

# Repair of laparoscopic inguinal and femoral hernia

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## ABSTRACT

**Introduction:** Inguinofemoral hernia is one of diseases which are the most frequently treated in general surgery clinics. In order to decrease the risk of possible complications and the ratio of morbidity, an increasing number of centers now prefer laparoscopic hernia repairs. The aim of this study was to evaluate the results of patients operated on with the laparoscopic total extraperitoneal (TEP) and transabdominal preperitoneal (TAPP) techniques in the repair of inguinal and femoral hernia.

**Materials and Methods:** The files of 56 patients who were diagnosed with inguinofemoral hernia at the polyclinic of general surgery between January 2000 and May 2002 with the complaints of pain and swelling in the inguinal and femoral area and for whom TEP and TAPP repairs were performed in elective circumstances were reviewed retrospectively. The patients were evaluated in terms of age, gender, type of hernia, comorbid factors, duration of the operation, duration of hospitalization, duration of active labor, postoperative early and late complications, and recurrence.

**Results:** The median age of the patients included in this study was 45.5 years (range: 17–73 years) and the male/female ratio was 4.6. The TEP technique was used in 53 of the 56 patients with inguinofemoral hernia and TAPP was used in 3 cases. Eight patients had a bilateral inguinal hernia. The average duration of follow-up of the patients was 12 months (range: 2–24 months) and there was no instance of recurrence observed in this period. An early complication was seen in 5 of the 53 TEP patients and 2 of the 3 TAPP patients. A superficial skin infection was seen in 1 patient in each group. A subcutaneous hematoma was observed in the early period in 1 TAPP patient.

**Conclusion:** In our study, minor complications occurred in the early postoperative period in patients who were operated on with both the TEP and TAPP techniques, but no major complication was seen in any patient. The early complications were treated medically. Although the follow-up duration was short, no recurrence was determined.

**Keywords:** Inguinal and femoral hernia; repair of laparoscopic hernia; TAPP; TEP.

## Introduction

The hernias seen in inguinal and femoral areas are classified together and named as inguinal hernia. In its treatment, surgical intervention is performed all over the

world. Since middle ages, it has been documented that there are contradictory opinions about treatment modalities of hernia<sup>[1]</sup> because every technique is open to dis-



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pute and more or less recurrence is seen in all of them. Although lots of repairs of perforation were performed from past to present with the aim of treatment, growth of recurrence has not been prevented. Since early 1990s, minimal invasive surgical techniques have commonly gone into use in hernia repair in parallel with increasing technological developments.<sup>[2]</sup> While that repair of laparoscopic hernia has short healing duration, postoperative active start-up time, better cosmetic results and low long-term relapse rates is regarded as an advantage, long learning curve, specific ability required and long duration of surgery are regarded as a disadvantage.<sup>[3]</sup> In this study, it was aimed to examine the results of 56 patients on whom techniques of Total Extraperitoneal (TEPP) and Transabdominal Preperitoneal (TAPP) were performed in repair of inguinal and femoral hernia.

## Materials and Methods

In conformity with Helsinki Declaration Criteria, the files of 56 patients who had the diagnosis of inguinal hernia by applying to the 2nd Polyclinic of General Surgery at İstanbul Education and Research Hospital between January, 2000 and May, 2002 with the complaints of pain and swelling in inguen and on whom TEPP and TAPP techniques were performed in were gone through retrospectively. Their results in terms of age, gender, type of hernia, comorbid factors, duration of operation, duration of hospitalization, active start-up time, postoperative early and late complications and recurrence were recorded from file registers of patients. Complications that developed within postoperative first seven days were interpreted as early period whereas the ones that developed after eight days were interpreted as late period complications. The patients with missing file records, history of antiaggregan use, bleeding and coagulation disorders and scrotal hernia were excluded from the study. The patients on whom repair of laparoscopic hernia was performed with the diagnosis of primary inguinal and femoral hernia, recurrent inguinal hernia and bilateral inguinal hernia were included into the study. All the operations were performed by one surgeon. Bladder was drained and antibiotic prophylaxis was performed before the operation. Bladder was drained thanks to urethral catheterization. The operations were performed with general anesthesia in supine and 15 degree Trendelenburg's position. While the operator stood opposite the side where repair of hernia would be performed and the junior doctor stood opposite the surgeon.

