

Three-Year Single-Center Retrospective Comparison of Total Extraperitoneal Versus Transabdominal Preperitoneal Approach Laparoscopic Groin Hernia Repair: Postoperative Complications and Operative Performance

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AIM: This single-center study aimed to evaluate the postoperative complications and operative performance of the total extraperitoneal (TEP) and transabdominal preperitoneal (TAPP) techniques used in laparoscopic groin hernia repair.

METHODS: A total of 511 patients who underwent laparoscopic groin hernia repair between January 2022 and January 2025 were screened for eligibility, and 116 patients who did not meet the eligibility criteria were excluded. Patients were divided into the TEP (n = 291) and TAPP (n = 104) groups. The primary endpoint was the comparison of postoperative complication rates between the TEP and TAPP groups according to the Clavien–Dindo classification. The secondary endpoint was defined as a comparison of the operative time between the groups.

RESULTS: Significant differences in terms of age and American Society of Anesthesiologists (ASA) score were observed between the groups ($p < 0.001$ and $p = 0.003$, respectively), whereas no significant differences were found regarding sex, prior open hernia repair (recurrent hernia), preoperative symptom type, or hernia localization ($p = 0.172$, $p = 0.059$, $p = 0.726$, and $p = 0.062$, respectively). The distribution of hernia types was comparable between the groups ($p = 0.957$), whereas the operative time was significantly shorter in the TEP group ($p < 0.001$). The Clavien–Dindo classification indicated no significant differences in postoperative complication rates between the groups ($p = 0.545$). Grade $\geq$ IIIA complications were observed at low rates for both groups, and all grade IIIB events corresponded to recurrence cases. All recurrences were reoperated using open surgical repair.

CONCLUSIONS: In our single-center experience, TEP and TAPP techniques demonstrated similar safety profiles in terms of postoperative complications. Operative time was shorter with the TEP technique, whereas complication rates were low in both approaches. Multicenter prospective studies are required to validate these findings and enhance generalizability.

Keywords: groin hernia; laparoscopy; total extraperitoneal; transabdominal preperitoneal; postoperative complications; operative time

Introduction

Groin hernias are one of the most prevalent surgical disorders globally, especially within the adult male demographic [1]. Each year, millions of patients require surgical treatment for this condition, which can substantially impair their quality of life. With advances in surgical techniques, minimally invasive approaches have become increasingly preferred for groin hernia repair [2]. In this context, laparoscopic approaches have attracted attention because of their favorable early postoperative recovery and low complication rates [3].

Transabdominal preperitoneal (TAPP) and total extraperi-

toneal (TEP) repairs are prevalent laparoscopic methods, with their efficacy and safety substantiated by several studies [4,5,6]. However, debate is ongoing regarding the comparative advantages of these two techniques in terms of operative efficiency, postoperative complications, and suitability for different patient populations [7,8,9,10]. Most studies are either multicenter registries with heterogeneous surgical experience or randomized trials conducted over a decade ago. Contemporary real-world data from high-volume centers, particularly those using standardized complication reporting systems, such as the Clavien–Dindo classification, are still limited.

This study aimed to address this gap by providing a recent 3-year single-center experience from a tertiary care center in which TEP and TAPP were performed by experienced surgical teams using standardized techniques. Comparing postoperative complications graded according to the Clavien–Dindo classification and operative times between the two approaches offers updated insights into their relative safety and efficiency in routine clinical practice. The

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findings may assist surgeons in technique selection, particularly when managing patients with different risk profiles. These contemporary data may contribute to the ongoing discussion on optimal laparoscopic groin hernia repair strategies in the current era of personalized surgery.

Methods

This retrospective, single-center observational study was approved by the Scientific Research Ethics Committee of Antalya Training and Research Hospital (approval no. 2025-183). Adult patients who underwent laparoscopic groin hernia repair (TAPP or TEP) between January 2022 and January 2025 were retrospectively assessed. All study procedures adhered to the Declaration of Helsinki and applicable national ethical requirements.

Patients who underwent surgery for unilateral or bilateral groin hernia and had complete postoperative follow-up data were included. Conversely, patients with an groin hernia defect diameter >3 cm, those receiving anticoagulant therapy, and those with incomplete clinical records were excluded.

