

# Which Technique Should We Select in Laparoscopic Inguinal Hernia Repairs?

*Laparoskopik İnguinal Herni Onarımlarında Hangi Tekniği Seçmeliyiz?*

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## Abstract

**Objective:** With the increasing popularity of laparoscopic surgeries, laparoscopic repairs in inguinal hernias have become more common day by day. Laparoscopic inguinal hernia repairs are most commonly performed using totally extraperitoneal (TEP) and transabdominal preperitoneal (TAPP) repair techniques. This study aimed to compare laparoscopic inguinal hernia repair results according to surgical techniques.

**Materials and Methods:** Data of patients who underwent closed inguinal hernia repair between July 2017 and July 2020 were retrospectively analyzed, and patients were divided into two groups: those who underwent the TAPP (group 1) and TEP (group 2) techniques. Postoperative recurrence rates of both groups, demographic data of patients, postoperative complication rates, complication types, operation duration, and postoperative hospital stay duration were evaluated; postoperative first-week, first-month, and third-month pain scores were evaluated with the visual analog scale (VAS). Data of both groups were evaluated in terms of statistical differences.

**Results:** A total of 113 patients underwent surgery in July 2017-July 2020, wherein 43 had TAPP (group 1) and 70 had TEP (group 2). The mean postoperative follow-up duration of patients was  $10.01 \pm 4.58$  months. No significant difference was found in the recurrence between the groups during the follow-up ( $p=0.67$ ). No significant difference was found in postoperative complications between the groups. The operation durations were longer in group 1 than in group 2 ( $p=0.04$ ). No significant difference was found between the groups in terms of postoperative hospital stay duration ( $p=0.29$ ). Postoperative first-week, first-month, and third-month VAS scores were higher in group 1 than in group 2 ( $p<0.001$ ,  $p=0.001$ ,  $p=0.006$ , respectively).

**Conclusion:** Laparoscopic inguinal hernia repairs can be performed safely, and the TEP technique is more comfortable than TAPP for patients in the early postoperative period.

## Öz

**Amaç:** Laparoskopik cerrahilerin popüleritesinin artması ile kasık fitiklerinde laparoskopik onarımlar gün geçikçe yaygınlaşmıştır. Kapalı kasık fitik onarımları en sık total ekstraperitoneal (TEP) ve transabdominal preperitoneal onarım (TAPP) teknikleri ile yapılmaktadır. Çalışmamızda laparoskopik kasık fitiği onarım sonuçlarınıza cerrahi tekniklere göre karşılaştırmayı amaçladık.

## Keywords

Laparoscopic inguinal hernia repair, inguinal hernia, transabdominal preperitoneal repair, totally extraperitoneal repair

## Anahtar Kelimeler

Laparoskopik kasık fitiği onarımı, inguinal herni, transabdominal preperitoneal onarım, total ekstraperitoneal onarım

Received/Geliş Tarihi : 23.10.2020

Accepted/Kabul Tarihi : 15.11.2020

doi:10.4274/meandros.galenos.2020.62681

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**Gereç ve Yöntemler:** 2017-2020 Temmuz tarihleri arasında kapalı kasık fitiği onarımı yapılan hastaların dosyaları retrospektif olarak incelenerken hastalar TAPP (grup 1) teknigi ve TEP (grup 2) teknigi ile opere olanlar olarak iki gruba ayrıldılar. Her iki grubun ameliyat sonrası nüks oranları, hastaların demografik verileri, postoperatif komplikasyon oranları, komplikasyon çeşitleri, ameliyat süreleri, postoperatif hastanede yatış süreleri; postoperatif 1. hafta, 1. ay ve 3. ay ağrı skorları visual analog skala (VAS) ile değerlendirildi. Her iki grubun verileri istatistiksel farklılık açısından değerlendirildi.

