov–Smirnov test was used to examine the homogeneity of the data. The Student's *t*-test was used to compare two groups during data processing. Using the chi-square test, categorical variables were compared. The acceptable confidence interval for statistical significance is 95%, and the bilateral *P*-value 0.05.

Results

Between 2019 and 2022, 887 patients underwent inguinal hernia surgery in our clinic. After the exclusion of 755 patients with open inguinal hernia surgery, 12 patients who were operated on by converted from laparoscopic to open, 5 patients under the age of 18, 2 patients with missing data, and 2 patients who required emergency laparoscopic surgery were also excluded. Analysis was conducted on 111 patients who underwent elective laparoscopic inguinal hernia repair.

Of the patients, 106 (95.5%) were male, 5 (4.5%) were female, and the mean age was 49.4 ± 13 years. About 82% of hernias were unilateral, and 18% were bilateral. About 38.7% of patients had comorbidity. Thirteen patients had hypertension, 10 had benign prostatic hyperplasia, 6 had type 2 diabetes, 3 had chronic obstructive pulmonary disease, 2 had asthma, and 9 had other comorbidities (Parkinson's disease, depression, hypothyroidism, and glaucoma). Ninety-six patients were operated on for primary hernia and 15 for recurrent hernia. Details are given in Table 1.

Patients were divided into TAPP and TEP repair groups according to the type of operation. TAPP repair was performed in 64 of 111 patients, and TEP repair was performed in 47 patients. The mean operative time was 77.5 ± 30.1 min in unilateral repair and 108.2 ± 33 min in bilateral repair. Follow-up time [months, mean ± standard deviation (SD)] (range) was 14.2 ± 10 (1–37). Forty-seven (42.3%) of the hernias were direct, 55 (49.5%)

Table 1: Characteristics of the patients who underwent laparoscopic hernia repair

Parameters		N = 111	Percent
Age (years, mean ± SD)		49.4 ± 13	
Sex	Female	5	4.5
	Male	106	95.5
American Society of Anesthesiologists Score	I	65	58.6
	II	46	41.4
Comorbidity	Present	43	38.7
	Absent	68	61.3
Hernia	Primary	96	86.5
	Recurrent	15	13.5
Hernia side	Right	56	50.5
	Left	35	31.5
	Bilateral	20	18
Size of hernia orifice (1 finger = 1.5 cm)	I (≤1 finger)	41	37
	II (1–2 fingers)	45	40.5
	III (≥3 fingers)	25	22.5

Table 2: Perioperative parameters of the patients

Parameters		N = 111	Percent
Operation type	TAPP	64	57.7
	TEP	47	42.3
Seroma	Absent	85	76.6
	Present	26	23.4
Scrotal edema	Absent	102	91.9
	Present	9	8.1
Skin ecchymosis	Absent	100	90.1
	Present	11	9.9
Chronic pain	Absent	104	93.7
	Present	7	6.3
Recurrence	Absent	109	98.2
	Present	2	1.8
Hernia type	Direct	47	42.3
	Indirect	55	49.5
	Pantaloon	9	8.1
Duration of operation (min, mean ± SD)	Unilateral	77.5 ± 30.1	
	Bilateral	108.2 ± 33	
Follow-up time (months, mean ± SD) (range)		14.2 ± 10 (1–37)	
Length of hospital stay	1 day	104	93.7
	2 days	5	4.5
	3 days	2	1.8

were indirect, and 9 (8.1%) were pantaloon hernias. The recurrence rate was found to be 1.8% in all patients. The length of hospitalization for the majority of patients was 1 day. Detailed information about postoperative complications is given in Table 2.

In comparing the TAPP and TEP groups, there was no statistically significant difference between the two groups in terms of mean age ($P = 0.58$). The operation time was found to be significantly lower in the TEP group than in the TAPP group (64.4 ± 23.5 , 96.7 ± 31.9 , respectively, $P < 0.001$). When the TAPP and TEP

groups were compared regarding the size of the hernia orifice, a significant difference was observed between the two groups. TAPP was preferred in patients with larger size of hernia orifices ($P = 0.01$). There was no significant difference between the two groups regarding postoperative complications and recurrence rate. The comparison between the two groups is shown in Table 3.