All procedures were performed by two experienced surgical teams with expertise in laparoscopic hernia surgeries. The recorded demographic characteristics of the included patients comprised age, sex, prior open hernia repair (recurrent hernia), American Society of Anesthesiologists (ASA) score, presenting symptoms, and hernia localization. Operative time, presence of intraoperative complications, and postoperative complications were analyzed using data obtained from the hospital record system, operative notes, and nursing observation forms through a structured patient information form. Operative time was calculated as the interval from the beginning of the skin incision to final closure. Postoperative complications were graded using the Clavien–Dindo system: grade I (minor deviation not requiring specific therapy), grade II (requiring pharmacological treatment), grade IIIA (requiring surgical, endoscopic, or radiological intervention without general anesthesia), grade IIIB (requiring surgical, endoscopic, or radiological intervention under general anesthesia), grade IV (life-threatening complication requiring intensive care), and grade V (death) [11]. Patients were followed up for a minimum of 12 months after surgery. Chronic groin pain was defined as pain persisting for at least 3 months after surgery and was identified based on postoperative follow-up records. Owing to the retrospective nature of the study, data on length of hospital stay, postoperative pain scores (visual analog scale), postoperative analgesic consumption, and time to return to normal daily activities or work were not consistently recorded and standardized and therefore could not be analyzed. All complications were retrospectively documented during postoperative follow-up.

Laparoscopic TAPP Repair Procedure

For groin hernia repair using the TAPP technique, the patient was positioned supine, and an optical trocar was inserted through the supraumbilical region using an open technique, followed by placement of two working trocars in the transverse plane under direct vision, with careful attention to the inferior epigastric vessels. A wide peritoneal flap was created to fully expose the myopectineal orifice of the inguinal canal. During dissection, Cooper's ligament, femoral orifice, iliopsoas fascia, and epigastric vessels were carefully identified; the hernia sac was dissected in appropriate planes, and parietalization was performed when necessary. Before mesh placement, an adequate preperitoneal space was prepared, a standard polypropylene mesh was fixed with absorbable tackers, and the procedure was completed by closing the peritoneal flap (Fig. 1A).

Laparoscopic TEP Repair Procedure

For groin hernia repair performed using the TEP technique, a small infraumbilical incision was made to access the anterior rectus sheath, and the rectus muscle was lateralized to allow trocar placement into the rectus space. The preperitoneal space was created with carbon dioxide insufflation, and the surgical field was assessed laparoscopically by advancing toward the pubic symphysis. Dissection was continued using two additional 5-mm trocars placed in the midline. The dissection exposed the preperitoneal fatty tissue, Cooper's ligament, Hesselbach's triangle, and iliac vessels. The hernia sac was carefully dissected, and the spermatic cord structures were parietalized. After completing the dissection, the prepared mesh was introduced through the trocar and deployed in the appropriate position. Following hemostatic control, carbon dioxide was evacuated, the fascia was closed, and skin sutures were completed to conclude the procedure. All procedures were performed in accordance with the Critical View of the Myopectineal Orifice criteria, which are based on the safe identification of critical anatomical structures (Fig. 1B) [12].

Statistical Analyses

Statistical analyses were conducted utilizing IBM SPSS Statistics version 27.0 (IBM Corp., Armonk, NY, USA). Normality assessment for the continuous variables was performed using the Shapiro–Wilk test. Given the non-normal distribution of the data, continuous variables are represented as median and interquartile range (IQR), with comparisons between the two independent groups being conducted via the Mann–Whitney U test. Categorical variables are delineated as numbers (n) and percentages (%) and were subjected to analysis utilizing the Pearson chi-square test or Fisher's exact test, as deemed appropriate. A threshold for significance was established at $p < 0.05$. Multivariate logistic regression analysis was used to determine the independent effects of factors associated with postoperative complications. In the regression analysis, odds ratios (ORs) and