**Bulgular:** 2017-2020 Temmuz tarihleri arasında 113 hasta ameliyat edildi. Bunlardan 43'ü TAPP onarımı (grup 1) ve 70'i TEP onarımı (grup 2) idi. Hastaların ameliyat sonrası takip süresi ortalama  $10,01 \pm 4,58$  ay olarak saptandı. Gruplar arasında takip boyunca nüks olarak anlamlı farklılık saptanmadı ( $p=0,67$ ). Gruplar arasında postoperatif gerçekleşen komplikasyonlarda anlamlı farklılık bulunmadı ( $p=0,93$ ). Ameliyat süreleri grup 1'de daha uzun olarak saptandı ( $p=0,04$ ). Gruplar arası postoperatif hastanede kalis süresi açısından anlamlı farklılık saptanmadı ( $p=0,29$ ). Postoperatif 1. hafta, 1. ay ve 3. ay VAS skorları grup 1'de daha yüksek saptandı ( $p<0,001$ ,  $p=0,001$ ,  $p=0,006$ ).

**Sonuç:** Laparoskopik kasık fitik onarımları güvenli bir şekilde yapılabilir. Hastalar için postoperatif erken dönemde TEP tekniginin TAPP teknigiden daha konforlu olduğunu düşünüyoruz.

## Introduction

Although inguinal hernias are traditionally treated with open surgical repair, traditional methods have changed towards laparoscopic inguinal hernia repairs with the development and increase in the popularity of laparoscopic surgery in the last 20 years (1). Some studies have shown that laparoscopic inguinal hernia repairs are superior to open hernia repairs in terms of postoperative pain, recovery and morbidity (2). Today, transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) techniques are used in laparoscopic inguinal hernia repairs (3). Although the repairs of laparoscopic inguinal hernias have been specified as guidelines by the international endohernia association, today there is no consensus about the superiority of both repair techniques (4). In our study, we aimed to reveal the difference between the two techniques by comparing TAPP and TEP in terms of hernia recurrence, postoperative pain scores, duration of operation, length of postoperative hospital stay and complication rates.

## Materials and Methods

In the study, files and outpatient clinic notes of patients who underwent closed inguinal hernia repair in Aydin State Hospital General Surgery Clinic between 2017-2020 July were analyzed retrospectively. Local ethics committee approval was obtained from Aydin Adnan Menderes University Non-Invasive Procedures Committee for the study (protocol no: 2020/159, date: 03.09.2020). Consent for the surgical procedure was taken from the patients. Nevertheless, due to the retrospective nature of the study, consent for the study was not taken from the patients. The patients

were classified into two groups as those who were underwent surgery by the TAPP (group 1) technique and the TEP (group 2) technique. Demographic data, hernia characteristics, and follow-up durations of the patients were examined. Postoperative recurrence rates of both groups, postoperative complication rates, types of complications, duration of operation, length of postoperative hospital stay; postoperative first week, first month and third month pain scores were evaluated with the visual analog scale (VAS). It was evaluated whether there was a statistical difference between the data of both groups.

## Statistical Analysis

For data evaluation, the SPSS 25 (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) statistical packaged program was used. The variables were stated using the mean  $\pm$  standard deviation, percentage and frequency values. Kolmogorov-Smirnov test was performed to evaluate the homogeneity of the data. In the analysis of data, Student's t-test were used for the comparison of two groups. When Student's t-test did not provide preconditions, Mann-Whitney U test was used. Categorical data were analyzed by Fisher's Exact test and chi-square test.  $P<0.05$  was considered statistically significant.

## Results

Files of 113 patients who underwent closed inguinal hernia repair in 2017-2020 July were retrospectively reviewed. While TAPP repair was performed in 43 of these patients (group 1), 70 of them were performed TEP repair (group 2). The mean postoperative follow-up duration of the patients was

found to be  $10.01 \pm 4.58$  months. Of the operated patients, 108 (95.6%) were male and 5 (4.4%) were female. Of the cases, 35 (31%) were direct, 74 (65.5%) were indirect, 4 (3.5%) were pantaloon hernias. Of the patients, 42 (37.2%) had right, 45 (39.8%) left, 26 (23%) had bilateral inguinal hernia. Of the hernias, 35 (31%) were direct, 74 (65.5%) were indirect, 4 (3.5%) were pantaloon hernias. The mean age of the patients was calculated as  $51.55 \pm 13.81$  years. Operation duration was calculated as  $51.66 \pm 14.33$  minutes. The mean duration of follow-up of the patients was calculated as  $10.01 \pm 4.58$  months. Recurrence was detected in 3 (2.65%) patients during follow-up. The demographic data of the patients are shown in Table 1.