Discussion

Several procedures have been described so far for inguinal hernia repair, strongly suggesting that there is no “best method of repair.” However, studies continue to search for a better method for patients, and minimally invasive procedures are available now. Although the use of TAPP and TEP procedures is on the rise, open mesh repair (mostly the Lichtenstein repair) is still the most common procedure. Laparoendoscopic inguinal hernia repair has advantages such as low recurrence rates and superiority to open surgery in terms of all parameters related to pain. Despite these advantages, however, the worldwide penetration rate of TAPP/TEP varies from 1% to 80%, depending on the country concerned, and the penetration rate remains low in most countries.^[1,7] As laparoscopic surgery becomes more accessible, laparoscopic inguinal hernia repair is performed at secondary-care hospitals in our country.^[12–14]

A meta-analysis comparing the short-term results of open, TAPP, TEP, and robotic-TAPP approaches for primary unilateral inguinal hernia repair: There was no significant difference in terms of postoperative hematoma, seroma, chronic pain, and early recurrence. Similarly, there was no difference in postoperative surgical site infection, urinary retention, and postoperative hospital stay.^[15]

A review comparing randomized controlled trials of TEP and laparoscopic TAPP hernioplasty showed that TEP and TAPP appeared comparable regarding hernia recurrence and chronic pain.^[16] In our study, there was no significant difference between the two methods regarding postoperative complications and recurrence rate, and this result was consistent with the literature.^[15–17]

In a study comparing the long-term results of the TAPP and TEP methods, significantly higher acute pain was detected following TAPP repair. In contrast, chronic inguinal pain was observed at similar rates in both TEP and TAPP methods. Preoperative and immediate postoperative pain correlated significantly with chronic inguinal pain.^[5] In our study, we could not make this evaluation in patients with chronic pain since early postoperative pain records were not available.

The International Endohernia Society guidelines state that TAPP has a longer hospital stay compared to TEP.^[9] However, there are publications stating that there is

Table 3: Comparison of the patients according to the type of hernia repair

Parameters		TAPP n = 64 (%)	TEP n = 47 (%)	P-value
Age (years, mean ± SD)		48.8±13.5	50.1±12.3	0.58
Duration of operation (min, mean ± SD)		96.7±31.9	64.4±23.5	<0.001
Length of hospital stay (days, mean ± SD)		1.14±0.7	1.09±0.3	0.64
American Society of Anesthesiologists Score	I	37 (57.8)	28 (59.6)	0.85
	II	27 (42.2)	19 (40.4)	
Size of hernia orifice (1 finger = 1.5 cm)	I (≤1 finger)	21 (32.8)	20 (42.5)	0.01
	II (1–2 fingers)	22 (34.4)	23 (49)	
	III (≥3 fingers)	21 (32.8)	4 (8.5)	
Seroma	Present	13 (20.3)	13 (27.7)	0.49
	Absent	51 (79.7)	34 (72.3)	
Skin ecchymosis	Present	4 (6.2)	7 (14.9)	0.23
	Absent	60 (93.8)	40 (85.1)	
Scrotal edema	Present	6 (9.4)	3 (6.4)	0.82
	Absent	58 (90.6)	44 (93.6)	
Chronic pain	Present	4 (6.2)	3 (6.4)	0.63
	Absent	60 (93.8)	44 (93.6)	

TAPP: transabdominal preperitoneal, TEP: total extraperitoneal

no difference.^[5,16] Our result showed no statistically significant difference between the two techniques regarding the length of hospital stay.

According to guideline recommendations, we chose the TEP technique in male patients with a large scrotal or irreducible hernia and potential bilateral hernia (occult hernia problem).^[1] In other cases, the surgeon independently decided between TAPP and TEP. In our results, it was determined that TAPP was chosen in patients with larger hernia sizes.

In literature reviews, no difference was found between the two methods regarding operation time.^[2,16,18,19] However, there are studies showing a significant difference in favor of TAPP or TEP in terms of operation time between the two techniques.^[5,13,20,21] Many factors affect the duration of the operation, such as surgeon experience, expertise, variety in technical skills, hospital size, and learning curve.^[16] Our results detected a significantly shorter operation time in the TEP method.

This research has several limitations. It is a low-volume study performed in a single center. Owing to the study's retrospective methodology, early postoperative pain assessment could not be performed. The follow-up period of the patients was short. Since our center is a secondary-care hospital, our patient group consists of ASA 1 and 2 patients, which may have resulted in fewer postoperative complications.

Conclusions

Our study did not detect any significant difference between TAPP and TEP repair regarding recurrence rate and postoperative complication. Laparoscopic inguinal hernia repair, which has advantages such as short

hospital stay and less pain, can be safely performed in a secondary-care hospital.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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