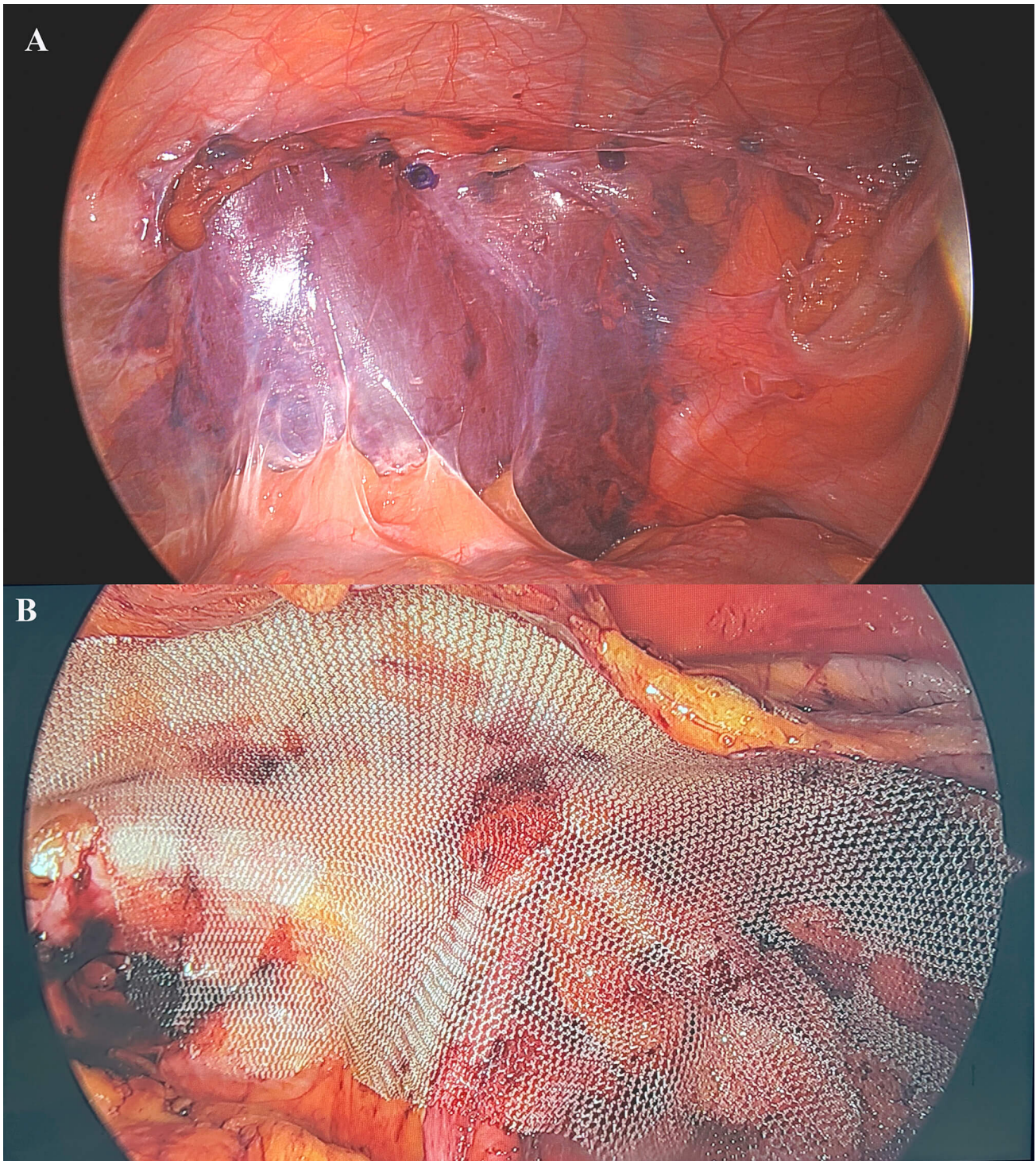


Fig. 1. Final intraoperative views after laparoscopic groin hernia repair. (A) Appearance after repair using the TAPP technique. (B) Appearance after repair using the TEP technique.

95% confidence intervals (CIs) were reported. The significance level was set at $p < 0.05$ for all analyses. No formal sample size calculation was performed before the study, as this retrospective observational investigation encompassed all patients who satisfied the inclusion criteria throughout the designated study timeframe. The unequal sample sizes of the TEP ($n = 291$) and TAPP ($n = 104$) groups reflect the

real-world preference and experience of the surgical teams at our center.

