

# Comparison of Transabdominal Preperitoneal (TAPP) and Total Extraperitoneal (TEP) Methods in Adult Inguinal Hernia Repair at a Secondary-Level State Hospital: A Retrospective Cohort Study

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## ABSTRACT

**Objective:** Inguinal hernia repair is the most common procedure performed by general surgeons. According to the European Hernia Society (EHS) guidelines, the Lichtenstein procedure is recommended as the standard approach for open repair, while TAPP and TEP procedures are routinely employed for laparoscopic inguinal hernia repair.

**Materials and Methods:** Between January 2017 and August 2024, patients diagnosed with inguinal hernia who underwent laparoscopic hernia repair in our general surgery department were included in the study. The patients' preoperative, intraoperative, and postoperative findings were compared.

**Results:** A total of 310 patients were included in the study. TAPP repair was performed in 89 patients (28.7%), while TEP repair was performed in 221 patients (71.3%). The mean operative time was 74 (±27) minutes in the TAPP group and 60 (±23) minutes in the TEP group, with the TEP group showing a significantly shorter operative time. The length of hospital stay was similar between the two groups. No statistically significant difference was found in the overall morbidity rates. Chronic pain was observed in 7.9% of patients in the TAPP group compared to 2.3% in the TEP group, a difference that was statistically significant ( $p=0.021$ ).

**Conclusion:** Differences in intraoperative and postoperative complication rates, recurrence rates, and length of hospital stay are observed between the TAPP and TEP techniques. It was found that the TAPP technique is associated with a longer operative time and a higher likelihood of chronic pain. For these reasons, we anticipate that surgeons will prefer the TEP technique despite its steep learning curve.

**Keywords:** Inguinal hernia, herniorrhaphy, laparoscopic surgery, TAPP, TEP

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## INTRODUCTION

Inguinal hernia (IH) arises from a defect in the abdominal wall within the inguinal region, and its treatment involves surgical repair.<sup>[1]</sup> Globally, more than 20 million patients undergo elective repair for inguinal hernia each year.<sup>[2]</sup> General surgeons frequently perform inguinal hernia repair (IHR), making it one of their most common procedures. The open mesh technique is widely regarded as the standard method for inguinal repair. The advent of lapa-

roscopic hernia repair (LHR) in the early 1990s ushered in a new era for inguinal hernia surgery, with both the total extraperitoneal (TEP) and transabdominal preperitoneal (TAPP) techniques playing pivotal roles.<sup>[3]</sup>

Selecting the most appropriate technique for inguinal hernia repair is crucial. The ideal surgical method should be easy to learn, cost-effective, associated with a rapid recovery period, and have a low risk and incidence of complications. The choice of surgical technique is influenced by various factors,



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such as the hernia's specific features, the type of anesthesia, available resources, the surgeon's preference, training, and skills. Additionally, patient preferences should also be considered. Emotional factors, the surgeons themselves, and cultural variations across countries and regions may all influence the decision-making process.<sup>[4]</sup>

According to the European Hernia Society (EHS) guidelines, the Lichtenstein procedure is defined as the standard approach for open surgery, while the TAPP and TEP procedures are considered routine practices for laparoscopic hernia repair (LHR). Based on these guidelines, it has been concluded that, when performed by surgeons with sufficient experience, the Lichtenstein and laparoscopic techniques have comparable operative times, rates of perioperative complications requiring reoperation, and recurrence rates. Studies have indicated that laparoscopic techniques provide benefits compared to the Lichtenstein procedure, notably in reducing both early and late postoperative pain and in facilitating a quicker return to normal activities or work. However, the steep learning curve of laparoscopic techniques has been emphasized.<sup>[5]</sup>

The two techniques used for LHR have certain advantages and disadvantages relative to each other. TAPP has the advantage of being easier to learn. However, its disadvantages include entry into the peritoneal cavity, a factor that heightens the likelihood of harming intra-abdominal organs and may lead to adhesion formation, potentially resulting in long-term bowel obstruction. The primary advantage of the TEP technique is that it avoids entry into the peritoneal cavity. However, its disadvantages include a steep learning curve and the risk of the preperitoneal dissection space becoming constricted due to unintended peritoneal tears.<sup>[6]</sup>

In this study, we aimed to compare the TAPP and TEP techniques, their outcomes, and associated complications in patients who received laparoscopic hernia repair (LHR) to treat inguinal hernia.

