

A RETROSPECTIVE COHORT STUDY ASSESSING TRANS-ABDOMINAL PRE-PERITONEAL PROCEDURE VERSUS LICHTENSTEIN APPROACH FOR INGUINAL HERNIA REPAIR

MOHIT KUMAR BADGURJAR*, PARTH BHUT, SUMAN PARIHAR, NEHA BAPORIKAR

Department of Surgery, Geetanjali Medical College and Hospital, Udaipur, Rajasthan, India.

*Corresponding author: Mohit Kumar Badgurjar; Email: mohitkumar294@gmail.com

Received: 25 January 2025, Revised and Accepted: 12 March 2025

ABSTRACT

Objective: Inguinal hernia is a common pathology diagnosed predominantly clinically in males as well as females. Imaging, preferably with ultrasound is indicated when the diagnosis is uncertain, or complicated inguinal hernia. Surgery is the only definitive treatment for inguinal hernia. Apart from the classical open inguinal hernia repairs, minimal access approaches are also increasingly preferred. However, the optimal surgical approach still remains controversial as both techniques have some pros and cons.

To compare the effectiveness of inguinal hernia repair utilizing the trans-abdominal pre-peritoneal repair (TAPP) and the Lichtenstein repair.

Methods: A retrospective study was planned, including 110 patients with unilateral or bilateral inguinal hernias admitted to the general surgery department of a tertiary care Centre. 42 patients who underwent the TAPP approach and 68 patients who underwent the Lichtenstein procedure were included in the study retrospectively. Using an institutional Hernia follow-up registry and telephonic conversations with patients, the incidence of post-operative pain and other complications were noted and compared.

Results: TAPP for inguinal hernias outperformed Lichtenstein in terms of post-operative discomfort and incidence of pain without increasing complications or recurrence rates.

Conclusion: TAPP surpassed the Lichtenstein operation in terms of post-operative discomfort and medication use for therapeutic intervention without increasing complication and recurrence rates.

Keywords: Lichtenstein inguinal hernia repair, Trans-abdominal pre-peritoneal procedure, Laparoscopy, Pain in inguinal region.

© 2025 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ajpcr.2025v18i4.54042>. Journal homepage: <https://innovareacademics.in/journals/index.php/ajpcr>

INTRODUCTION

Inguinal hernias have a lifetime risk of developing in about 30% of men and 6% of women. The correction of symptomatic inguinal hernias is a rather common operation worldwide. Most of those who are kept for watchful waiting also land up in surgical intervention.

Inguinal hernia surgical repair procedures have seen significant advancement and innovation over the past few decades in an effort to minimize intra-operative and post-operative problems. These procedures mainly divided into an open and minimal invasive procedure. With different degrees of recurrence, the Lichtenstein procedure (LP) is still the gold standard in open hernia treatment today [1,2]. As far as laparoscopic procedure is concerned, there are two approaches: Trans-abdominal pre-peritoneal repair (TAPP) and totally extra-peritoneal repair (TEP).

At present, laparoscopic inguinal hernia repair is often done all over the world and has achieved universal acceptability. Laparoscopy is becoming a practical substitute for conventional open methods. In many studies, it has been observed that laparoscopic hernia repair is associated with lesser post-operative pain, faster recovery, and early return to work as compare to open hernia because of lesser tissue damage and no muscular dissection during surgery [3]. On the downside, laparoscopic repair is more technically challenging for surgeons and it requires more operative time and a longer learning curve. Laparoscopic repair is costlier to the patients and health care system, as it require laparoscopic setup and larger mesh.

On the other hand, although few but there are some references that also have suggested that decreased post-operative pain is not that of

significant in laparoscopy which can justify the steep learning curve [4] and relatively costlier and complicated approaches.

Hence, this study is oriented around laparoscopic mesh hernioplasty (TAPP) versus open mesh hernioplasty (LP) in terms of post-operative recovery, pain, and complication.

Aims and objectives

The aim of this study was to compare the effectiveness of inguinal hernia repair utilizing the TAPP and the Lichtenstein repair. The outcomes were studied in terms of operation time, length of stay, post-operative pain, achievement of normal routine activity, recurrence, and surgical site occurrence.

METHODS

After obtaining approval from the Institutional Research Ethics Committee, a retrospective study was planned, including 110 patients with unilateral or bilateral inguinal hernia admitted in the General Surgery Department of the tertiary care center. All adult patients with uncomplicated inguinal hernia were included in this study except recurrent and massive scrotal hernia. 42 patients who were operated by the TAPP technique and 68 patients who were operated by the LP over the said duration were included. Long-term and short-term results, such as Visual Analog Scale (VAS) score for pain, incidence of complications, post-surgery recovery were evaluated retrospectively utilizing the pre-recorded database (Hernia follow-up Registry), and telephonic conversion. The following questions were explicitly asked: When were you able to return to work or do daily physical activity, and whether there had been any medical or surgical issues that needed medical care. The presence of visible swelling, which needed to be

verified by physical and ultrasound assessment, was suspected as a hernia recurrence and were verified by physical follow-up.

