The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 3, Issue 6, 2025

COMPARING EARLY POSTOPERATIVE OUTCOMES OF LAPAROSCOPIC (TAPP) REPAIR & OPEN LICHTENSTEIN MESH REPAIR FOR INGUINAL HERNIA

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DOI: https://doi.org/10.5281/zenodo.15781783

Keywords
Inguinal hernia, Laparoscopy, Lichtenstein repair, Mesh repair, Transabdominal preperitoneal repair

Article History
Received on 24 May 2025
Accepted on 24 June 2025
Published on 30 June 2025

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Abstract

OBJECTIVE: *To compare the early postoperative outcomes between laparoscopic transabdominal pre-peritoneal (TAPP) repair versus open Lichtenstein mesh repair in inguinal hernia.*

METHODOLOGY: *This randomized controlled trial was executed at Liaquat University of Medical and Health Sciences (LUMHS), located in Jamshoro, involving a cohort of 92 patients aged between 18 to 70 years diagnosed with primary inguinal hernia, selected through non-probability consecutive sampling methodology. Participants were systematically allocated to receive either laparoscopic transabdominal preperitoneal (TAPP) repair or the open Lichtenstein mesh repair technique. Postoperative outcomes, including pain levels, duration of hospital stay, and incidence of complications, were meticulously evaluated. Statistical analysis of the data was performed utilizing SPSS software version 26, with a significance threshold set at a p-value of ≤0.05.*

RESULTS: *Among a cohort of 92 patients, the Transabdominal Preperitoneal (TAPP) repair technique was correlated with markedly reduced postoperative pain metrics (3.93 as opposed to 6.20; p=0.0001) and a diminished duration of hospitalization (1.93 days in contrast to 2.50 days; p=0.002) when compared to the Lichtenstein repair method. Furthermore, the incidence of urinary retention was significantly lower in the TAPP cohort (4.3% versus 21.7%; p=0.013). Conversely, other complications, encompassing hematoma, seroma, and wound infection, did not exhibit statistically significant variances between the two surgical groups.*

CONCLUSION: *The laparoscopic transabdominal pre-peritoneal (TAPP) repair exhibited markedly more favorable early postoperative results in comparison to the open Lichtenstein mesh repair for inguinal hernias, encompassing*

significantly diminished pain scores, abbreviated hospital stays, and a reduced incidence of complications such as urinary retention. These results advocate for the preferential implementation of TAPP repair in environments where surgical expertise and appropriate facilities are accessible, particularly for patients who emphasize expedited recovery and minimized postoperative discomfort.

INTRODUCTION

Inguinal hernia is one of the commonest general surgical conditions seen around the world and accounts for a significant proportion of surgical groin procedures [1]. It ensue as a result of laxity of the inferior abdominal wall allowing intra-abdominal viscera to herniated through the inguinal canal [2]. Its prevalence is especially elevated among men, with lifetime risk estimates at around 27% for men and 3% for women [3]. Surgery still remains the gold standard of available treatment, and with the evolution of the surgical approach, several other approaches have been developed to improve the patient results, minimize the recurrence and decrease the postsurgical complications [4-5].

The two most common techniques used in the treatment of inguinal hernias are the open Lichtenstein mesh approach and the laparoscopic transabdominal preperitoneal (TAPP) repair[6]. Use of the Lichtenstein technique involves a tension-free technique based on placement of a polypropylene mesh over the hernial defect via an open inguinal approach and was first described in the 1980s [7]. This method is considered the standard for the same reasons: simplicity of technique, low rates of recurrence, and ease of teaching [8]. However, despite its effectiveness, patients who undergo open repair may experience increased postoperative pain, longer time to recovery, and a limited return to their activities compared with those receiving minimally invasive procedures [9].