## MATERIALS and METHODS

### Study Population

Patients admitted to our general surgery department for inguinal hernia treatment between January 2017 and August 2024 were screened. Adult patients (aged 18 and above) who underwent elective laparoscopic hernia repair for inguinal hernia were enrolled in the study. Patients under 18 years old, individuals who underwent open surgery, those requiring emergency procedures, and cases with incomplete data were not included in the study. The patients' medical records

were retrospectively examined. Based on the laparoscopic hernia repair technique used, patients were categorized into two groups: one group comprised individuals who underwent TAPP, while the other included those who underwent TEP.

The demographic characteristics of the patients, comorbidities, history of heavy labor, body mass index (BMI), symptoms, history of previous abdominal surgery, ASA score (American Society of Anesthesiologists), Charlson Comorbidity Index (CCI), physical examination findings, hernia type, hernia laterality, surgical technique, type and size of the mesh used, fixation method, use of drains, conversion to conventional surgery, operation time, length of hospital stay, laboratory parameters, ultrasound and abdominal tomography findings, morbidity, and mortality status were recorded in a database created using Microsoft Excel 2010. The variables between the two groups were compared.

The study was conducted in accordance with the principles of the Helsinki Declaration. Approval from the Bakirkoy Dr. Sadi Konuk Training and Research Hospital ethics committee was obtained prior to the study (Date: 27/11/2024, Decision No: 2024-13-15).

### Surgical Technique

In the TAPP technique, a 10 mm camera trocar was inserted below the umbilicus, followed by the placement of two 5 mm trocars in the right and left lower quadrants under camera guidance. The peritoneum was incised between the symphysis pubis and the anterior superior iliac crest, and the preperitoneal space was dissected. After freeing the peritoneum laterally and medially under the guidance of the inferior epigastric vessels, the hernia sac was reduced, and a mesh was placed in the dissected space. The mesh was fixed with two tacks at the symphysis pubis and one at the lateral abdominal wall. Following confirmation of proper placement, the peritoneal opening was closed. The trocars were removed, and the umbilical fascia was sutured for closure.

In the TEP technique, a subumbilical incision was made, and the anterior fascia of the rectus muscle on the hernia side was opened. The rectus muscle was lateralized, and access to the preperitoneal space was obtained anterior to the posterior fascia of the rectus muscle. A balloon trocar was introduced, and two 5 mm trocars were placed in the suprapubic region. Under the guidance of the inferior epigastric vessels, lateral and medial dissection was performed to expose the area between the symphysis pubis and the anterior superior iliac crest. The hernia sac was then reduced, and a mesh was placed in the dissected space. The mesh was fixed with two

tacks at the symphysis pubis. After confirming proper placement, the trocars were removed, and the anterior fascia of the rectus muscle was sutured for closure.

### Statistical Analysis

Descriptive statistics were summarized using the mean, standard deviation, median, minimum, maximum, frequency, and percentage values. Variable distributions were evaluated with the Kolmogorov-Smirnov and Shapiro-Wilk tests. For normally distributed quantitative variables, the independent samples t-test was applied, while the Mann-Whitney U test was used for those that were not normally distributed. Categorical variables were analyzed using the chi-square test, with Fisher's exact test employed if chi-square assumptions were not met. All statistical analyses were conducted using SPSS version 28.0.

## RESULTS

Between January 2017 and August 2024, our general surgery department performed inguinal hernia surgeries on a total of 310 patients, all of whom were included in the study. The patients had an average age of 47 years, with a standard deviation of 12 years. Females represented 9.4% of the patient population, while males accounted for 90.6%. The calculated average BMI among the patients was 26, with a standard deviation of 3. The average duration of symptoms was 10 ( $\pm$  16) months. According to the ASA classification, 274 patients (88.4%) were classified as ASA I, while 36 patients (11.6%) were classified as ASA II. A substantial proportion of patients engaged in light labor. A history of prior abdominal surgery was present in 4.2% of the patients. Right-sided inguinal hernia was addressed surgically in 42.6% of patients, left-sided in 32.9%, and bilateral in 24.5%. Among the study groups, 89 patients (28.7%) underwent the TAPP procedure, while 221 patients (71.3%) underwent the TEP procedure. Table 1 provides an overview of the patients' demographic characteristics.