We had calculated the VAS score in the post-operative period on a daily basis in all hernia patients undergoing whether LP or TAPP in the registry. The mean VAS score was calculated for both groups and was compared to know the significance. Patients' satisfaction and recovery post-surgery were estimated on the basis of a questionnaire to be answered by the patients either on follow-up or through telephonic conversation. In addition we also compared operative time, complication, and recurrence between two groups. (Statistical analysis was done using WPS Excel, WPS Word, and Statistical Package for the Social Sciences 13 software).

Operative technique

All Surgeries were performed at a single center by a single surgeon. During LP we put 11×6 cm sized prolene mesh (heavy weight) and fixed it with prolene sutures, while in TAPP, 15×12 cm sized prolene mesh (heavy weight) was put and fixed with absorbable tackers at 3 points (2 medially and 1 laterally above iliopubic tract). The peritoneum flap was closed using 2-0 absorbable sutures.

RESULTS

This study covered 110 hernia patients in total, including 42 TAPP and 68 LP cases. The LP group's median age was almost the same as the TAPP group's. In LP, the mean age was 55.20±15.07, while in TAPP, it was 47.88±17.47. Apart from age, gender, type of hernia (direct versus indirect), and unilateral versus bilateral were also similarly distributed among both groups (Fig. 1).

The operation took much more time in the TAPP group (60.28±9.27 min) than it took in the LP (38.77±7.51 min) ($p \leq 0.05$) (Table 1). There were no intra-operative complications in either group, with one TAPP conversion to an open method which was due to dense inter-bowel adhesion. Although the incidence of post-operative complications (such as seroma, hematoma, chronic pain, and wound infection) was higher

in the LP group but were not significant when compared with the TAPP group. In neither group was there any recurrence (Table 2).

According to VAS scoring, there was a significant difference in the severity of groin pain (4.41 ± 1.51 , LP Group vs. 2.26 ± 0.70 in the TAPP procedure) ($p \leq 0.05$); but patients in both groups were managed with oral analgesics only. In the LP group, the post-operative hospital stay was significantly lengthier as compared to the TAPP group (3.16 ± 0.68 days vs. 2.19 ± 0.40 days, respectively) ($p \leq 0.05$). Similarly, patients in the LP group were back to work in 12.39 ± 1.03 days, compared to 5.78 ± 0.75 days ($p \leq 0.05$) in the TAPP group (Table 2).

DISCUSSION

The purpose of this study was to compare the surgical, short-term, and long-term clinical results of TAPP and LP for inguinal hernia. The LP treatment was carried out in this study under spinal anesthesia, while the TAPP procedure was carried out under general anesthesia. The post-operative results do not appear to be impacted by the anesthesia technique.

According to a prospective study comparing TAPP with LP for inguinal hernias, the LP was quicker, less expensive, and technically simpler, had fewer short- or long-term problems, and had a lower recurrence rate [5].

On the other hand, many other studies as well as European Hernia Society guidelines suggest that laparoscopic techniques have a lower incidence of surgical site occurrences (infection and hematoma) and earlier return to work and daily activities. On the downside, laparoscopic approaches are costlier, do take longer duration for surgery and seroma formation is high. For unilateral hernia repair, the guidelines advise LP as well as laparoscopic management of inguinal hernia, while for bilateral hernia laparoscopic approach is stated superior. Hence, from a socioeconomic standpoint, the active working population should undergo an endoscopic operation, particularly for bilateral hernia repair [1,6].

In our study, although the sample size was different but both the TAPP group and LP group had similar patients on the basis of demography and type of inguinal hernia (Fig. 1). As far as technique is concerned the TAPP group had significantly longer operating time (38.77 ± 7.51 min in LP vs. 60.28 ± 9.27 min in TAPP) which is mainly because of longer learning curve associated with laparoscopic procedures. Although it seems that with more experience there is a potential to minimize this time gap. The ease of LP makes it feasible for junior doctors too, to learn. Despite of relatively difficult technique, there was no conversion to open except for one (1.47%) which was because of the dense adhesion due to previous surgery. Among the 3130 designated laparoscopic repairs, McCormack *et al.* reported that 2.7% of the laparoscopic surgeries were changed to an open procedure [7]. These chances of conversion to open can be further minimized by proper case selection and more experience. Although in this study, we have not calculated the exact cost difference between the two groups but we can assume that due to the need for a laparoscopic setup, a fixation device, and a bigger size mesh, TAPP hernia repair seems to be more expensive for the patient and the medical center than open LP surgery.