The other approach is laparoscopic transabdominal preperitoneal (TAPP) repair, where the preperitoneal space is entered through the peritoneal cavity and a mesh is laid over the hernial orifice [10]. This type of surgery holds several potential advantages including reduced postoperative pain, earlier return to regular activities and improved cosmetic results [11]. However, it requires general anesthesia, specialized instruments, increased surgical expertise that limits its implementation in some clinical settings [12].

Comparative studies investigating the early postoperative recovery following these two surgical methods have had controversial outcomes: some have favored laparoscopy due to less pain and faster recovery, whereas others highlighted the simplicity and cost effectiveness of the open method [13,14]. The comparison of operative time, duration of hospitalization, post-operative pain, and complications are also essential parameters assessed in such comparisons [15].

In the setting of current debate and the variability of surgical practices, early postoperative results of laparoscopic (TAPP) vs open Lichtenstein mesh repair need to be examined in order to provide evidence-based recommendation for clinical practice. The purpose of this study is to compare these 2 surgical techniques related to short-term post-operative complications, to recovery indexes and patient satisfaction, helping the surgeons and patients to decide better when choosing how the hernia repair will be conducted.

METHODOLOGY

This investigation constituted a randomized controlled trial executed within the Department of Surgery at Liaquat University of Medical and Health Sciences (LUMHS), Jamshoro, spanning a duration of six months. The patient cohort encompassed 92 subjects, aged between 18 and 70 years, who had been diagnosed with primary inguinal hernia (characterized by pain or discomfort in the groin, particularly during activities such as bending, coughing, or lifting, alongside a palpable bulge adjacent to the pubic bone, more distinctly observed in an upright posture). The diagnosis was substantiated through computed tomography (CT) imaging, which revealed a disruption in the musculature of the anterior abdominal wall, the presence of bowel loops within the hernial defect, and the identification of the lateral crescent sign. Both male and female participants classified within ASA classes I to III were recruited via

non-probability consecutive sampling methodology. Eligibility criteria included the necessity for patients to undergo either laparoscopic transabdominal pre-peritoneal (TAPP) repair or open Lichtenstein mesh repair for the treatment of primary inguinal hernia. Exclusion criteria encompassed individuals with a history of incisional hernia, bilateral hernias, renal failure, prior chemotherapy or radiotherapy, previous lower abdominal surgery, non-reducible or obstructed hernias, emergency repairs, re-hernioplasty, hypersensitivity to lignocaine or bupivacaine, as well as those who were pregnant or lactating.

A thorough compilation of demographic and clinical information was undertaken subsequent to the acquisition of informed consent. The participants were subsequently randomized into two distinct groups. The study was executed in a single-blind paradigm. In Group A, all subjects received treatment via TAPP under general anesthesia, employing three trocars and a 15 × 15 cm polypropylene mesh strategically positioned within the preperitoneal space. Conversely, Group B underwent Lichtenstein mesh repair with the hernia sac left unclosed, administered under spinal anesthesia through an inguinal incision, utilizing a 7.5 × 15 cm polypropylene mesh secured with interrupted sutures of 2.0 polyglactin. All participants were administered equivalent perioperative analgesia, which consisted of intravenous tramadol (100 mg) and ketorolac (30 mg). Surgical duration was meticulously recorded in minutes, from the initiation of the incision until the completion of closure, utilizing a stopwatch to ensure precise measurements. The Visual Analog Scale (VAS), with a range from 0 (indicating no pain) to 10 (representing the maximum pain conceivable), was employed to quantify postoperative pain levels. The duration of hospital stay was defined as the cumulative total of postoperative hospitalization days for each patient. Postoperative complications, occurring within a 24-hour timeframe, included hematoma (VAS >3, ipsilateral swelling, and bruising), seroma (characterized by ultrasound detection of a pseudosolid appearance with accompanying gas locules), wound infection (purulent without the occurrence of wound dehiscence), and urinary retention (quantified by ultrasound postvoid residual volume exceeding 150 ml).