Ultrasonography was performed in 107 patients (34.5%), and the mean hernia defect diameter in these patients was 13 ( $\pm$ 8 mm). Abdominal computed tomography scanning was performed on just 2 patients.

Patients in the TEP group exhibited a significantly higher average age than those in the TAPP group ( $p < 0.05$ ). Likewise, the TEP group comprised a significantly larger percentage of male patients compared to the TAPP group ( $p < 0.05$ ) (Fig. 1). BMI measurements were comparable between the TAPP and TEP groups ( $p > 0.05$ ). Laboratory values did not differ significantly between the two groups. Direct inguinal hernias were more prevalent among patients in the TAPP group,

while those in the TEP group more frequently presented with indirect inguinal hernias. Recurrent hernia repair was conducted in 6.7% of patients in the TAPP group and 5.4% in the TEP group. In the TAPP group, bilateral hernia repair was carried out in 30.3% of patients, compared to 22.2% in the TEP group. The differences in general characteristics between the two groups are presented in Table 2.

General anesthesia was administered in every case. Among the patients, 89 underwent the TAPP procedure, whereas 221 received TEP. A peritoneal tear developed in two patients from the TEP group; in one case, conversion to open surgery was necessary, while the other procedure was completed entirely using the laparoscopic approach. In the TAPP group, no transition to an open surgical approach or to the TEP technique occurred. The mean operative time was 74 ( $\pm$ 27) minutes in the TAPP group and 60 ( $\pm$ 23) minutes in the TEP group, with a significantly shorter operative time in the TEP group ( $p < 0.05$ ). While no patients in the TAPP group required a drain, 22.6% of the TEP group had drains placed, with a significantly higher drain usage rate in the TEP group ( $p < 0.05$ ). Larger 15 $\times$ 15 cm meshes were predominantly used in the TAPP group, whereas 10 $\times$ 15 cm meshes were more frequently used in the TEP group. The use of metal tacks for mesh fixation was 2.2% in the TAPP group and 28.8% in the TEP group, with a significantly higher metal tacker usage in the TEP group ( $p < 0.05$ ). Hospital stay durations were similar between the two groups. Postoperative morbidities included incisional hernia, recurrence, chronic pain, scrotal edema, testicular ischemia, and decreased libido. Overall morbidity rates did not differ significantly between the two groups. Chronic pain was reported in 7.9% of patients undergoing TAPP, compared with 2.3% among those treated with TEP. Chronic pain was significantly more prevalent among patients who underwent TAPP ( $p = 0.021$ ) (Fig. 2). Major intraoperative complications such as vascular injury, bladder injury, and hollow organ injury were not observed. No mortality was observed in any patient. Table 3 displays a comparison of intraoperative findings and postoperative morbidity between the two groups. Additionally, one patient in the TAPP group underwent a cholecystectomy, and another patient underwent an appendectomy.

## DISCUSSION

Ger and colleagues were the first to describe the minimally invasive method for hernia repair. Today, the two primary laparoscopic approaches utilized for inguinal hernia repair are the TAPP and TEP methods. Relative to the conventional open technique, both TAPP and TEP repairs are linked to sig-

**Table 1. Demographic characteristics of the study patients**

	Min-max	Median	Mean±SD	n	%
Age	19.0–79.0	47.0	47.5±12.8		
Gender					
Female				29	9.4
Male				281	90.6
BMI	17.6–37.1	25.8	26.2±3.1		
Symptoms					
Pain				30	9.7
Swelling				99	31.9
Pain+swelling				181	58.4
Symptom duration (months)	1.0–120.0	6.0	10.5±16.3		
ASA					
I				274	88.4
II				36	11.6
CCI Score	0.00–4.00	0.00	0.75±0.98		
Smoking status					
(–)				224	72.3
(+)				86	27.7
Alcohol consumption					
(–)				285	91.9
(+)				25	8.1
Occupation type					
Heavy Labor				56	18.1
Desk Job				254	81.9
Comorbidities					
(–)				272	87.7
(+)				38	12.3
History of abdominal surgery					
(–)				297	95.8
(+)				13	4.2
Anticoagulant use					
(–)				297	95.8
(+)				13	4.2

