

Comparison of Telescopic and Balloon Dissection Techniques in Total Extraperitoneal Inguinal Hernia Repair: A Retrospective Analysis

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Abstract

Background: Totally extraperitoneal (TEP) inguinal hernia repair involves creating a preperitoneal space with balloon dissection (BD) or telescopic dissection (TD). This study aimed to compare the outcomes of TD and BD techniques in TEP inguinal hernia repair in male patients.

Methods: A retrospective analysis was conducted on male patients who underwent TEP hernia repair by a single surgeon between November 2023 and November 2024. Patients were divided into two groups based on the technique used to create the preperitoneal space: BD or TD. Demographic data, operative outcomes, and postoperative pain scores were compared between the groups. Statistical significance was set at $p < 0.05$.

Results: A total of 49 patients were included, with 31 in the TD group and 18 in the BD group. The BD group had significantly shorter operative times (37.8 ± 15.8 vs. 45.6 ± 17.4 minutes, $p = 0.029$). Postoperative pain at the 3rd hour was significantly lower in the TD group (2.0 ± 2.1 vs. 3.0 ± 1.6 , $p = 0.018$). Pain scores at later time points and other parameters, including peritoneal rupture rates and hospital stay duration, were comparable between the groups.

Conclusion: Both TD and BD are safe and effective techniques for TEP hernia repair. BD may reduce operative time, while TD offers superior early postoperative pain control. The choice of technique should be guided by patient characteristics, surgeon expertise, and cost considerations.

Keywords: Total Extraperitoneal Hernia Repair, Balloon Dissection, Telescopic Dissection, Postoperative Pain

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INTRODUCTION

Laparoscopic totally extraperitoneal (TEP) inguinal hernia repair is among the most frequently applied techniques for inguinal hernia (1). One of the critical steps in TEP hernia repair is the creation of an adequate preperitoneal space (PPS). Complications such as epigastric artery bleeding or peritoneal rupture during this step can obscure the surgical field and complicate the procedure (2). In such cases, it may be necessary to convert to a transabdominal preperitoneal (TAPP) approach or open hernia repair (3).

Balloon dissection (BD) is commonly used to create an adequate PPS. However, the blunt dissection caused by BD may lead to bleeding or peritoneal laceration (4). Another method for PPS creation is the telescopic dissection (TD) technique, which is hypothesized to allow for more controlled dissection under direct visualization (5). Recent studies have reported no significant differences in complications between the two techniques (2).

Studies comparing BD and TD in TEP hernia repair have yielded inconclusive results. Therefore, the present study aimed to compare these two techniques for creating an adequate PPS.

MATERIALS AND METHODS

This retrospective study included male patients who underwent TEP inguinal hernia repair performed by a single surgeon between November 2023 and November 2024. The study was approved by the local ethics committee (Gaziantep City Hospital Clinical Research Ethics Committee (2024/88, date: 20.11.2024)). Male patients over 18 years of age who underwent TEP hernia repair for inguinal hernia were included. Patients requiring emergency surgery, those with scrotal hernias, recurrent inguinal hernias, bilateral inguinal hernias, or a history of prior abdominal surgery were excluded. Patients with bleeding disorders and plegic patients were not included in the study. In addition, patients who did not speak Turkish and were illiterate were not included in the study.

Data were collected retrospectively from the hospital information system and patient files. Demographic data, surgical details, Numeric Rating Scale (NRS) pain scores (6), and other relevant information were recorded in an Excel file. Hernia dimensions were recorded according to radiological imaging results. Patients were divided

into two groups: those who underwent BD group and those who underwent TD group.

Surgical Technique

A 10-mm incision was made below the umbilicus, and the rectus sheath was incised to lateralize the rectus muscle. In the BD group, a balloon trocar was inserted, inflated, and left for three minutes before removal. A 10-mm trocar was then placed. In the TD group, a 10-mm trocar was directly inserted, and the Retzius space was opened under camera guidance. Once the initial workspace was created, the remaining operational steps were the same for both groups. For both groups, two additional 5 mm working trocars were inserted along the midline, and a 10×15 cm polypropylene mesh was placed over the hernia sites after appropriate dissection. The mesh was fixed with two absorbable tackers to the Cooper ligament at the medial and posterior aspects of the transverse abdominis aponeurosis.

Pain Management

All patients received 1000 mg paracetamol intravenously every 8 hours after surgery. If patients had pain unresponsive to paracetamol, 100 mg tramadol was administered intravenously. Additional dose analgesic application was recorded in the Excel file.

Statistical Analysis

Statistical analysis was performed using SPSS Statistics version 21. Continuous variables such as age, BMI, operative time, and postoperative NRS pain scores were expressed as mean \pm standard deviation and analyzed using the independent sample t test. Categorical variables such as ASA grade and hernia type were analyzed using the Chi-square test or Fisher's exact test, as appropriate. A p value of <0.05 was considered statistically significant.

RESULTS

A total of 49 male patients were analyzed, with 31 in the telescopic dissection group and 18 in the balloon dissection group. The groups had similar results in terms of age (42.8 ± 8.0 vs. 46.0 ± 4.3 years, $p = 0.332$), BMI (25.0 ± 2.8 vs. 25.7 ± 3.1 kg/m², $p = 0.198$), ASA scores, hernia types, hernia sides, and hernia diameters. The mean

operative time was significantly shorter in the balloon dissection group (37.8 ± 15.8 vs. 45.6 ± 17.4 minutes, $p=0.029$). Peritoneal laceration occurred in 9 patients in the telescopic group and 2 patients in the balloon group ($p=0.147$). Hospitalization duration was similar between groups (1.1 ± 0.4 vs. 1.0 ± 0.2 days, $p=0.188$) (Table 1). No complications occurred in any patient.