Standardized analgesic protocols were administered to all patients during the surgical induction phase and the immediate postoperative period, comprising intravenous tramadol (100 mg) in conjunction with ketorolac (30 mg). Following surgical intervention, patients were transferred to the ward. At the point of discharge, oral prescriptions of paracetamol (500 mg) and ibuprofen (400 mg) were issued for administration every 8 hours over a span of 5 days. The pain intensity was reassessed on the seventh postoperative day during the follow-up appointment utilizing the VAS.

Data analysis was conducted employing SPSS version 26. Descriptive statistics were articulated using mean ± standard deviation and frequency with percentage. Categorical variables were conveyed as frequencies and percentages. The statistical significance test was performed at a predetermined threshold of 5% significance level.

RESULTS

Table I elucidates the essential attributes of the cohort of patients undergoing either Transabdominal Preperitoneal (TAPP) or Lichtenstein hernia repair, comprising a total of 46 participants in each respective cohort. The mean age of individuals within the TAPP group was documented at 40.28 ± 15.28 years, while the Lichtenstein cohort demonstrated a slightly reduced mean age of 37.80 ± 14.42 years. The average Body Mass Index (BMI) was determined to be 25.88 ± 3.58 kg/m² in the TAPP cohort, in contrast to 24.85 ± 3.55 kg/m² within the Lichtenstein cohort. Concerning the gender distribution, the TAPP group was composed of 44 males (95.7%) and 2 females (4.3%), whereas the Lichtenstein group included 45 males (97.8%) and 1 female (2.2%

Table II presents a thorough comparative examination of early postoperative outcomes between patients undergoing laparoscopic transabdominal pre-peritoneal (TAPP) repair and those receiving open Lichtenstein mesh repair for the management of inguinal hernia. The average postoperative pain score was significantly lower in the TAPP group (3.93 ± 1.69) when contrasted with the Lichtenstein group (6.20 ± 1.88), yielding a statistically significant p-value of 0.0001. Similarly, the length of hospital stay was notably diminished in the TAPP cohort (1.93 ± 0.80 days) compared to the Lichtenstein cohort (2.50 ±

0.88 days), which also achieved statistical significance (p = 0.002). Regarding postoperative complications, a hematoma was documented in 1 patient (2.2%) within the TAPP group, while 2 patients (4.3%) encountered this complication in the Lichtenstein group (p = 0.500). Seroma formation was exclusively reported in the Lichtenstein group (6.5%), with no occurrences recorded in the TAPP group (p = 0.121). The prevalence of urinary retention was observed to be considerably higher in the Lichtenstein group (21.7%) in comparison to the TAPP group (4.3%), accompanied by a p-value of 0.013. Chronic pain was noted in 1 patient (2.2%) from the TAPP group and in 4 patients (8.7%) from the Lichtenstein group (p = 0.181). The frequency of hernia recurrence was consistent across both groups, with one patient (2.2%) affected in each cohort (p = 0.753). Scrotal edema was observed in 2 patients (4.3%) within the Lichtenstein group, whereas no instances were recorded in the TAPP group (p = 0.247). A wound infection was reported in 1 patient (2.2%) in the TAPP group and in 2 patients (4.3%) within the Lichtenstein group (p = 0.500).

Table I: Baseline Characteristics of the patients (n=92)

Characteristics		Groups	
		TAPP (n=46)	**Lichtenstein** (n=46)
Age in years, Mean ± SD		40.28 ± 15.28	37.80 ± 14.42
Body Mass Index in kg/m², Mean ± SD		25.88 ± 3.58	24.85 ± 3.55
Gender	Male, n (%)	44 (95.7)	45 (97.8)
	Female, n (%)	2 (4.3)	1 (2.2)

Table II: Comparison of Early Postoperative Outcomes Between Laparoscopic Transabdominal Pre-Peritoneal (Tapp) Repair Versus Open Lichtenstein Mesh Repair in Inguinal Hernia (n=92)