SD: Standard deviation; BMI: Body mass index; ASA: American society of anesthesiologist

nificantly less early postoperative pain, a more rapid return to work and activities, and reduced rates of chronic pain, hematoma, and wound infection.<sup>[3,6]</sup> Due to the steep learning curve associated with endoscopic repairs and the requirement for a more costly infrastructure, a large number of hernia repairs are still performed using the open technique. Despite several obstacles, laparoscopic repair is becoming the preferred approach, particularly for bilateral and recurrent hernias.<sup>[6]</sup> This study compared the clinical outcomes of the TAPP and TEP techniques.

In studies comparing the TAPP and TEP techniques, no consensus has been reached regarding operative time outcomes. In many studies, no significant differences in operative times were observed between the two techniques.<sup>[2,7,8]</sup> However, previous research indicates that the operative time for the TEP technique is significantly longer than that for the TAPP technique. In the study by Dokania et al.,<sup>[6]</sup> the operative time ranged from 80 to 130 minutes in the TEP group and from 70 to 110 minutes in the TAPP group. The median operative time was 90 minutes in the TEP group and 85 minutes in the TAPP

Table 2. Comparison of general characteristics between TAPP and TEP groups

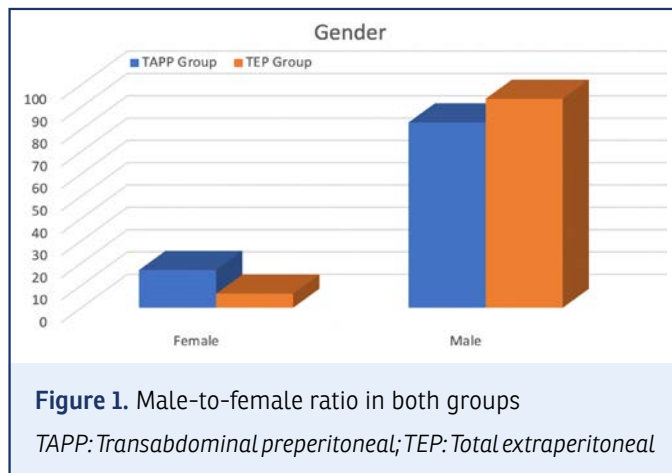
	TAPP group (n=89)				TEP Group (n=221)				p
	Mean±SD	n	%	Median	Mean±SD	n	%	Median	
Age	44.5±11.8			45.0	48.7±13.1			49.0	0.010 <sup>a</sup>
Gender									
Female		15	16.9			14	6.3		0.004 <sup>c</sup>
Male		74	83.1			207	93.7		
BMI	26.3±3.1			25.6	26.1±3.1			26.1	0.696 <sup>a</sup>
Symptom duration (months)	10.2±15.0			6.0	10.7±16.9			5.0	0.112 <sup>b</sup>
ASA score									
I		80	89.9			194	87.8		0.601 <sup>c</sup>
II		9	10.1			27	12.2		
CCI score	0.55±0.74			0.00	0.84±1.05			0.00	0.068 <sup>b</sup>
History of abdominal surgery									
(-)		84	94.4			213	96.4		0.427 <sup>c</sup>
(+)		5	5.6			8	3.6		
Anticoagulant use									
(-)		85	95.5			212	95.9		0.867 <sup>c</sup>
(+)		4	4.5			9	4.1		
Laboratory values									
Leukocyte	7.9±1.7			7.8	7.9±2.1			7.5	0.694 <sup>b</sup>
CRP	3.4±5.1			1.6	2.4±2.3			1.2	0.472 <sup>b</sup>
Hernia side									
Right		31	34.8			101	45.7		0.151 <sup>c</sup>
Left		31	34.8			71	32.1		0.614 <sup>c</sup>
Bilateral		27	30.3			49	22.2		0.279 <sup>c</sup>
Hernia type									
Femoral		2	2.2			1	0.5		0.258 <sup>c</sup>
Direct		66	74.2			46	20.8		0.000 <sup>c</sup>
Indirect		21	23.6			174	78.7		0.000 <sup>c</sup>
Recurrence									
(-)		83	93.3			209	94.6		0.655 <sup>c</sup>
(+)		6	6.7			12	5.4		