Results

Between January 2022 and January 2025, a total of 511 patients who underwent laparoscopic groin hernia repair were screened for eligibility. Of these, 116 patients were ex-

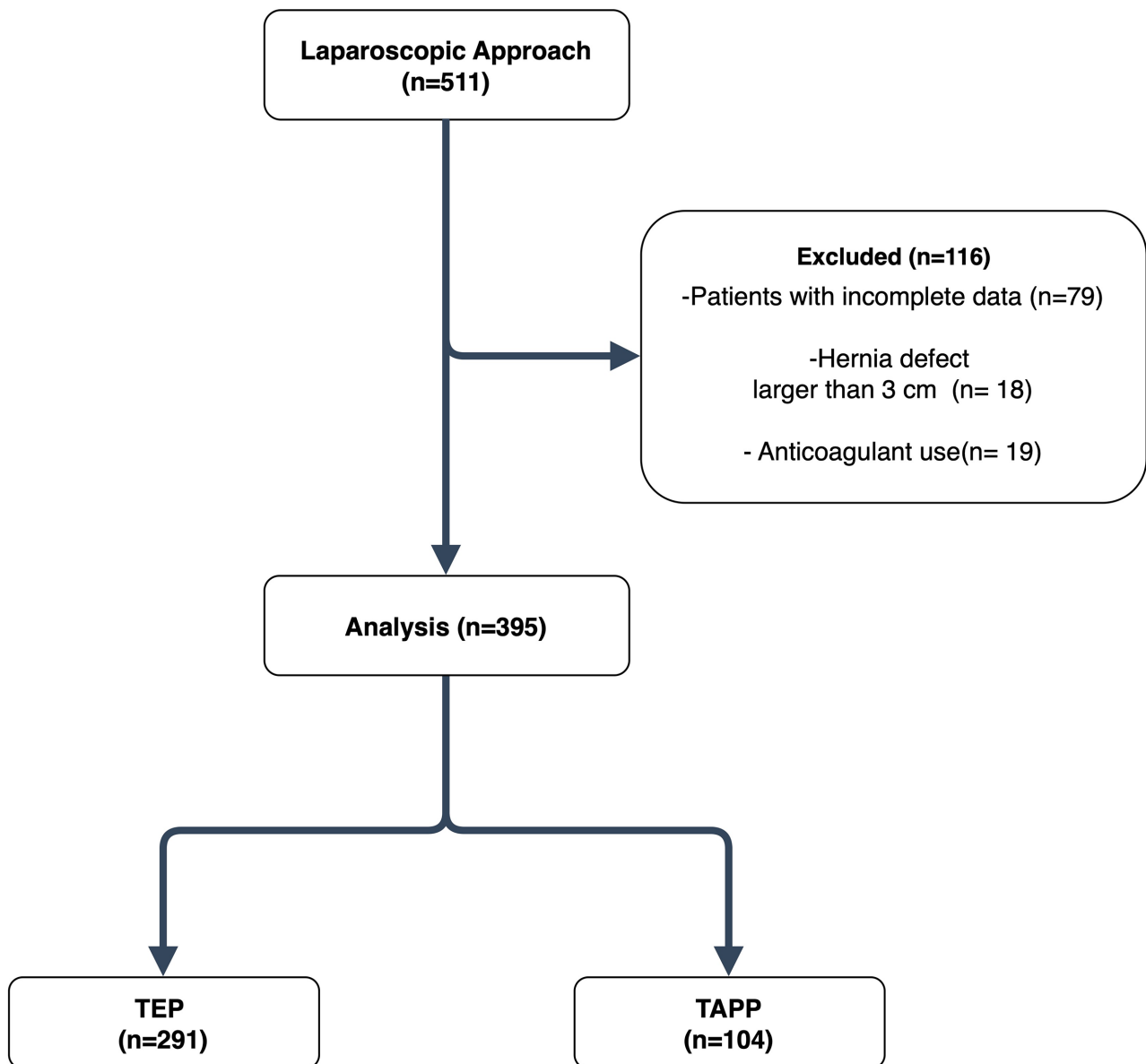


Fig. 2. Flowchart of the study.

cluded from the study: 79 due to incomplete clinical data, 18 due to an groin hernia defect diameter >3 cm, and 19 due to anticoagulant use. Consequently, 395 patients who met the eligibility criteria were included in the final analysis. Of these, 291 patients underwent TEP repair and 104 patients underwent TAPP repair (Fig. 2).