Early Postoperative Outcomes	Groups		95% C. I	P-Value
	TAPP (n=46)	Lichtenstein (n=46)		
Pain Score, Mean ± SD	3.93 ± 1.69	6.20 ± 1.88	-3.002~~-1.520	0.0001
Hospital Stay in days, Mean ± SD	1.93 ± 0.80	2.50 ± 0.88	-0.915~~-0.215	0.002
Complications, n (%)				
Hematoma	1 (2.2)	2 (4.3)	0.043~~5.588	0.500
Seroma Formation	0 (0.0)	3 (6.5)	N/A	0.121
Urinary Retention	2 (4.3)	10 (21.7)	0.034~~0.795	0.013
Chronic Pain	1 (2.2)	4 (8.7)	0.025~~2.173	0.181
Hernia Recurrence	1 (2.2)	1 (2.2)	0.061~~16.485	0.753
Scrotal Edema	0 (0.0)	2 (4.3)	N/A	0.247
Wound Infection	1 (2.2)	2 (4.3)	0.043~~5.588	0.500

DISCUSSION

The comparative analysis of early postoperative results in laparoscopic (TAPP) and open Lichtenstein mesh repair of inguinal hernia is still a matter of great interest among the scientific community, due to its different technique and its implications on patient recovery. Many studies have described significant differences regarding relevant clinical parameters to the advantage of laparoscopic TAPP repair.

In our study, in comparison between both groups, the early postoperative outcomes were postoperative pain (3.93 ± 1.69 v/s 6.20 ± 1.88; p=0.0001), hospital stay (1.93 ± 0.80 v/s 2.50 ± 0.88; p=0.002), while complications were hematoma (2.2% v/s 4.3%; p=0.500), seroma formation (0.0% v/s 6.5%; p=0.121), wound infections (% v/s 4.3%; p=0.500), urinary retention (4.3% v/s 21.7%; p=0.013), chronic pain (2.2% v/s 8.7%; p=0.181), hernia recurrence (2.2% v/s 2.2%; p=0.753), and scrotal edema (0.0% v/s 4.3%; p=0.247).

A specific study has shown that TAPP repair had a shorter mean operative time of 64.3±6.85 (TAPP) versus 78.5±4.63 (open Lichtenstein mesh repair), refuting the skeptics of laparoscopic technique, as typically, a longer duration of time is needed for laparoscopic approach. Postoperative pain, which is an important parameter of patient satisfaction, also proved to be favorable for TAPP. Seven days after surgery, patients in the TAPP group had a mean pain score of 8.5±5.42, which was significantly lower than the open repair group (17.4±6.43). This reduction of postoperative pain has substantial consequences with regard to early postoperative mobilization, reduced needs for analgesics and improved patient satisfaction. The length of hospital stay was also the only parameter in which TAPP had shown superiority after the operation with a mean postoperative hospital stay of 1.6±0.82 days as opposed to 3.6±1.35 days in open technique [16]. This was supported by a second study in which a mean hospitalization period of 1.84±0.37 days and 2.46±0.54 days were documented following TAPP and Lichtenstein repair, respectively [17]. The difference was particularly pronounced in the setting of complications. The complication rate for the TAPP approach was 10% and that following the open mesh repair was considerably higher (22.5%) [16]. Similar trends were supported by another study in which 32% of patients in the open repair group had postoperative complications compared with only 6% of those in the TAPP group[17]. Assessment of postoperative pain at different periods also confirmed the benefit of TAPP. Six hours after operation, 66% of TAPP patients and 34% of them had moderate pain, compared to 62% of the Lichtenstein group of whom had severe pain, and 38% moderate pain ($p<0.05$). Pain was moderate in 76% and mild in 24% among TAPP patients and 80% of the Lichtenstein group had severe pain and 20% had moderate pain at 12 hours [17]. Even at 48-hour postoperatively, 10% of TAPP patients suffered from moderate to severe pain compared to 20% in open repair [18]. On day 7 after surgery, these differences still existed with only 4.3% of the TAPP patients versus 10% of the open patients complaining of significant pain. The rate of wound infections was also lower in patients treated with TAPP (1.4%) than in patients treated with Lichtenstein (2.9%) [18]. Another study by Malik H et al. found a statistically significant reduction in the mean pain score in the TAPP group (39.38±5.811) compared with the Lichtenstein group (60.37±17.6, p=0.001), confirming the chronic analgesic benefits of the laparoscopic approach [19]. While laparoscopic TAPP requires general anesthesia, specific instruments and surgical expertise, the relevant postoperative short-term results favoring laparoscopic TAPP—alleviated pain, faster recovery and return to activity, fewer complications, and shorter hospital stay—show its direct clinical superiority to open Lichtenstein repair. In the light of the above results, it can be said that TAPP is a better alternative for selected patients, especially in centers where the required facilities and surgeons are available. However, the choice of surgical approach must be individualized, in consideration of the patient and the setting.