<sup>a</sup>: Independent samples t-test; <sup>b</sup>: Mann-Whitney U test; <sup>c</sup>: Chi-square test (Fisher test). SD: Standard deviation; TAPP: Transabdominal preperitoneal; TEP: Total extraperitoneal; BMI: Body mass index; ASA: American society of anesthesiologist; CCI: Comorbidity index; CRP: C-reactive protein

group, with TEP showing a significantly longer operative time compared to TAPP. In the study by Gass et al.,<sup>[9]</sup> which evaluated 1,309 patients, the operative time was 80.3 minutes for TEP and 73 minutes for TAPP, with longer operative times observed in patients undergoing TEP. In another study by Gass et al.<sup>[10]</sup> that included 4,552 patients, operative times were 66.6 minutes for TEP and 59.0 minutes for TAPP, again showing a longer operative time in the TEP group. In the study by Jaiswal et al.,<sup>[11]</sup> the operative time was 89.2 minutes

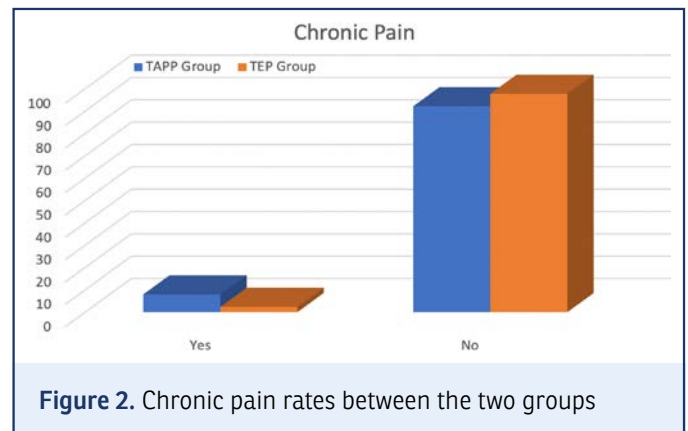
in the TEP group versus 74.4 minutes in the TAPP group, with the TEP group having a significantly longer operative time.

Conversely, some research has reported that the operative time for the TAPP technique is significantly longer than that for the TEP technique. In the study by Goksoy et al.,<sup>[12]</sup> which evaluated 301 patients, the mean operative time was 67 minutes in the TAPP group compared to 58 minutes in the TEP group, with a significantly longer operative time in the TAPP group. In Cao et al's<sup>[13]</sup> study involving 686 patients, opera-



tive times were found to be significantly longer in the TAPP group. In the study by Köckerling et al.,<sup>[14]</sup> the operative time was 49.7 minutes for the TAPP technique and 45.8 minutes for the TEP technique, with the TAPP technique having a significantly longer operative time. In our study, the mean operative time was calculated as 74 ( $\pm 27$ ) minutes (median: 70.0 minutes) in the TAPP group and 60 ( $\pm 23$ ) minutes (median: 60.0 minutes) in the TEP group, with the operative time being significantly shorter in the TEP group.