Demographic Data

Of the 395 patients included in the study, 73.7% (n = 291) underwent TEP repair, and 26.3% (n = 104) underwent TAPP repair. A comparative analysis of demographic and clinical attributes demonstrated significant variations between the two cohorts regarding age and ASA score. The median (IQR) age was 47 (38–58) years in the TAPP group and 53 (41–65) in the TEP group, and this difference was

significant ($p < 0.001$). Likewise, the distribution of patients according to the ASA classification differed significantly between the groups ($p = 0.003$). However, no significant differences in sex, prior open hernia repair (recurrent hernia), preoperative symptom type (pain, swelling, or both), or hernia localization (right, left, or bilateral) ($p = 0.172$, $p = 0.059$, $p = 0.726$, and $p = 0.062$, respectively) were observed between the groups (Table 1).

Intraoperative Data

When intraoperative parameters were evaluated, no significant difference was observed between the TEP and TAPP groups regarding hernia-type distribution ($p = 0.957$). Indirect groin hernia was the most common type observed in both groups. However, the median (IQR) operative time

Table 1. Comparison of demographic and clinical characteristics of patients who underwent TEP and TAPP procedures.

		TEP (n = 291)	TAPP (n = 104)	p-value
Age, years		53 (41–65)	47 (38–58)	<0.001
Sex	Male	270 (92.8%)	92 (88.5%)	0.172
	Female	21 (7.2%)	12 (11.5%)	
Prior open hernia repair (recurrent hernia)		20 (6.9%)	2 (1.9%)	0.059
ASA	I	54 (18.6%)	23 (22.1%)	0.003
	II	187 (64.3%)	77 (74.0%)	
	III	50 (17.2%)	4 (3.8%)	
Preoperative symptom	Pain	89 (30.6%)	30 (28.8%)	0.726
	Swelling	67 (23.0%)	28 (26.9%)	
	Both	135 (46.4%)	46 (44.2%)	
Side of the hernia	Right	151 (51.9%)	65 (62.5%)	0.062
	Left	106 (36.4%)	34 (32.7%)	
	Bilateral	34 (11.7%)	5 (4.8%)	

Values are presented as median (interquartile range [IQR]) or number (%). The chi-square test was used to analyze categorical variables. The Mann–Whitney U-test was used in the analysis of continuous variables.

ASA, American Society of Anesthesiologists; TEP, total extraperitoneal; TAPP, Transabdominal preperitoneal.

Table 2. Comparison of intraoperative parameters in patients who underwent TEP and TAPP procedures.

		TEP (n = 291)	TAPP (n = 104)	p-value
Hernia type	Indirect	176 (60.4%)	61 (58.7%)	0.957
	Direct	94 (32.3%)	34 (32.7%)	
	Pantaloon	18 (6.2 %)	8 (7.7%)	
	Femoral	3 (1 %)	1 (1%)	
Operation duration, min		30 (20–35)	35 (30–36)	<0.001

Values are presented as median (IQR) or number (%). The chi-square test was used to analyze categorical variables. The Mann–Whitney U test was used to analyze continuous variables.

was 30 (20–35) min in the TEP group and 35 (30–36) min in the TAPP group, indicating a significant difference between the groups ($p < 0.001$) (Table 2).

Postoperative Complications

Upon evaluation, the rate of postoperative complications according to the Clavien–Dindo classification was not significantly different between the TEP and TAPP groups ($p = 0.545$). The proportion of patients without complications was high in both groups, accounting for 84.9% ($n = 247$) and 86.5% ($n = 90$) in the TEP and TAPP groups, respectively. Minor complications (grades I–II) were observed in 12.7% ($n = 37$) of patients in the TEP group and 9.6% ($n = 10$) of those in the TAPP group. Major complications (grade $\geq$ IIIA) occurred at low rates in both groups, with 2.4% ($n = 7$) in the TEP group and 3.8% ($n = 4$) in the TAPP group. Grade IIIA complications consisted of seroma cases requiring needle aspiration without general anesthesia. Notably, all grade IIIB events corresponded to recurrent hernia cases, and all recurrences were managed with open reoperation (Table 3).

