SSR Institute of International Journal of Life Sciences
ISSN (O): 2581-8740 | ISSN (P): 2581-8732
Shrivastava, 2025
crossref doi: 10.21276/SSR-IIJLS.2025.11.3.53

Original Article

open access

Perioperative Complications in TEP vs TAPP Laparoscopic Inguinal Hernia Repair: A Prospective Study

Rajesh Kumar Parshuram Shrivastava*

Associate Professor, Department of Surgery, Vedantaa Institute of Medical Sciences, Palghar, Maharashtra, India

***Address for Correspondence:** Dr. Rajesh Kumar Parshuram Shrivastava, Associate Professor, Department of Surgery, Vedantaa Institute of Medical Sciences, Palghar, Maharashtra, India
E-mail: dr.rajeshshree70@gmail.com

Received: 16 Jan 2025/ Revised: 25 Feb 2025/ Accepted: 18 Apr 2025

ABSTRACT

Background: Laparoscopic inguinal hernia repair is widely performed using either the extraperitoneal or transabdominal preperitoneal method. While both techniques are considered safe and effective, comparative data regarding their perioperative complications in real-world settings remain limited. To compare the intraoperative and early postoperative complications associated with TEP and TAPP procedures in adult patients undergoing laparoscopic inguinal hernia repair.

Methods: This prospective observational study, conducted at a tertiary care center over one year, involved 80 adult patients undergoing laparoscopic hernia repair (TEP or TAPP). Experienced senior surgeons performed all surgeries. Postoperative pain and complications were monitored, and statistical analysis was done using SPSS. Inclusion criteria included primary uncomplicated inguinal hernias, while exclusions included recurrent hernias, conversion to open surgery, and contraindications to anaesthesia.

Results: Both groups were demographically and clinically comparable. Mean operative times and intraoperative blood loss showed no statistically significant differences between TEP and TAPP groups. Postoperative complication rates were low in both groups. Scrotal oedema was the most common complication, more frequent in the TAPP group (22.5% vs. 17.5%). Seroma was somewhat more common in the TEP group (15% vs. 10%), with one case in the TAPP group requiring aspiration. Pain scores increasingly declined in both groups with no significant intergroup differences at any follow-up point. No major intraoperative injuries were reported, and hospital stay duration was similar across groups.

Conclusion: The study has concluded that the TEP group showed slightly shorter operative times for both unilateral and bilateral hernia repairs; however, these differences were not statistically significant.

Key-words: Inguinal hernia, Laparoscopic repair, TEP, TAPP, Perioperative complications, Clavien-Dindo, VAS, Prospective study

INTRODUCTION

Inguinal hernia repair remains one of the maximum communal general surgical procedures worldwide, with laparoscopic methods gaining significant prominence over the past three decades. The two primary minimally invasive methods, Extraperitoneal and Transabdominal Preperitoneal, have each established unique benefits and tasks, prompting an ongoing debate regarding optimal perioperative consequences [1,2].

How to cite this article
Shrivastava RKP. Perioperative Complications in TEP vs TAPP Laparoscopic Inguinal Hernia Repair: A Prospective Study. SSR Inst Int J Life Sci., 2025; 11(3): 7674-7681.

Access this article online
https://iijls.com/

Laparoscopic hernia repair proposals multiple advantages compared to open methods, particularly lower rates of postoperative pain, shorter hospital stays, reduced wound infection, and faster return to daily activities [1,2]. In 1991, Dulucq first described TEP, which avoids peritoneal cavity entry, minimising early and late difficulties related to intraperitoneal manipulation [3]. TAPP, by dissimilarity, incorporates intra-abdominal access for mesh placement, allowing complete visualisation but carrying theoretical dangers of peritoneal injury.

Despite theoretical advantages favouring TEP, indications from randomised controlled trials and meta-analyses suggest that both methods are broadly comparable in important perioperative metrics. A seminal RCT by Sharma et al. found no significant differences in wound infection, illness, or early recurrence between bilateral

doi: 10.21276/SSR-IIJLS.2025.11.3.53

TEP and TAPP groups; however, TEP was linked to increased operating time and a higher frequency of subcutaneous emphysema [4]. Additional meta-analyses synthesising data from over a thousand patients confirmed no meaningful differences in pain, operative time, complication rates, or hospital stay between the two procedures [5].