## TEPP Technique

A 10 mm balloon dilator (AutoSuture Spacemaker Plus®, Covidien™, Mansfield, MA, USA) was pushed forward till symphysis pubis via an almost 1 cm cut of inferior umbilical midline, the balloon was blown up in Bogros and preperitoneal space was made apparent with the help of laparoscope's blunt end. After supplying CO<sub>2</sub> from subumbilical port, two 5 mm trochars also was pushed forward in a non-blocking way from inferior umbilical midline under a 30 degree camera viewpoint. Dissection space was enlarged until symphysis pubis and inferior epigastric veins were seen inside and peripheral line of psoas appeared outside at a level of spina iliac anterosuperior. All the adherence around hernia sac was separated. A prolene mesh made in proper sizes was fixed via a tacker after being laid as so close hernia space.

## TAPP Technique

Intraabdominal pressure was stabilized at 12 mmHg after generating pneumoperitoneum via veress needle. A 10 mm trochar was implanted into abdomen for the camera through a subumbilical incision. An exploration was performed via laparoscope for any possible intraabdominal pathology. Two 5 mm trochars that would be used from a distance of 5 cm by both the surgeon and his resident were embedded from periphery of rectus abdominus (linea semilunaris) muscles in a way to become on abdominal transverse line. In TAPP technique performed on only three cases, operations after trochars were implanted into abdomen directly, gas insufflation and peritoneum was cut in inguinal region were made as in TEPP technique. The prolene mesh made in proper sizes was fixed via a tacker after being laid as so close hernia space. Then, peritoneum was tapped via absorbable suture.

## Results

The technique of TEPP was practiced on 53 out of 56 patients with inguinofemoral hernia who were included into the study and TAPP was practiced on 3 patients. The median age of the patients included in this study was 45.5 (17–73) and male/female ratio was seen as 4,6. 53 out of 56 patients were with inguinal hernia and 3 of them were with femoral hernia. 47 out of 53 inguinal hernias were indirect whereas 6 of them were direct. 3 out of inguinal hernias were indirect and recurrent. Bilateral inguinal hernia was existing in 8 patients (Table 1). One of the patients with indirect hernia had also undescended testis,

**Table 1. Hernia types**

Total patient	Indirect inguinal hernia	Direct inguinal hernia	Femoral hernia	Bilateral inguinal hernia
56 (100%)	47 (83.9%)	6 (10.7%)	3 (5.4%)	8 (14.3%)

laparoscopic orchiectomy was performed on this patient as well as repair of laparoscopic hernia. The average duration of follow-up of our patients was 12 (2–24) months and no recurrence was determined in this period. Early complication was seen in 5 out of 53 patients on whom the technique of TEPP was performed and 2 out of 3 patients on whom the technique of TAPP was performed. Superficial skin infection was determined in 1 patient for each group. In 1 patient on whom the technique of TAPP was practiced, subcutaneous hematoma was observed in early period (Table 2).

Average operation duration is 60 (25–120) minutes. The average hospitalization period of our patients was determined as 1.5 days. Early complications were more apparent in patients on whom TAPP was performed and it was seen that hospitalization period of all the patients

exposed to both techniques had lengthened out. The average start-up time of patients working actively is 7 days. In our patients, advanced age was seen as 65 the most frequently among comorbid factors (Table 3).