Specific types of complications were as follows: The most common complication was seroma, which occurred in 23 patients (7.9%) in the TEP group and 6 patients (5.8%) in the TAPP group. Hematoma was observed in 2 patients (0.7%) in the TEP group and 2 patients (1.9%) in the TAPP group. Chronic groin pain was reported in 14 patients (4.8%) and 2 patients (1.9%) in the TEP and TAPP groups, respectively. All Grade IIIB complications were due to hernia recurrence, which occurred in 5 patients (1.7%) in the TEP group and 4 patients (3.8%) in the TAPP group. The distribution of specific complication types did not differ significantly between the groups ($p = 0.313$). The median time to recurrence was 8 (range, 3–18) months. All recurrent cases were repaired using the open Lichtenstein technique. No mesh infection or other major complications were observed during the follow-up.

Multivariate Logistic Regression Analysis for Postoperative Complications

In the multivariate logistic regression analysis, age, ASA score, and operative technique were evaluated as potential predictors of postoperative complications. In the first step

Table 3. Comparison of Clavien–Dindo grade in patients who underwent TEP and TAPP procedures.

		TEP (n = 291)	TAPP (n = 104)	p-value
No complication		247 (84.9%)	90 (86.5%)	
Minor complications	Clavien–Dindo grade 1	32 (11%)	10 (9.6%)	0.545
		2 (1.7%)	0	
Major complications	Clavien–Dindo grade 3A	2 (0.7%)	0	
		3B	4 (3.8%)	

Values are presented as numbers (%). The chi-square test was used to analyze categorical variables.

Table 4. Evaluation of the effect of age, ASA score and operative technique on complications using a multivariate logistic regression model.

Variables	B	Step 1 OR (95% CI)	p value	Step 2 OR (95% CI)	p value
Age, years	0.002	1.003 (0.939–1.027)	0.814	(removed)	–
ASA	0.032	1.033 (0.571–1.867)	0.915	(removed)	–
Operative technique, TEP vs. TAPP	0.113	1.120 (0.461–2.165)	0.736	(removed)	–

The relationship between complication and age, ASA score and operative technique was assessed using multivariate logistic regression analysis.

In Step 1, all variables were included in the model, while in Step 2, only significant variables were included in the model.

“–” indicates that the variable was removed from the final model and therefore no corresponding *p* value was available.

CI, confidence interval; OR, odds ratio.

of the model, none of the variables were significantly associated with complication development. Age was not a significant predictor of complications (OR: 1.003, 95% CI: 0.939–1.027, *p* = 0.814), and ASA score also showed no significant association (OR: 1.033, 95% CI: 0.571–1.867, *p* = 0.915). When TAPP was selected as the reference category for operative technique, TEP was not associated with a significantly different risk of postoperative complications compared with TAPP (OR: 1.120, 95% CI: 0.461–2.165, *p* = 0.736). Since no variable reached statistical significance in Step 1, no variables were retained in Step 2. These findings suggest that age, ASA score, and operative technique were not independent predictors of postoperative complications in this cohort (Table 4).

Discussion

In this study, the TAPP and TEP techniques used for laparoscopic groin hernia repair performed at our center between January 2022 and January 2025 were compared in terms of demographic characteristics, intraoperative parameters, and postoperative complication rates. Both techniques were associated with low complication rates and exhibited similar safety profiles. The operative time was significantly shorter in the TEP group, whereas the complication rates in both groups were consistent with those reported in the literature. In addition, although the distribution of hernia types was similar between the groups, the TAPP group was characterized by a younger population. Although the TEP group was significantly older and had higher ASA scores, the postoperative complication rates were similar between groups. This finding suggests that TEP may have a com-

parable safety profile in this relatively high-risk population. Although baseline differences in age and ASA score were present between the groups, multivariate logistic regression analysis showed that age, ASA score, and operative technique were not independent predictors of postoperative complications. Nevertheless, given the retrospective design and unequal group sizes, the possibility of residual confounding cannot be completely excluded, and the findings should be interpreted with caution.