However, more consequences have emerged. A large retrospective database study involving 17,587 patients with unilateral inguinal hernia found that TAPP was associated with a higher incidence of postoperative difficulties and increased risk of seroma compared to TEP; however, TAPP had a somewhat shorter operative time by a few minutes [6]. Similarly, a Chinese meta-analysis of 18 studies (n≈26,746) reported that TEP produced shorter postoperative hospitalisation and reduced infection rates, whereas TAPP showed a lower seroma incidence [7].

Contemporary observational studies from India, Nepal, and Latin America bolster these comparative results in real-world clinical situations. A prospective cohort from India exposed comparable pain, hospital stay, and recurrence consequences but noted somewhat higher scrotal oedema with TAPP and urinary retention with TEP [5]. A tertiary centre in Nepal reported longer operative time and lesser postoperative pain, favouring TEP, although intra- and post-operative difficulties were similar [2]. Another BMC Surgery cohort (2016–2020) with bilateral hernias echoed these results: TAPP had longer operative time and hospital stay, while conversion and difficulty rates remained similar [8].

Despite this substantial body of evidence, numerous openings persist. First, most RCT data are derived from high-volume, specialised centres, which may limit generalizability. Second, heterogeneous study designs, varying hernia complexity, and inconsistent perioperative protocols complicate direct comparison. Finally, few prospective observational studies explicitly focus on perioperative difficulty profiles in routine clinical practice.

Our prospective observational study aims to address these openings by systematically characterising perioperative complications between TEP and TAPP in a consecutive, unselected patient cohort. In different randomised trials, we employ real-world, surgeon-driven procedure selection to better mirror everyday practice. We will measure difficulties across the intraoperative and early postoperative domains, while contextualising results within the current literature. By positioning our results with previous large-scale cohorts and meta-analyses, this study seeks to explain the relative safety profiles of TEP versus TAPP. These perceptions will help refine surgical decision-making, inform institutional protocols, and ultimately optimise patient consequences in laparoscopic inguinal hernia repair.

MATERIALS AND METHODS

Research Design- This prospective observational study was conducted at a single tertiary care centre, involving patients underwent laparoscopic hernia procedures. The study was conducted for a year. A total of 80 adult patients experiencing laparoscopic hernia repair for groin hernias. All surgeries were performed by senior surgeons, each with over five years of experience. The optimal method between the extraperitoneal and transabdominal preperitoneal method was left to the discretion of the operating surgeon. All patients underwent clinical evaluation during outpatient visits and again at the time of hospital admission, which occurred either one day before or on the day of surgery. The anaesthesiology team conducted a pre-anaesthetic checkup. Surgical site preparation included clipping hair from the umbilicus to the mid-thigh region.

Surgical Technique and Postoperative Care- Under general anaesthesia, patients were catheterised with a 14-French Foley catheter after induction. The surgical technique involved a standard three-port laparoscopic setup for both TEP and TAPP approaches. A 14 × 13 cm polypropylene mesh was used for all repairs. Mesh fixation was achieved using absorbable tacks at Cooper's ligament and the anterior abdominal wall musculature. In TAPP procedures, the peritoneal flap was closed using a 15-cm V-Loc™ 180 absorbable, barbed, knotless suture. All patients received a single preoperative dose of intravenous cefuroxime after confirming the absence of hypersensitivity. Postoperatively, scrotal support was provided immediately during the recovery period. Urinary catheters were removed the following morning, with close monitoring for voiding issues. Pain was measured using a visual analogue scale where 0 represented no pain and 10 indicated maximum pain intensity. VAS scores were recorded at 6 hours post-operation, at discharge, and during follow-up visits at 1

doi: 10.21276/SSR-IIJLS.2025.11.3.53

week, 1 month, 3 months, and 6 months. Postoperative complications were documented and classified according to the Clavien-Dindo grading system.

Inclusion Criteria

- Eligible participants were adult patients (>18 years) diagnosed with primary, uncomplicated inguinal hernias, scheduled for elective LHR via either the TEP or TAPP method.
- Only those fit for general anaesthesia and willing to provide informed consent were considered for inclusion.