In this study, we found that the LP group experienced two cases (2.94%) of chronic pain, one case (1.47%) of wound infection, and five cases (7.31%) of seroma development. While the patient with the wound infection received oral antibiotics, the patients with the seroma were just observed, resulting in complete resolution in all the cases. Two patients who continued to have discomfort in the inguinal region even after a month were treated conservatively over time with oral analgesics. In the TAPP group, only two (4.76%) patients had seroma development, and there were no further problems. Although the surgical site occurrences are less in the TAPP group but the p-value came to be insignificant. In other studies also surgical site occurrences are less in laparoscopic limbs except in seroma, which is higher [3]. For

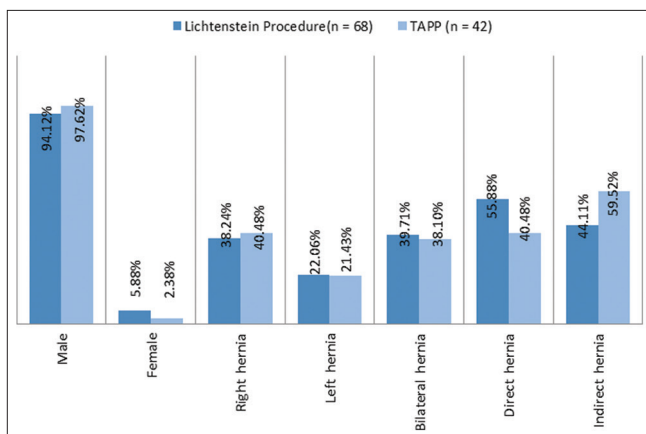


Fig. 1: Comparison between trans-abdominal pre-peritoneal repair and Lichtenstein procedure group

Table 1: Operating time

Duration of surgery	Lichtenstein procedure (n=68)	TAPP (n=42)	p-value
Operation time (minutes) (mean±SD, range)	38.77±7.51 (34–67)	60.28±9.27 (48–78)	<0.05

TAPP: Trans-abdominal pre-peritoneal repair

Table 2: Post-operative outcome

Post-operative events	Lichtenstein procedure (n=68) (%)	TAPP (n=42) (%)	p-value
Complications	10	2	
Seroma formation	5 (7.31)	2 (4.76)	0.5
Hematoma	2 (2.94)	0	0.27
Wound infection	1 (1.47)	0	0.17
Chronic pain	2 (2.94)	0	0.27
Recurrence	0	0	-
Post-operative pain (VAS) (mean±SD)	4.41±1.51	2.26±0.70	<0.05
Post-operative hospital stay in days (mean±SD, range)	3.16±0.68 (2-4)	2.19±0.40 (2-3)	<0.05
Return to regular activity in days (mean±SD, range)	12.39±1.03 (11-15)	5.78±0.75 (5-7)	<0.05

TAPP: Trans-abdominal pre-peritoneal repair; VAS: Visual Analog Scale

recurrence earlier studies, such as Pokorny *et al.* [8] and Abbas *et al.* [9], have reported more recurrence rate in Laparoscopic limbs as compared to open procedures while studies, such as Sultan *et al.* [10] and Takayama *et al.* [11] have encountered similar incidences of recurrence in both techniques. Achievement of the learning curve and refinement in the technique over the period of time might be the rationale for the decrease in recurrence rate in laparoscopic procedure. In our study, we have not encountered recurrence in both the groups in a mean follow-up duration of 13.16±6.10 months.

Now, coming to the most promising rather crucial benefit of Laparoscopic procedures, that is, reduced pain and early recovery, the TAPP group had a significant upper hand over the LP group. The TAPP group's reduced pain scores result in an earlier hospital discharge and therefore patients reported back to work earlier. This might be the result of tension-free repair, lower complication rate, and lack of an inguinal incision or muscle dissection in the groin during laparoscopic repair [11].

Open, TAPP and other repairs may have been comparable in the shorter term, but a longer-term analysis is necessary, according to the report. The optimum course of therapy should also be determined by the skill of the surgeon and the individual patient [12]. We strongly advise future research with a larger sample size and a further longer follow-up period. With more refinement in skills and technique, we hope that in the future laparoscopic approach might have a further decrease in recurrence rate and might become a superior technique for most of the groin hernias.

The study's drawbacks, however, are the retrospective design, the limited sample size, and the fact that it involved a single center. Regarding the impact on post-operative pain, we should have made a distinction between the patients who received tacks and the rest of the patients. We do surgeries under government insurance policies as well as private insurance policies along with a direct payment basis, which have different reimbursement packages, so an exact cost estimate could not be made. Moreover, the follow-up in our trial could be further longer to draw conclusions about recurrence and chronic pain over the long term.