The recurrence rate was detected as 2.3% in group 1 and 2.9% in group 2 ( $p=0.67$ ). When looking at the complications, 7 (16.3%) patients in group 1 and 11 (15.7%) patients in group 2 had complications ( $p=0.93$ ). As complications, seroma in 2 patients, cord edema in 4 patients, scrotal ecchymosis in 1 patient were detected in group 1; and in group 2, 3 patients had seroma, 6 patients had cord edema, and

2 patients had scrotal ecchymosis. Postoperative 1<sup>st</sup> week VAS scores were calculated as  $2.81 \pm 0.958$  in group 1, and  $2.11 \pm 0.84$  in group 2 ( $p<0.001$ ). In the postoperative 1<sup>st</sup> month, VAS scores were calculated as  $0.98 \pm 1.12$  in the first group and as  $0.4 \pm 0.8$  in the second group ( $p=0.001$ ). The calculated VAS scores of the patients on the postoperative 3<sup>rd</sup> month were  $0.47 \pm 0.85$  in the first group and  $0.13 \pm 0.47$  in the second group ( $p=0.006$ ).

The mean operation duration was calculated as  $54.9 \pm 14.73$  minutes in the patients operated with the TAPP technique, and  $49.6 \pm 13.8$  minutes in the patients operated with the TEP technique ( $p=0.04$ ). The mean length of hospital stay in patients operated with the TAPP technique was  $1.19 \pm 0.39$  days, and  $1.11 \pm 0.32$  days in patients operated with the TEP technique ( $p=0.29$ ). Table 2 shows the comparison between the two groups.

## Discussion

With the development and widespread use of laparoscopic surgery in 1990, the first minimally

**Table 1. Demographic data of the patients**

Parameters	Group 1 (TAPP)	Group 2 (TEP)
Number of patients	43	70
Age	$52.51 \pm 13.19$	$50.96 \pm 14.24$
<b>Gender</b>		
Male, n (%)	43 (100%)	65 (92.9%)
Female, n (%)	0 (0%)	5 (7.1%)

n: Number of patients, TAPP: Transabdominal preperitoneal, TEP: Totally extraperitoneal

**Table 2. Detailed comparison of both groups**

	Group 1 (TAPP)	Group 2 (TEP)	p
Recurrence, n (%)	1 (2.3%)	2 (2.9%)	0.67
Complication, n (%)	7 (16.3%)	11 (15.7%)	0.93
Seroma	2	3	-
Cord edema	4	6	-
Scrotal ecchymosis	1	2	-
VAS 1 <sup>st</sup> week	$2.81 \pm 0.958$	$2.11 \pm 0.84$	$p<0.001$
VAS 1 <sup>st</sup> month	$0.98 \pm 1.12$	$0.4 \pm 0.8$	0.001
VAS 3 <sup>rd</sup> month	$0.47 \pm 0.85$	$0.13 \pm 0.47$	0.006
Duration of operation (minute)	$54.9 \pm 14.73$	$49.6 \pm 13.8$	0.04
Length of hospital stay (days)	$1.19 \pm 0.39$	$1.11 \pm 0.32$	0.29

n: Number of patients, VAS: Visual analog scale, TAPP: Transabdominal preperitoneal, TEP: Totally extraperitoneal

invasive inguinal hernia repair was performed in 1992 (5).

Most of the patients we operated were males. Of the 5 female patients we operated with the TEP technique, 4 had an indirect hernia, and 1 had a direct hernia. There are studies stating that inguinal hernias are more common in male gender (6). The cases were mostly left-sided, with indirect inguinal hernia as a type of hernia. In the majority of the population, unilateral hernias have the highest rate of left indirect inguinal hernia (7).