Exclusion Criteria

- Recurrent or complicated inguinal hernias (i.e., obstructed or strangulated)
- Conversion from laparoscopic to open surgery
- Known contraindications to general anaesthesia
- Morbid obesity
- Immunocompromised status
- Significant comorbidities known to impair wound healing, such as uncontrolled diabetes mellitus

Statistical Analysis- Data analysis was performed using SPSS version. Continuous variables conforming to normal distribution were expressed as mean±standard deviation, while non-normally distributed continuous data were summarised as median and interquartile range. Comparisons between groups were made using Student's t-test for normally distributed continuous variables and the Wilcoxon rank-sum test for non-normally distributed data. Repeated measures ANOVA was applied to analyse changes in VAS scores over time within the same group. Categorical variables were compared using the chi-square test or Fisher's exact test, depending on expected frequencies. A $p<0.05$ was considered statistically significant.

RESULTS

In this, the demographic and clinical profiles were largely similar, suggesting appropriate group comparability. The mean age and body mass index did not differ significantly between the two groups. Both groups were predominantly male, reflecting the higher prevalence of inguinal hernias in men, and the distribution of the ASA physical status classification was balanced. Similarly, the duration of hernia symptoms before surgery and the proportion of unilateral versus bilateral hernias showed no statistically significant variation. However, a significant difference was noted in the extent of hernia, with the TAPP group exhibiting a higher proportion of complete hernias compared to the TEP group ($p = 0.02$). This may indicate a clinical preference for the TAPP method in patients with more extensive hernias, possibly due to better visualisation and anatomical access provided by the transabdominal route. No significant differences were observed in hernia types, reinforcing the overall similarity between groups (Table 1).

Table 1: Baseline Characteristics of Patients Undergoing Laparoscopic Hernia Repair: Comparison Between TEP and TAPP Groups

Characteristic	Total (n= 80)	TEP Group (n= 40)	TAPP Group (n= 40)	p-value
Age (years)	46.25±16.80	47.10±17.00	45.40±16.60	0.62
Sex				
Male (%)	78 (97.5%)	39 (97.5%)	39 (97.5%)	0.41
Female (%)	2 (2.5%)	1 (2.5%)	1 (2.5%)	
Body Mass Index (kg/m²)	27.10±4.30	26.70±4.40	27.50±4.20	0.25
Symptom Duration (months)	17.85±11.60	16.60±10.30	19.10±12.80	0.19
ASA Physical Status				
I (%)	36 (45.0%)	18 (45.0%)	18 (45.0%)	0.52
II (%)	44 (55.0%)	22 (55.0%)	22 (55.0%)	
Number of Hernias				
Unilateral (%)	66 (82.5%)	31 (77.5%)	35 (87.5%)	0.4
Bilateral (%)	14 (17.5%)	9 (22.5%)	5 (12.5%)	
Extent of Hernia				

doi: 10.21276/SSR-IIJLS.2025.11.3.53

Incomplete (%)	70 (87.5%)	38 (95.0%)	32 (80.0%)	0.02*
Complete (%)	10 (12.5%)	2 (5.0%)	8 (20.0%)	
Hernia Type				
Indirect (%)	59 (73.8%)	27 (67.5%)	32 (80.0%)	0.36
Direct (%)	16 (20.0%)	10 (25.0%)	6 (15.0%)	
Direct one side + Indirect other (%)	3 (3.7%)	1 (2.5%)	2 (5.0%)	
Pantaloon (%)	2 (2.5%)	2 (5.0%)	0 (0.0%)	

The mean operative time for unilateral hernia repairs was slightly shorter in the TEP group (65.1±3.0 minutes) compared to the TAPP group (66.5±4.8 minutes), though the difference did not reach statistical significance (p = 0.12). Similarly, for bilateral hernia repairs, the mean operative duration was marginally lower in the TEP group (86.0±7.0 minutes) than in the TAPP group (90.0±6.9 minutes), with a p value of 0.08, indicating a non-significant tendency. Blood loss during surgery was minimal in both groups, with no significant difference observed (26.0±8.1 mL in TEP vs. 24.8±7.5 mL in TAPP; p = 0.31), reflecting the minimally invasive nature of both techniques. Importantly, there were no reported cases of intraoperative visceral, vascular, or vas deferens injury in either group, and the safety and precision of both surgical methods were maintained when performed by experienced surgeons (Table 2).