Reported complication rates after laparoscopic groin hernia repair generally range from 5% to 15%, with most of these events consisting of minor complications such as seroma, hematoma, and superficial wound infection [13]. In this study, the rates of major complications, defined as Clavien–Dindo grade $\geq$ IIIA, were 2.4% in the TEP group and 3.8% in the TAPP group, with no significant difference between the groups. In both groups, the rates of mild complications (grade I–II) were low, and seroma was the most frequently observed event. These findings support previous studies reporting comparable overall complication rates between the TEP and TAPP techniques in laparoscopic groin hernia repair, with no significant difference between the two approaches. For example, Yang et al. [14] found no difference in overall complication rates between the two techniques. Moreover, systematic reviews have suggested that the TEP technique may be associated with a lower risk of scrotal or cord edema, whereas the TAPP technique may confer a slightly lower risk of seroma in certain patient groups [15,16]. However, more recent retrospective analyses have reported a higher incidence of seroma in the TEP technique than in TAPP; this difference has been attributed

to mechanisms such as wider dissection in the preperitoneal space, greater tissue trauma, and impaired fluid drainage [17]. In light of the existing literature, the comparable complication rates observed in this study suggest that determinants related to patient characteristics and perioperative care protocols may be more influential than the surgical technique. Consistently, multivariate logistic regression analysis showed that operative technique was not independently associated with postoperative complication development after adjustment for age and ASA score, further supporting the comparable safety profile observed between the two approaches. Regarding recurrence, although it is one of the most critical determinants of long-term success in laparoscopic groin hernia repair, current evidence does not demonstrate a clear superiority of either the TEP or TAPP technique in terms of recurrence. Indeed, a 2024 updated systematic review reported that there may be little to no difference between TAPP and TEP in terms of hernia recurrence, emphasizing that the choice of technique is often shaped by the surgeon's experience and the specific characteristics of the patient and hernia [18]. Nevertheless, large registry-based cohort analyses have shown that recurrence rates requiring reoperation are generally low; however, in certain subgroups, particularly in male patients, the reoperation risk for recurrence may be higher after TEP than after TAPP. This difference may be related to patient selection, hernia morphology, and center- or surgeon-related factors [19]. In addition, the effect of technique selection on recurrence is more closely related to operative factors, such as the learning curve, adequacy of preperitoneal dissection, proper mesh placement and overlap (particularly complete coverage of the myopectineal orifice), and appropriate patient selection, rather than to the technique itself [16]. Consistent with this perspective, all Clavien–Dindo Grade IIIB events corresponded to recurrence cases, and no significant difference was observed between the two groups. In the present study, seroma was the most frequent minor complication in both groups, consistent with previous reports. Although chronic groin pain was more frequently observed in the TEP group (4.8% vs. 1.9%), the overall rates of clinically significant complications remained low. Hernia recurrence, the most important long-term outcome, occurred in 1.7% of TEP and 3.8% of TAPP cases. All recurrences were detected within the first 18 months and successfully managed with open repairs. All patients who developed recurrence [5 (1.7%) patients in the TEP group and 4 (3.8%) in the TAPP group] underwent Lichtenstein repair. Given that TEP and TAPP are posterior (preperitoneal) repairs, an anterior approach such as Lichtenstein is commonly preferred for recurrences after posterior repairs. Likewise, for recurrences after an anterior repair, a posterior repair (e.g., TAPP/TEP/Stopppa) is generally recommended, as reoperation through an undisturbed tissue plane is suggested by international guidelines [20].