Compared to the risk of conversion from TAPP to open surgery, the risk of requiring a switch from TEP to either TAPP or open surgery may be higher.<sup>[15]</sup> During TEP procedures, issues like peritoneal layer opening, bleeding, and adhesions may prompt conversion to either TAPP or an open repair approach.<sup>[2]</sup> In Dokania et al.<sup>[6]</sup>'s study, one patient from both the TEP and TAPP groups required conversion to open surgery, with the difference between groups lacking statistical significance. In the study by Goksoy et al.,<sup>[12]</sup> the conversion rates in both the TAPP and TEP groups were 6%, with no significant difference between them. In the study by Jaiswal et al.,<sup>[11]</sup> conversion to open surgery occurred in three cases (6.7%) in the TEP group, whereas no conversion occurred in the TAPP group. In the study by Gass et al.,<sup>[10]</sup> the conversion rate was 1.0% in the TEP group compared to 0.2% in the TAPP group, a difference that was statistically significant. Conversely, in the study by Ozel et al.,<sup>[4]</sup> 10% of patients in the TEP group were converted to open surgery and 18% to the TAPP method, while no conversion was required in the TAPP group. In our study, a peritoneal tear developed in two patients in the TEP group, with one patient undergoing conversion to open surgery while the other patient's procedure was completed using the TEP technique. Within the TAPP group, there were no instances requiring a switch to an open approach or to the TEP technique.



In terms of intraoperative and postoperative complication outcomes, studies have reported varying results. In the study by Dokania et al.,<sup>[6]</sup> no intraoperative visceral or vascular injuries were observed, and neither postoperative port site hernias nor recurrent wound infections were detected. The incidences of hematoma, seroma, and scrotal edema did not reach statistical significance. Hung et al.,<sup>[16]</sup> in their systematic review of 14 studies, analyzed seroma formation, edema, hematoma, intraoperative injuries, urinary retention, epigastric vessel bleeding, and wound infection. They found that seroma formation was higher in the TEP group, whereas scrotal edema was lower. The other complications showed no statistically significant variations.<sup>[16]</sup> Similarly, in the systematic review by Aiolfi et al.,<sup>[2]</sup> which included 15 studies, postoperative complications were found to be comparable across the two approaches. Almutairi et al.<sup>[17]</sup> also reported that the TAPP and TEP techniques yielded comparable outcomes regarding inguinoscrotal numbness or burning, hematoma, seroma, scrotal swelling, spermatic cord edema, wound infection, and urinary complaints. In a systematic review by Andersen et al.,<sup>[15]</sup> which included 23 studies and evaluated 2,266 patients, the complication outcomes were similar for both the TAPP and TEP groups. Goksoy et al.<sup>[12]</sup> observed similar rates of both intraoperative and postoperative complications for the two techniques. Wei et al.<sup>[8]</sup> reported comparable complication rates between the two techniques. Conversely, in the study by Köckerling et al.,<sup>[14]</sup> although no difference was found in intraoperative complications between the TAPP and TEP techniques, postoperative complications were markedly elevated among TAPP patients, a difference attributed to a higher seroma rate. Cao et al.<sup>[13]</sup> observed that the rates of incision infection, seroma, postoperative fever, postoperative bleeding, chronic pain, urosepsis, and other related complications were statistically similar between the TAPP and TEP techniques. In the study

**Table 3. Comparison of surgical findings and postoperative morbidity between TAPP and TEP groups**

	TAPP Group (n=89)				TEP Group (n=221)				p
	Mean±SD	n	%	Median	Mean±SD	n	%	Median	
Peritoneal tear									
(-)						219	99.0		1.000 <sup>b</sup>
(+)						2	1.0		
Conversion to open surgery									
(-)		89				220	99.5		1.000 <sup>b</sup>
(+)		0				1	0.5		
Operative time (minutes)	74.0±27.2			70.0	60.6±23.9		60.0		0.000 <sup>a</sup>
Drain placement									
(-)		89	100.0			171	77.4		0.000 <sup>b</sup>
(+)		0	0.0			50	22.6		
Mesh type									
Prolene		89	100.0			219	99.0		1.000 <sup>b</sup>
3D		0	0.0			2	1.0		
Mesh size (cm)									
10*15		5	5.6			161	72.9		0.000 <sup>b</sup>
12*15		1	1.1			35	15.8		
15*15		83	93.3			25	11.3		
Fixation									
Absorbable tacker		87	98.9			164	74.2		0.000 <sup>b</sup>
Metal tacker		1	1.1			57	25.8		
Chronic Pain									
(-)		82	92.1			216	97.7		0.021 <sup>b</sup>
(+)		7	7.9			5	2.3		
Morbidity									
None		77	86.5			201	91.0		0.246 <sup>b</sup>
Incisional hernia		1	1.1			2	0.9		
Scrotal edema		1	1.1			4	1.8		
Chronic pain		5	5.6			2	0.9		
Recurrence		4	4.5			11	5.0		
Testicular ischemia		1	1.1			0	0.0		
Decreased libido		0	0.0			1	0.5		
Length of hospital stay (days)	1.96±0.21			2.00	1.96±0.35			2.00	0.864 <sup>a</sup>