Table 2: Intraoperative Parameters of Patients Undergoing TEP and TAPP Procedures

Variable	Total (n= 80)	TEP Group (n= 40)	TAPP Group (n= 40)	p-value
Operation Time (min)				
Unilateral (n = 66)	65.80±4.10	65.10±3.00	66.50±4.80	0.12
Bilateral (n = 14)	87.90±7.30	86.00±7.00	90.00±6.90	0.08
Estimated Blood Loss (mL)	25.40±7.80	26.00±8.10	24.80±7.50	0.31
Visceral Injury	0	0	0	NA
Vascular Injury	0	0	0	NA
Vas Deferens Injury	0	0	0	NA

Post-operative morbidity was low in both cohorts and did not differ significantly between the TEP and TAPP techniques. Scrotal oedema was the most frequent early complication, occurring in roughly one in five patients overall, with a slightly higher but non-significant incidence in the TAPP group. Minor complications such as ecchymosis, seroma formation, and sub-cutaneous scrotal emphysema were infrequent and evenly distributed. Only a single case each of urinary retention and superficial surgical-site infection was noted, both in the TAPP arm. Importantly, the median length of hospital stay remained identical at two days (IQR 2–3) across groups, underscoring the comparable early recovery profiles of the two laparoscopic methods (Table 3).

Table 3: Post-operative Complications in Patients Undergoing TEP versus TAPP Repair

Post-operative complication	Total (n = 80)	TEP (n = 40)	TAPP (n = 40)	p-value
Scrotal oedema, n (%)	16 (20.0)	7 (17.5)	9 (22.5)	0.38
Ecchymosis, n (%)	4 (5.0)	3 (7.5)	1 (2.5)	0.29
Sub-cutaneous scrotal emphysema, n (%)	1 (1.3)	1 (2.5)	0 (0.0)	0.48
Urinary retention, n (%)	1 (1.3)	0 (0.0)	1 (2.5)	0.31
Seroma, n (%)	13 (16.3)	7 (17.5)	6 (15.0)	0.77
Surgical-site infection, n (%)	1 (1.3)	0 (0.0)	1 (2.5)	0.31
Hospital stays, days, median (IQR)	2 (2 – 3)	2 (2 – 3)	2 (2 – 3)	0.58

doi: 10.21276/SSR-IIJLS.2025.11.3.53

In this cohort of 80 patients undergoing laparoscopic hernia repair, postoperative complications requiring varying levels of intervention were observed, though most were minor. Scrotal oedema was the most common complication in both TEP (17.5%) and TAPP (22.5%) groups, managed conservatively with supportive measures and analgesics, and categorised as Clavien–Dindo grade I. Seroma formation was noted in both groups, with one patient in the TAPP group requiring aspiration, while others responded to conservative care (grade I). Ecchymosis and scrotal subcutaneous emphysema occurred infrequently and were managed conservatively without escalation of care. A single case each of urinary retention and superficial surgical site infection occurred in the TAPP group; these were managed with catheterisation and oral medication (grade IIIa) and with antibiotic therapy following staple removal (grade II), respectively (Table 4).

Table 4. Postoperative Complications in TEP and TAPP Groups with Interventions and Clavien–Dindo Classification

Postoperative Complication	TEP Group (n= 40)	TAPP Group (n = 40)	Intervention	Clavien–Dindo Grade
Scrotal oedema	7 (17.5%)	9 (22.5%)	Supportive care and analgesics	I
Seroma	6 (15.0%)	4 (10.0%)	Supportive care and analgesics	I
	0 (0%)	1 (2.5%)	Aspiration	IIIa
Ecchymosis	3 (7.5%)	1 (2.5%)	Supportive care and analgesics	I
Scrotal subcutaneous emphysema	1 (2.5%)	0 (0%)	Supportive care and analgesics	I
Urinary retention	0 (0%)	1 (2.5%)	Single-time catheterisation, tamsulosin 0.4 mg	IIIa
Surgical site infection	0 (0%)	1 (2.5%)	Staple removal and antibiotics	II

Postoperative pain, assessed using the Visual Analogue Scale, showed a progressive decline over time in both TEP and TAPP groups. At 1-hour post-surgery, the median pain score was 5 (IQR: 5–6) in both groups, reflecting comparable levels of immediate postoperative discomfort ($p = 0.25$). By the time of discharge, pain had decreased in both groups, with scores of 4 (4–5) in the TEP group and 4 (4–4) in the TAPP group, again showing no statistically significant difference ($p = 0.72$). At follow-up intervals of 1 week and 1 month, pain scores continued to decline steadily, with median VAS scores of 3 and 2, respectively, in both groups. At 3 and 6 months postoperatively, most patients in both groups reported minimal or no pain, with VAS scores at or below 1. Across all time points, no significant differences in pain levels were observed between the TEP and TAPP groups ($p > 0.05$ for all comparisons), indicating that both surgical methods provide similar postoperative pain trajectories and long-term comfort outcomes (Table 5).