In this study, the operative time was significantly shorter for repairs performed using the TEP technique than for those performed using the TAPP technique, which is consistent with the existing literature. For example, in their single-center observational analysis, Ergenç and Gülşen [21] reported a mean operative time of 64.4 ± 23.5 min for the TEP approach and 96.7 ± 31.9 min for the TAPP approach, with a significant difference. Similarly, Hidalgo et al. [7] reported a mean operative time of 82 min in the TEP group and 107 min in the TAPP group, with this difference also reaching statistical significance. These differences may be attributable to factors such as the surgeon's experience, the effect of the learning curve, and technical aspects of the procedure. In the study by Iossa et al. [16], although the TEP approach was considered technically more demanding, it offered an advantage in operative time once the learning curve had been overcome by experienced surgeons. In addition, Cao et al. [5] reported that the TEP approach demonstrated a statistically significant advantage over TAPP in reducing intraoperative trauma and shortening operative time. In this context, the shorter operative time observed in the TEP group may be explained by the additional procedural burden associated with the TAPP technique, particularly during peritoneal flap creation and peritoneum closure. Moreover, the fact that both techniques were performed at a single center by surgeons experienced in both approaches may have reduced surgeon- and center-related variability, thereby improving the comparability between the groups. Furthermore, the absence of significant differences between the groups in terms of hernia type and hernia localization (right/left/bilateral) suggests that technique-specific procedural steps may have contributed to the observed difference in operative time. Finally, excluding larger defect diameters (>3 cm), as defined by the European Hernia Society groin hernia classification (based on the Aachen defect-size categories), may have reduced heterogeneity related to technical complexity, which could potentially influence operative time and postoperative outcomes; however, this criterion may also limit the generalizability of our findings to large-defect hernias [22].

This study had several limitations. First, its single-center retrospective design, the fact that the procedures were not performed by the same surgeons and the absence of randomization make it difficult to completely exclude selection bias from the study. Notably, significant baseline imbalances were found between the groups: the TEP group was older (median age 53 vs. 47 years, $p < 0.001$) and had higher ASA scores (ASA III: 17.2% vs. 3.8%, $p = 0.003$) than the TAPP group. Although multivariate logistic regression was performed to adjust for baseline differences in age and ASA score, the retrospective design, unequal group sizes, and potential unmeasured confounders may still limit the causal interpretation of the findings. Second, although specific types of complications were reported, validated questionnaires (e.g., Carolina comfort scale) were not used to

assess chronic pain, which may limit the standardization of this outcome. Additionally, although a minimum 12-month follow-up was achieved, longer-term data would be valuable for more accurate assessment of recurrence rates, as recommended by the International HerniaSurge guidelines. Third, the exclusion criterion of hernia defect diameter > 3 cm was applied according to the European Hernia Society classification based on the abdominal wall defect size; however, this may limit the generalizability of our findings to patients with larger hernias. Furthermore, as this was a retrospective study, no formal a priori sample size calculation was performed. The study population was determined by all eligible cases during the study period, resulting in unequal group sizes (291 in TEP vs. 104 in TAPP). This imbalance may have reduced the statistical power to detect differences in rare outcomes. Fourth, this study primarily evaluated operative time and Clavien–Dindo grade complications. Other important postoperative recovery indicators, such as the length of hospital stay, postoperative pain scores (e.g., visual analog scale), analgesic consumption, and time to return to normal daily activities or work, could not be analyzed owing to the lack of standardized and complete documentation in the retrospective records. These parameters are critical for assessing the overall benefits of laparoscopic hernia repair techniques and should be included in future prospective comparative studies.

Conclusions

In this study, TEP and TAPP techniques in laparoscopic groin hernia repair had comparably low complication rates. The shorter operative time in the TEP group may be related to the additional procedural steps specific to TAPP repair, particularly peritoneal flap creation and closure. Thus, in experienced hands, both techniques are safe options, and the choice of technique should be individualized according to patient- and hernia-related characteristics, as well as surgical experience. Further multicenter prospective studies are warranted to corroborate these findings and strengthen their generalizability.

Availability of Data and Materials

All data generated and analyzed during this study are included within the article and are available from the corresponding author upon reasonable request.

Author Contributions

Conceptualization: NA, MIT; Methodology: NA, KE, BS; Data Curation: AC, BO; Formal analysis and investigation: NA, AC, BO; Writing - original draft preparation: NA, BS, MIT; Writing - review and editing: NA, KE, MIT; Supervision: NA. All authors contributed to the critical revision of the manuscript for important intellectual content. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics Approval and Consent to Participate

Ethical approval for the study was obtained from the Scientific Research Ethics Committee of Antalya Training and Research Hospital (approval number: 2025-183), and the study was conducted in accordance with the Declaration of Helsinki and national regulations. In accordance with the decision of the Scientific Research Ethics Committee of Antalya Training and Research Hospital and national guidelines for retrospective observational studies, the requirement for informed consent was waived.

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Conflict of Interest

The authors declare no conflict of interest.

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