<sup>a</sup>: Mann-Whitney U test; <sup>b</sup>: Chi-square test (Fisher's exact test where applicable). SD: Standard deviation; TAPP: Transabdominal preperitoneal; TEP: Total extraperitoneal

by Gass et al.<sup>[9]</sup> evaluating patients with recurrent inguinal hernias, the TEP group exhibited a significantly elevated intraoperative complication rate (6.3%) compared to the TAPP group (2.8%,  $p=0.0225$ ), while postoperative complications were comparable. In another study by Gass et al.,<sup>[10]</sup> both intraoperative and postoperative complications occurred at a significantly greater frequency in the TEP group. Ozel et al.<sup>[4]</sup> similarly reported a higher postoperative complication rate

in the TEP group. In our study, no intraoperative complications were observed in any patient. Regarding postoperative complications, outcomes were statistically similar between the two approaches.

Inguinal hernia recurrence after repair is one of the significant postoperative complications. Studies have shown no differences between the TAPP and TEP techniques in terms

of recurrence.<sup>[2,8,12-18]</sup> Our study revealed recurrence rates of 4.5% for the TAPP group and 5.0% for the TEP group. Recurrence rates were similar between the groups, a finding that aligns with the existing literature.

Pain lasting longer than 3 months after inguinal hernia surgery is defined as chronic pain. Most studies have not identified any significant differences in chronic pain between the TAPP and TEP approaches.<sup>[2,7,13-15,17]</sup> In our study, 7.9% of patients in the TAPP group experienced chronic pain, compared to 2.3% in the TEP group. Chronic pain was found to be significantly higher in TAPP patients ( $p=0.021$ ).

Study outcomes regarding hospital stay vary. Some studies have reported that the duration of hospital stay is similar for both TAPP and TEP procedures.<sup>[2,8,13,18]</sup> In other studies, however, patients undergoing the TAPP technique were found to have longer hospital stays than those undergoing the TEP technique.<sup>[1,6,9,10,14]</sup> In the study by Ozel et al.,<sup>[4]</sup> patients in the TEP group experienced a longer hospital stay.

## CONCLUSION

The TAPP and TEP techniques are effective and reliable methods in the treatment of adult inguinal hernia. Similar intraoperative and postoperative complication rates, recurrence rates, and lengths of hospital stay have been observed. It should be noted that the operative time may be longer in the TAPP technique because extra time is required for opening and closing the peritoneum. The use of a tacker for peritoneal closure may also increase the risk of chronic pain. Moreover, entry into the abdominal cavity, the possibility of organ injury, and the potential for adhesion formation are disadvantages that cannot be overlooked. For these reasons, we predict that surgeons will prefer the TEP technique despite its steep learning curve.

## Disclosures

**Ethics Committee Approval:** The study was approved by the Bakirkoy Dr. Sadi Konuk Training and Research Hospital Ethics Committee (No: 2024-13-15, Date: 27/11/2024).

**Authorship Contributions:** Concept: N.Ş., U.M.Y.; Design: N.Ş., U.M.Y.; Supervision: N.Ş., U.M.Y.; Funding: N.Ş., U.M.Y.; Materials: N.Ş., U.M.Y.; Data Collection or Processing: N.Ş., U.M.Y.; Analysis or Interpretation: N.Ş., U.M.Y.; Literature Search: N.Ş., U.M.Y.; Writing: N.Ş., U.M.Y.; Critical review: N.Ş., U.M.Y.

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**Informed Consent:** Written informed consent was obtained from all patients.

**Use of AI for Writing Assistance:** Artificial intelligence-assisted technologies were not used in our study.

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