



OPEN VERSUS LAPAROSCOPIC TRANSABDOMINAL PREPERITONEAL INGUINAL HERNIA REPAIR: A COMPARATIVE STUDY OF OPERATIVE OUTCOMES AND POSTOPERATIVE COMPLICATIONS

General Surgery

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ABSTRACT

Background: Inguinal hernia repair is among the most common surgical procedures worldwide. Open preperitoneal repair and laparoscopic transabdominal preperitoneal repair are widely used, but their relative advantages remain debated. **Objectives:** To compare operative outcomes, postoperative pain, complications, and recurrence between open preperitoneal and laparoscopic TAPP inguinal hernia repair. **Methods:** This prospective comparative study included 60 patients with primary or first recurrent inguinal hernia, randomized equally into open preperitoneal repair (n=30) and laparoscopic TAPP repair (n=30). Outcomes assessed included operative time, hospital stay, pain (VAS at 6 h, 48 h, 1 wk, 8 wk, 12 mo), ambulation, complications, and recurrence. Data were analyzed using independent t-test and Chi-square/Fisher's exact test. **Results:** Mean age and hernia type distribution were comparable. Operative time was longer in TAPP (142.4 vs 102.3 min, $p<0.001$). Hospital stay was similar (2.04 vs 2.02 days, $p=0.91$). Early ambulation (<2 h) was more common in open repair (16.7% vs 0%, $p=0.02$) under regional anesthesia, whereas delayed ambulation (6–24 h) was more common in TAPP (46.7% vs 16.7%, $p=0.03$). Postoperative pain was significantly lower in TAPP at 6 h, 48 h, and 1 wk ($p<0.05$). Complications were infrequent and not significantly different. One recurrence occurred in TAPP at 12 months. **Conclusion:** Both techniques are safe and effective. TAPP provides lower early postoperative pain but requires longer operative time, while open repair permits earlier ambulation under regional anesthesia. Long-term recurrence rates are comparable.

KEYWORDS

Inguinal Hernia, Laparoscopic Hernia Repair, TAPP, Open Preperitoneal Repair, Mesh Repair

INTRODUCTION

Inguinal hernia is one of the most frequent general surgical conditions, with a lifetime risk of 27% in men and 3% in women (1). Repair techniques have evolved from tissue-based sutured methods to mesh-based tension-free repairs, which markedly reduced recurrence rates (2).

The advent of laparoscopy introduced minimally invasive techniques, particularly transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) approaches, which have gained popularity due to benefits of less postoperative pain, early return to work, and improved cosmesis (3,4). However, these procedures require general anesthesia, longer operative times, and specialized expertise (5). Open preperitoneal mesh repair, on the other hand, is feasible under regional anesthesia, technically simpler, and widely practiced (6).

Evidence from randomized controlled trials has been mixed. Some studies reported less pain and faster recovery after laparoscopy (7,8), while others found comparable or even superior results with open repair regarding recurrence and complications (9–12).

This study aimed to compare open preperitoneal mesh repair and laparoscopic TAPP repair in terms of operative duration, pain, complications, hospital stay, and recurrence.

MATERIALS AND METHODS

Design and Setting: Prospective comparative study at a tertiary care teaching hospital

Participants: 60 adult patients (30–80 years) with primary or first recurrence inguinal hernia. **Inclusion:** ASA grade I–II. **Exclusion:** irreducible/obstructed hernia, >1 recurrence, ASA grade $\geq$ III, giant hernia, prior major lower abdominal surgery, contraindications to laparoscopy.

Groups:

- Group A (n=30): Open preperitoneal repair
- Group B (n=30): Laparoscopic TAPP repair

Surgical Technique:

- Open preperitoneal repair: Preperitoneal space is reached with dissection, 10×12 cm polypropylene mesh placed and fixed to Cooper's ligament and transverse fascia.

- TAPP repair: Three-port laparoscopy, peritoneal incision, hernia sac dissection, placement of 10×12 cm polypropylene mesh with staple fixation, peritoneal closure.

Outcome Measures: Operative time, hospital stay, pain (VAS), ambulation time, complications (seroma, scrotal edema, emphysema, SSI, mesh removal, paresthesia/chronic pain), recurrence.

Statistical Analysis: Independent t-test for continuous variables; Chi-square/Fisher's exact test for categorical variables. $p<0.05$ considered significant.

RESULTS

Baseline Characteristics: Groups were comparable in age, side, and hernia type (Table 1).