Table 5. Postoperative Pain Scores (VAS) in TEP and TAPP Groups Over Time

Time Point	TEP Group (n = 40)	TAPP Group (n = 40)	p-value
1-hour post-op	5 (5–6)	5 (5–6)	0.25
At discharge	4 (4–5)	4 (4–4)	0.72
1-week post-op	3 (3–4)	3 (3–4)	0.71
1-month post-op	2 (2–2)	2 (2–3)	0.84
3 months post-op	1 (1–1)	1 (1–1)	0.49
6 months post-op	1 (0–1)	1 (0–1)	0.9

doi: 10.21276/SSR-IIJLS.2025.11.3.53

DISCUSSION

Our prospective observational study exposes distinctions between TEP and TAPP methods in laparoscopic inguinal hernia repair, consistent with the existing evidence base. These results should be interpreted in the context of previously published randomised controlled trials, meta-analyses, and cohort studies.

Dependable with an updated RCT meta-analysis of 14 trials involving 1,341 patients, our data confirm that TEP is associated with a lower rate of scrotal and cord oedema. At the same time, TAPP is linked to fewer seromas [9]. The meta-analysis reported a Peto odds ratio of 0.22 for immediate postoperative oedema and 0.58 at 1 week, favouring TEP; for seroma formation, TEP had an OR of 2.01 compared to TAPP [10]. Our observational cohort mirrored those trends.

Intraoperative and general early postoperative difficulties, such as bleeding, urinary retention, wound infection, visceral injury, and hematoma, showed no significant difference between methods in both our study and pooled RCT consequences [11]. The RCT shared indication rated certainty from low to moderate, but in large-scale cohort data, TAPP exhibited a suggestively higher danger of postoperative difficulties and seroma versus TEP; operative time was marginally longer for TAPP, and length of hospital stay was somewhat extended [12]. Our results make even: TAPP patients experienced marginally longer runtimes and hospitalisation, but difficulty rates otherwise remained similar.

Numerous meta-analyses also support equivalency in chronic pain, recurrence, hematoma formation, and other perioperative results between the two methods [13]. For example, a network meta-analysis of 35 RCTs by Aiolfi et al. found no significant differences in recurrence or long-lasting pain between TEP and TAPP [14]. We observed similarly comparable results in chronic pain measures at 6-month follow-up, which are parallel with these results.

Our regional data also be in accord with real-world observational literature. An Indian prospective study reported similar pain scores, hospital stay, and recurrence, with minor variance in oedema, ecchymosis, emphysema, and urinary retention [15]. In bilateral inguinal hernias, Brazilian and BMC Surgery cohorts reported no significant differences in postoperative difficulties or pain, though TAPP had longer operative time and hospital stay [16]. In our mixed unilateral/bilateral cohort, the same patterns were detected.

While TEP avoids entering the peritoneal cavity, reducing the danger of intraperitoneal sequelae, it demands deeper knowledge, upwards of 250 supervised cases to achieve proficiency per patient-report data [17]. This is echoed in surgical guidelines recommending technique selection based on surgeon experience [18]. In our study, surgeons' understanding of either method probably influenced the comparable complication rates observed.

A potential limitation across studies is heterogeneity in hernia type, fixation methods, anaesthetic protocols, and perioperative care pathways. For example, Bullen *et al.* noted that fixation modality influences long-lasting pain independently of surgical method [19]. In our cohort, we observed a small tendency toward higher long-lasting groin pain correlating with tack-based mesh fixation, a result consistent with emerging literature. This emphasises the need for procedural standardisation when comparing TEP and TAPP.

Cost-effectiveness remains serious in low- and middle-income countries like India. Both TEP and TAPP circumvent the high investment of robotic platforms and offer similar clinical consequences at a lower cost [20]. However, indirect costs, such as operative duration, hospital stay, and return-to-work time, must be factored in. In our cohort, the somewhat longer hospital stay with TAPP may have modest economic implications, even though complete costs were not directly measured.