CONCLUSION

The TAPP and LP for inguinal hernia repair are both secure and effective. Early acceptance of oral feedings, less post-operative pain, faster release from the hospital, a quicker return to regular activities, and less persistent pain were all related with TAPP repair. There was no discernible difference in the complication rates of the two procedures. During the same TAPP session, occult hernias on the opposite side may also be visualized and perhaps treated. And lastly, greater study is encouraged.

AUTHOR'S CONTRIBUTION

Dr. Mohit Kumar Badgurjar - Conceptualization, methodology, validation, investigation, writing - review and editing, writing - original draft, supervision. Dr. - Parth Bhut formal analysis, investigation,

writing - original draft, data curation, resources. Dr. Suman Parihar- Validation, supervision. Dr. Neha Boparikar- resources, writing - review and editing.

AUTHOR FUNDING

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

REFERENCES

- HerniaSurge Group. International guidelines for groin hernia management. *Hernia*. 2018 Feb;22(1):1-165. doi: 10.1007/s10029-017-1668-x, PMID 29330835
- Savlovski C, Brănescu C, Serban D, Tudor C, Găvan C, Shanabli A, *et al.* Amyand's hernia—a clinical case. *Chirurgia (Bucur)*. 2010 May-Jun;105(3):409-14. PMID 20726311
- Sofi J, Nazir F, Kar I, Qayum K. Comparison between TAPP and Lichtenstein techniques for inguinal hernia repair: A retrospective cohort study. *Ann Med Surg (Lond)*. 2021 Dec 01;72:103054. doi: 10.1016/j.amsu.2021.103054, PMID 34934481
- Novitsky YW, Czerniach DR, Kercher KW, Kaban GK, Gallagher KA, Kelly JJ, *et al.* Advantages of laparoscopic transabdominal preperitoneal herniorrhaphy in the evaluation and management of inguinal hernias. *Am J Surg*. 2007 Apr 01;193(4):466-70. doi: 10.1016/j.amjsurg.2006.10.015, PMID 17368290
- Pikoulis E, Tsigris C, Diamantis T, Delis S, Tsatsoulis P, Georgopoulos S, *et al.* Laparoscopic preperitoneal mesh repair or tension-free mesh plug technique? A prospective study of 471 patients with 543 inguinal hernias. *Eur J Surg*. 2002;168(11):587-91. doi: 10.1080/11024150201680003, PMID 12699093
- Simons MP, Aufenacker T, Bay-Nielsen M, Bouillot JL, Campanelli G, Conze J, *et al.* European Hernia Society guidelines on the treatment of inguinal hernia in adult patients. *Hernia*. 2009;13(4):343-403. doi: 10.1007/s10029-009-0529-7, PMID 19636493
- McCormack K, Scott NW, Go PM, Ross S, Grant AM. Laparoscopic techniques versus open techniques for inguinal hernia repair. *Cochrane Database Syst Rev*. 2003;2003(1):CD001785.
- Pokorny H, Klingler A, Schmid T, Fortelny R, Hollinsky C, Kawji R, *et al.* Recurrence and complications after laparoscopic versus open inguinal hernia repair: Results of a prospective randomized multicenter trial. *Hernia*. 2008;12(4):385-9. doi: 10.1007/s10029-008-0357-1, PMID 18283518
- Abbas AE, Abd Ellatif ME, Noaman N, Negm A, El-Morsy G, Amin M, *et al.* Patient-perspective quality of life after laparoscopic and open hernia repair: A controlled randomized trial. *Surg Endosc*. 2012;26(9):2465-70. doi: 10.1007/s00464-012-2212-9, PMID 22538670
- Sultan AA, Abo 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 (Lond)*. 2022 Apr 01;76:103428. doi: 10.1016/j.amsu.2022.103428, PMID 35345792
- Takayama Y, Kaneoka Y, Maeda A, Takahashi T, Uji M. Laparoscopic transabdominal preperitoneal repair versus open mesh plug repair for bilateral primary inguinal hernia. *Ann Gastroenterol Surg*. 2020;4(2):156-62. doi: 10.1002/ags3.12314, PMID 32258981
- Aiolfi A, Cavalli M, Micheletto G, Lombardo F, Bonitta G, Morlacchi A, *et al.* Primary inguinal hernia: Systematic review and Bayesian network meta-analysis comparing open, laparoscopic transabdominal preperitoneal, totally extraperitoneal, and robotic preperitoneal repair. *Hernia*. 2019;23(3):473-484. doi: 10.1007/s10029-019-01964-2, PMID 31089835