Postoperative pain at the 3rd hour was lower in the telescopic dissection group (2.0 ± 2.1 vs. 3.0 ± 1.6 , $p=0.018$), while pain scores at the 6th, 12th, and 24th hours showed no significant differences (Table 2).

Table 1: Comparison of characteristics between the groups

Characteristics	Telescopic dissection (n=31)	Balloon dissection (n=18)	P value
Age (years)	42.8 ± 8.0	46.0 ± 4.3	0.332
BMI (kg/m ²)	25.0 ± 2.8	25.7 ± 3.1	0.198
ASA score			
I	21	13	0.257
II	6	5	
III	4	0	
Comorbidities			
Diabetes	4	2	0.854
Hypertension	4	3	0.717
Hernia type			
Medial	6	5	0.349
Lateral	22	13	
Both	3	0	
Hernia side			
Right	18	7	0.161
Left	13	11	
Hernia diameter (mm)	15.6 ± 5.0	14.8 ± 1.3	0.727
Operative time (minutes)	45.6 ± 17.4	37.8 ± 15.8	0.029
Peritoneal laceration (n)	9	2	0.147
Hospitalization day	1.1 ± 0.4	1.0 ± 0.2	0.188
Need additional analgesics	3	2	0.873
BMI=Body mass index, ASA= American Society of Anesthesiologists			

Table 2: Comparison of postoperative pain between groups at 3rd, 6th, 12th and 24th hours

Timing of the pain	Telescopic dissection (n=31)	Balloon dissection (n=18)	P value
Pain at 3th hour	2.0 ± 2.1	3.0 ± 1.6	0.018
Pain at 6th hour	1.9 ± 1.4	2.0 ± 1.1	0.783
Pain at 12th hour	1.9 ± 1.5	1.9 ± 0.7	0.771
Pain at 24th hour	1.7 ± 1.2	1.2 ± 1.0	0.188

DISCUSSION

This study evaluated the outcomes of telescopic and balloon dissection techniques in male patients undergoing TEP hernia repair. Our findings highlight the distinct advantages and comparable safety profiles of both methods, providing valuable insights for clinical decision-making.

The shorter operative time observed in the balloon dissection group aligns with previous studies emphasizing its efficiency in creating the PPS (7,8). This may be attributed to the occasional displacement of the inferior epigastric vessels and the time required for lateral dissection during PPS creation. Notably, increased peritoneal laceration during TD may narrow the surgical field and prolong operative time (7).

Peritoneal laceration during TEP hernia repair are among the leading causes of conversion to TAPP or open hernia repair (9). For surgeons in the early stages of their learning curve, identifying anatomical structures in a constricted field can be challenging, complicating the TEP procedure (10). The effectiveness of TD heavily depends on the surgeon's familiarity with the PPS. Thus, BD may be a more suitable option for surgeons early in their learning curve (2,11).

The telescopic dissection group demonstrated significantly lower pain scores at the third postoperative hour. However, pain scores between the groups equalized at the sixth postoperative hour and beyond, indicating that both techniques provide comparable mid- to long-term analgesic outcomes. Similar studies have also reported no significant differences in postoperative pain outcomes between BD and TD groups (7,12,13). Early pain control is critical for improving patient satisfaction

and facilitating faster recovery, key components of enhanced recovery after surgery protocols (14).

Cost is another significant consideration in the choice of technique. Cost-effectiveness calculations depend on several factors, including the materials used, operative time, and length of hospital stay (15). While some studies have shown that the use of balloon trocars increases costs by over \$350, others have reported smaller cost differences (8,16,17). These variations depend on the type of balloon used, with a wide range of brands available. Considering the reduced operative time with BD, debates remain about which technique is more cost-effective (18). Ultimately, cost-effectiveness must be evaluated based on multiple factors.

This research has certain limitations, including a limited sample size. The absence of long-term follow-up inhibits the ability to draw conclusions on hernia recurrence rates or chronic pain outcomes. In addition, the fact that the study was retrospective and did not conduct a cost analysis are other limitations. Subsequent research with larger cohorts, multicenter collaboration, and prolonged follow-up is essential to corroborate these results and evaluate their influence on long-term patient outcomes.

Both telescopic and balloon dissection techniques are safe for TEP hernia repair in male patients, each offering unique advantages. Balloon dissection is associated with shorter operative times, while telescopic dissection may provide better early postoperative pain control. The choice of technique should be tailored to individual patient characteristics, surgeon expertise, and cost considerations.

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Abbreviations list

ASA: American Society of Anesthesiologists
 BD: balloon dissection
 BMI: body mass index
 NRS: numeric rating scale
 PPS: preperitoneal space
 TAPP: transabdominal preperitoneal
 TD: telescopic dissection
 TEP: total extraperitoneal

Ethics approval and consent to participate

Informed consent was obtained from all participants.

Consent for publication

It does not contain any personal data.

Availability of data and materials

Not available.

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