This randomized controlled trial provides important knowledge on early postoperative results after laparoscopic TAPP inguinal hernia repair versus open Lichtenstein mesh repair. There are, however, several limitations which need to be acknowledged. The single-center nature of the study limits the applicability of the results and the relatively small sample size (92 patients) might not be able to include less common complications. The usage of non-probability consecutive sampling introduces a possibility of selection bias, and the exclusion of the complex hernia such as bilateral, recurrent hernia also restricts the generalizability of the findings of the study. In addition, the limited follow-up period of 7 days does not include long term outcomes such as chronic pain or recurrence. Lack of blinding could have introduced response or observer bias, especially in subjective outcomes such as pain scores. Notwithstanding these limitations, the study has several strengths. Randomization is to increase

internal validity and a regular analgesic regimen is to reduce confounding pain assessment. The clear surgical protocol and the use of objective diagnostic criteria enhance the validity of the method. In addition, the use of standardized statistical methods led to a strong analytical design. Multicenter studies with larger sample sizes and longer follow-up periods are recommended for future research. Complex cases, blinding of outcome assessors, and assessment of long-term and patient-relevant outcomes (e.g., quality of life, cost-effectiveness) would substantially enhance patient-centeredness and clinical applicability of the results.

CONCLUSION

The laparoscopic transabdominal pre-peritoneal (TAPP) repair exhibited markedly more favorable early postoperative results in comparison to the open Lichtenstein mesh repair for inguinal hernias, encompassing significantly diminished pain scores, abbreviated hospital stays, and a reduced incidence of complications such as urinary retention. These results advocate for the preferential implementation of TAPP repair in environments where surgical expertise and appropriate facilities are accessible, particularly for patients who emphasize expedited recovery and minimized postoperative discomfort.