## Discussion

From past to present, patients who had the diagnosis of inguino-femoral hernia have been treated with a lot of various surgical methods at the polyclinic of general surgery. In parallel with technological developments, that high ligation was performed on hernia sac without using any prosthetic mesh was firstly defined by Ger. At the beginning of 1900s, transabdominal approaches such as Transabdominal Preperitoneal (TAPP) were described. However, high complications such as high recurrence rate, intraabdominal organ damage and adherence caused clinicians to look for new methods. The technique of Total Extraperitoneal (TEPP) performed by putting a mesh in preperitoneal space without going into abdomen was defined by McKernan and Laws in 1993.<sup>[4,5]</sup> According to European Association of Hernia, laparoscopic techniques are preferred in females with hernia because femoral hernia is detected better and mesh is implanted more easily into preperitoneal space in its repair.<sup>[6]</sup> In this study, the number of femoral hernia belonging to female patients who had a hernia operation is stated as 3. The average operation duration of cases in which inguinal and femoral hernia were repaired via laparoscopic method in this study was determined as 60 minutes. In literature review, it is seen that this duration is over average literature data. The average operation period is 53 minutes in 400 TEPP hernia repairs made by Felix.<sup>[7]</sup> It is considered that 8 operated patients had bilateral inguinal hernia and 3 patients had recurrence caused operation period to lengthen out. Laparoscopic method and simultaneous hernia repair are seen as a rational method for bilateral inguinal hernia and it is regarded as the most important indication of repair of recurrent hernia and laparoscopic hernia.<sup>[8]</sup> Also, it was stated that a new laparoscopic technique had a obvious learning curve and it was indicated that this curve reported between 80–250 cases in literature at early times<sup>[9]</sup> whereas 25 cases were enough for learning curve

**Table 2. Complications in laparoscopic hernia repair**

Complications	Operation types	
	TEPP (n=53)	TAPP (n=3)
Superficial skin infection	1 (1.8%)	1 (1.8%)
Scrotal pain	1 (1.8%)	0
Urinary infection	1 (1.8%)	0
Orchitis	1 (1.8%)	0
Seroma (False recurrence)	1 (1.8%)	0
Hematoma	0	1 (1.8%)

TEPP: Total Extraperitoneal Preperitoneal; TAPP: Transabdominal Preperitoneal.

**Table 3. Comorbid factors**

Comorbid factors	Number of patients	Ratio (%)
COPD	4	7.14
Complaints of prostatism	3	5.35
Advanced age (65 and over)	5	8.92

COPD: Chronic obstructive pulmonary disease.

in recent studies.<sup>[10]</sup> The patients on whom method of hernia repair was performed via laparoscopic TEPP and TAPP methods have less postoperative pain, their hospitalization and active start-up periods are shorter and cosmetic superiority is in the forefront for them.<sup>[11]</sup> According to the results of this study, average hospitalization time is 1,5 days and active start-up period is 7 days in keeping with literature. No major complication was determined in our patients on whom inguinal and femoral hernia were repaired via TEPP and TAPP methods. Some complications such as colonic perforation, ileus, bladder injury, testicular infarction, pneumothorax, inferior epigastric artery injury are rarely reported.<sup>[12,13]</sup> The number of postoperative minor early complications is 7 in our study. Minor early complications were stated in 5 patients (9.4%) out of 53 repaired through TAPP and 2 patients (66.6%) out of 3 repaired through TEPP. Superficial skin infection was determined in 1 patient for each group. In 1 patient on whom the technique of TAPP was practiced, subcutaneous hematoma was observed in early period. In all the series, hematoma is the most frequently stated complication.<sup>[14]</sup> Other early complications such as scrotal pain, urinary infection, orchitis and seroma were seen in 1 patient in each group and they were treated medically. Recurrence is maybe the most unlucky complication of laparoscopic repair of hernia. In the early periods of such kind of attempts, unfortunate and unsuccessful ones caused early recurrences with a high rate, therefore repairing hernias laparoscopically was looked with suspicion for a long time. In recent studies, the rate of early recurrence was reported as 0.1%.<sup>[15]</sup> Although follow-up time was short in our study, no recurrence was determined.

## Conclusion

Repair of inguinal and femoral hernia through laparoscopic TEPP and TAPP methods is preferred because postoperative analgesic is slightly required, start-up time for daily activities and active business life is short after operation, cosmetic results are better and postoperative complications are few in bilateral inguinal hernias and recurrence hernias.

## Disclosures

**Ethics Committee Approval:** The study was approved by the Local Ethics Committee at Kafkas University.

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

**Conflict of Interest:** None declared.

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