In the patients we operated, recurrence was observed at a rate of 2.3% in group 1, while a recurrence rate was 2.9% in group 2, and no significant difference was observed between the two techniques in terms of recurrence. In a study conducted by Toma et al. (8) on TEP repairs in inguinal hernia, the recurrence rate has been found to be 1.3%, and it closely resembles ours. The recurrence rate has been found to be 3.1% in Erdoğan et al.'s (9) study on repair with the TAPP technique in inguinal hernias, and it was found to be 2.3% in our study. In our study, no significant difference was found between the two techniques in terms of recurrence, and no significant difference has been found in terms of recurrence in the systematic review study performed by McCormack et al. (10). There are various studies in the literature showing that there is no difference between TEP and TAPP techniques in terms of recurrence (11,12).

Different complication rates have been reported in the literature in laparoscopic inguinal hernia repairs. Since the abdomen is entered in the TAPP technique, the surgical area is wider than the TEP technique. It has the advantage of entering the abdomen; however, there is the possibility of developing complications such as trocar site hernias, solid organ injuries, and bride ileus (13,14). In the TEP technique, it is a great advantage that not to enter the abdomen, the operation does not require general anesthesia and the complications in TAPP do not develop as a result (15,16). Nawaz et al. (11) have found in their study no difference in terms of complications between TEP and TAPP techniques. In also our study, no significant difference was found between the two techniques in terms of complications.

Postoperative pain may be more common in the TAPP technique, compared to the TEP technique, due

to the greater use of tackers for fixation purposes in mesh fixation and to close the peritoneum (17). Therefore, absorbable tackers and non-tacker adhesives have been recommended for mesh fixation to reduce postoperative pain (18). We used absorbable tacker (AbsorbaTack, Covidien) in our operations. We think that opening the peritoneum and entering the abdominal cavity in the TAPP technique may be one of the factors that increase pain in the postoperative period. In our study, postoperative 1<sup>st</sup> week VAS scores were found to be significantly higher in the TAPP group. Although there was a statistically significant increase in pain scores in the postoperative 1<sup>st</sup> and 3<sup>rd</sup> months, we think that there was no difference in terms of pain in the long-term since VAS scores between 1 and 0 are not clinically significant.

Although the duration of the operation of the TEP and TAPP techniques may differ, in our study, the mean duration of operation for TAPP was  $54.9 \pm 14.73$  minutes, while duration of operation in the TAPP technique has increased to 90 minutes in Pironi. et al.'s (19) study. In our study, while the duration of operation of the patients operated with the TEP technique was observed as  $49.6 \pm 13.8$  minutes, Hasbahceci et al. (20) in their study on TEP, the mean duration of operation has been found to be  $55 \pm 22.8$  minutes. Nawaz et al. (11) in their study, the operation duration of the TEP technique has been found to be shorter than the TAPP technique. In our study, the operation duration of the TEP technique was found to be shorter than the TAPP technique. We think that this difference may occur due to the extra time spent for peritoneal closure in the TAPP technique.

Although in the study conducted by Baca et al. (21), the length of postoperative hospital stay of patients who underwent TEP surgery was shorter than patients who had surgery with the TAPP technique, no difference was observed in the length of postoperative hospital stay of the patients in our study.

## Conclusion

Closed inguinal hernia repair with a low complication rate can be performed safely in patients. While both laparoscopic techniques can be selected according to surgeon's experience and preference, the TEP technique can provide better comfort and shorter operation time for the patient in terms of pain

in the early postoperative period compared to the TAPP technique.

### Ethics

**Ethics Committee Approval:** The study was approved by Non-Invasive Clinical Research Ethics Committee of Aydın Adnan Menderes University Faculty of Medicine (protocol no: 2020/159, date: 03.09.2020).

**Informed Consent:** Consent for the surgical procedure was taken from the patients. Nevertheless, due to the retrospective nature of the study, consent for the study was not taken from the patients.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Concept: E.K., Design: E.K., Supervision: E.M.Y., Fundings: E.M.Y., Materials: E.K., E.Kü., Data Collection or Processing: E.M.Y., Analysis or Interpretation: E.K., E.Kü., Literature Search: E.Kü., Writing: E.K., Critical Review: E.K., E.M.Y.

**Conflict of Interest:** No conflict of interest was declared by the authors.

**Financial Disclosure:** The authors declared that this study received no financial support.

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