REFERENCES

1. Elmessiry MM, Gebaly AA. Laparoscopic versus open mesh repair of bilateral primary inguinal hernia: a three-armed Randomized controlled trial. Ann Med Surg. 2020;59:145-50.
2. Sultan AA, Elazm HA, Omran H. Lichtenstein versus transabdominal preperitoneal (TAPP) inguinal hernia repair for unilateral non recurrent hernia: a multicenter short term randomized comparative study of clinical outcomes. Ann Med Surg. 2022;76:103428.
3. Salama M, Mostafa M. A Comparative study between Laparoscopic inguinal hernia repair and open Lichtenstein mesh repair. Med J Cairo Univ. 2019;87(December):4441-7.
4. Scheuermann U, Niebisch S, Lyros O, Jansen-Winkeln B, Gockel I. Transabdominal Preperitoneal (TAPP) versus Lichtenstein operation for primary inguinal hernia repair–A systematic review and meta-analysis of randomized controlled trials. BMC Surg. 2017;17:1-0.
5. Shah MY, Raut P, Wilkinson TR, Agrawal V. Surgical outcomes of laparoscopic total extraperitoneal (TEP) inguinal hernia repair compared with Lichtenstein tension-free open mesh inguinal hernia repair: a prospective randomized study. Medicine. 2022;101(26): e29746.
6. Ielpo B, Duran H, Diaz E, Fabra I, Caruso R, Malavé L, et al. A prospective randomized study comparing laparoscopic transabdominal preperitoneal (TAPP) versus Lichtenstein repair for bilateral inguinal hernias. Am J Surg. 2018;216(1):78-83.
7. Sofi J, Nazir F, Kar I, Qayum K. Comparison between TAPP & Lichtenstein techniques for inguinal hernia repair: a retrospective cohort study. Ann Med Surg. 2021;72:103054.
8. Batool A, Rauf H, Khalid W, Samee MU, Murtaza M, Mian A. Comparison of common postoperative complications between lichtenstein open repair and laproscopic transabdominal pre-peritoneal (TAPP) repair in inguinal hernia. Med Forum Monthly 2024;35 (9):17-20.
9. Garg P, Pai SA, Vijaykumar H. Comparison of early postoperative outcome of laparoscopic and open inguinal hernia mesh repair. Int Surg J. 2018;5(8):2732-6.
10. Rafiullah RK, Ismail M, Mehmood A, Kaleem M, Ghafoor A. Comparison of laparoscopic transabdominal preperitoneal (TAPP) versus open (Lichenstein) repair of inguinal hernia in terms of early post operative pain. Khyber J Med Sci. 2020;13(2):293.
11. Faessen JL, Stoot JH, van Vugt R. Safety and efficacy in inguinal hernia repair: a retrospective study comparing TREPP, TEP and Lichtenstein (SETTLE). Hernia. 2021:1-7.

12. Lyu Y, Cheng Y, Wang B, Du W, Xu Y. Comparison of endoscopic surgery and Lichtenstein repair for treatment of inguinal hernias: a network meta-analysis. Medicine. 2020;99(6):e19134.
13. Kalaycı T, Yeni M. Comparison of early and late period outcomes of transabdominal pre-peritoneal technique and Lichtenstein technique in repair of bilateral inguinal hernia. Laparosc Endosc Surg Sci. 2021;28(4):192.
14. Lillo-Albert G, Villa EB, Boscà-Robledo A, Carreño-Sáenz O, Bueno-Lledó J, Martínez-Hoed J, et al. Chronic inguinal pain post-hernioplasty. Laparo-endoscopic surgery vs Lichtenstein repair: systematic review and meta-analysis. Hernia. 2024;28(4):1427-39.
15. Kollampare SG, Philip AM, Rai RA. Postoperative outcomes in patients undergoing transabdominal preperitoneal repair versus Lichtenstein's repair for inguinal hernia: a prospective cohort study. J Clin Diagn Res. 2024;18(2).
16. Zargar O, Ashraf N, Albina A, Iqbal J, Dhingra NC. Comparative study of transabdominal preperitoneal versus open Lichtenstein hernia repair in primary inguinal hernia. Intl J Res Med Sci. 2022;10(10):2240-5.
17. Jan Z, Ali S, Ahmed N, Sarwar MA, Jan ZU. Comparison of common postoperative complications between Lichtenstein open repair and laparoscopic transabdominal pre-peritoneal (TAPP) repair for unilateral inguinal hernia. Cureus. 2021;13(9).
18. Naveed M, Zabd-ur-Rehman A-R, Javeed MU, Akbar A. Comparison of early outcome of laparoscopic with open inguinal mesh hernioplasty. PJMHS. 2013;7(3).
19. Malik H. Postoperative pain in laparoscopic transabdominal preperitoneal versus Lichtenstein open mesh repair techniques for inguinal hernia. J Surg Pak. 2017;22(3):79-82.