Operative Outcomes: Mean operative time was longer in TAPP (142.4 ± 22.7 vs 102.3 ± 18.2 min, $p<0.001$). Hospital stay was similar (~ 2 days, $p=0.91$). Ambulation within 2 h was higher in open repair (16.7% vs 0%, $p=0.02$); ambulation at 6–24 h was more frequent in TAPP (46.7% vs 16.7%, $p=0.03$) (Table 2).

Pain: TAPP patients had significantly lower VAS scores at 6 h, 48 h, and 1 wk ($p<0.05$). At 8 wk and 12 mo, differences were not significant (Table 3).

Complications: Both groups showed low complication rates, with no significant differences. Seroma and scrotal edema were more frequent in open repair, while emphysema occurred only in TAPP. One recurrence occurred in the TAPP group at 12 months (Table 4).

Table 1. Baseline Characteristics of Patients

Variable	Category	Open (n=30)	TAPP (n=30)	p-value
Mean age (years)	–	55.9 ± 9.8	53.2 ± 10.4	0.42
Side of hernia	Left	11 (36.7%)	16 (53.3%)	0.28
	Right	18 (60.0%)	12 (40.0%)	
	Bilateral	1 (3.3%)	2 (6.7%)	
Type of hernia	Direct	13 (43.3%)	12 (40.0%)	0.79
	Indirect	17 (56.7%)	18 (60.0%)	

Table 2. Operative and Hospital Stay Details

Variable	Category	Open (n=30)	TAPP (n=30)	p-value
Duration of surgery (min)	–	102.3 ± 18.2	142.4 ± 22.7	<0.001
Hospital stay (days)	–	2.04 ± 0.6	2.02 ± 0.5	0.91
Ambulation	<2 h	5 (16.7%)	0 (0%)	0.03
	2–6 h	20 (66.7%)	16 (53.3%)	
	6–24 h	5 (16.7%)	14 (46.7%)	

Table 3. Post-operative Pain (VAS scores)

Time point	Open (n=30)	TAPP (n=30)	p-value
6 hours	4.8 ± 0.9	4.26 ± 1.0	0.04
48 hours	1.7 ± 0.6	1.36 ± 0.5	0.03
1 week	0.52 ± 0.2	0.28 ± 0.1	0.01
8 weeks	0.16 ± 0.1	0.08 ± 0.05	0.08
12 months	0.06 ± 0.03	0.00	0.12

Table 4. Post-operative Complications and Recurrence

Outcome	Category	Open (n=30)	TAPP (n=30)	p-value
Seroma	–	2 (6.7%)	0 (0%)	0.49
Scrotal edema	–	3 (10.0%)	1 (3.3%)	0.61
Surgical emphysema	–	0 (0%)	2 (6.7%)	0.49
SSI	Superficial	1 (3.3%)	1 (3.3%)	1.00
	Deep	1 (3.3%)	0 (0%)	1.00
Mesh removal	–	1 (3.3%)	0 (0%)	1.00
Paresthesia/chronic pain	–	2 (6.7%)	1 (3.3%)	1.00
Recurrence	1 week	0 (0%)	1 (3.3%)	1.00
	8 weeks	0 (0%)	0 (0%)	–
	12 months	0 (0%)	1 (3.3%)	1.00

DISCUSSION

This study demonstrates that both open preperitoneal and laparoscopic TAPP repair are effective with low complication rates, but each has specific strengths.

Operative duration was significantly longer in TAPP, in agreement with Leibl et al. (6) and Barkun et al. (7), reflecting the technical complexity and learning curve.

Pain outcomes were better in TAPP at early follow-up, supporting earlier findings by Lawrence et al. (5) and Johansson et al. (3). By 8 weeks and 12 months, pain outcomes equalized, consistent with Neumayer et al. (8).

Ambulation was earlier in the open group, likely because it can be performed under regional anesthesia. Similar trends were noted by Stoker et al. (4).

Complications were infrequent in both groups. Seroma and scrotal edema were slightly higher in open repair, while emphysema was unique to TAPP, consistent with reports by Maddern et al. (5) and Wellwood et al. (9). None of these differences were statistically significant.

Recurrence was low overall, with only one recurrence in the TAPP group at 12 months, aligning with multicenter data by Johansson et al. (3) and Neumayer et al. (8).

Overall, both approaches are safe and effective. The choice should be individualized depending on patient comorbidities, anesthesia feasibility, surgical expertise, and resource availability.

CONCLUSION

Both open preperitoneal and laparoscopic TAPP inguinal hernia repairs are safe and effective. TAPP provides less short-term pain but requires longer operative time, while open repair facilitates earlier ambulation under regional anesthesia. Long-term recurrence and complication rates remain comparable.

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