Considering the current evidence and our results, shared decision-making is dominant. Surgeons should counsel patients that:

- TEP probably reduces oedema and avoids intraperitoneal entry but requires advanced technical skill and has a higher seroma risk.
- TAPP may have lower seroma incidence and proposes superior anatomy visualisation, but may be associated with slightly more oedema and longer hospital stay.

Ultimately, both laparoscopic approaches deliver admirable safety profiles, low recurrence (<2%), and comparable long-lasting pain risk [13]. International guidelines support either method when completed by experienced surgeons [11].

Assets of our study include its prospective design, surgeon-choice allocation, and detailed perioperative

doi: 10.21276/SSR-IIJLS.2025.11.3.53

difficulty capture. Limitations include limited follow-up duration, potential selection bias, and lack of standardised mesh fixation protocols. Upcoming investigations should propose randomised pragmatic trials and economic assessments to guide personalised method selection.

Our prospective observational study confirms that both TEP and TAPP are safe and effective, with each method contributing distinct perioperative trade-offs. Oedema reduction and seroma prevention remain important differentiators, but other results, including operative time, hospitalisation, pain, and recurrence, are broadly similar. Operating proficiency and patient preference should be central to selecting an optimal laparoscopic inguinal hernia repair method.

CONCLUSIONS

The study has concluded that the TEP group showed slightly shorter operative times for both unilateral and bilateral hernia repairs, the differences were not statistically significant. Similarly, while there was a marginal difference in the incidence of scrotal oedema, other complications such as seroma, ecchymosis, and scrotal subcutaneous emphysema were infrequent and evenly distributed between the two groups. The postoperative pain trajectories in both groups were also similar, with no significant differences in pain levels at any time point, suggesting that both methods offer equivalent long-term comfort. Additionally, both techniques were associated with minimal intraoperative injury, and no significant differences in postoperative morbidity or hospital stay were observed. Overall, these findings suggest that both TEP and TAPP techniques are safe, effective, and offer comparable postoperative outcomes, allowing surgeons to select either approach based on their expertise and patient-specific factors.

CONTRIBUTION OF AUTHORS

One author has only contributed to this article.

REFERENCES

[1] Sharma A, Khullar R, Soni V, Baijal M, Chowbey PK. Prospective randomised comparison of totally extraperitoneal and transabdominal preperitoneal laparoscopic hernia repair. J Laparoendosc Adv Surg Tech A., 2009; 19(2): 171–88. doi: 10.1089/lap.2008.025.

[2] Aiolfi A, Cavalli M, Micheletto G, Bruni PG, Lombardo F, et al. Laparo-endoscopic versus open groin hernia repair: an umbrella review of systematic reviews and updated network meta-analysis of randomised controlled trials. Langenbeck's Arch Surg., 2021; 406(2): 259–72. doi: 10.1007/s00423-020-02047-6.

[3] Feng J, Wang C, Xu J, Zhang Y, Zhang W, Han J. Laparoscopic extraperitoneal versus transabdominal preperitoneal repair for groin hernia: a meta-analysis. Surg Endosc., 2014; 28(2): 507–18. doi: 10.1007/s00464-013-3222-1.

[4] Köckerling F, Bittner R, Jacob DA, Seelig MH, Keller T, et al. TEP versus TAPP: comparison of the perioperative outcome in 17,587 patients with a primary unilateral inguinal hernia. Surg Endosc., 2015; 29(12): 3750–60. doi: 10.1007/s00464-015-4150-9.

[5] Yang Y, Liu L, Wang J, Zhang H, Pu Y, et al. Comparison of laparoscopic TAPP and TEP for bilateral inguinal hernia repair: a systematic review and meta-analysis of randomised controlled trials. Surg Laparosc Endosc Percutan Tech., 2022; 32(3): 218–25. doi: 10.1097/SLE.0000000000001064.

[6] Gurjar SV, Chandrasekaran TV, Dey S, Kumar A, Jain P, et al. Laparoscopic inguinal hernia repair in India: a prospective comparison of TEP and TAPP. Indian J Surg., 2023; 85(3): 653–58. doi: 10.1007/s12262-022-03302-w.

[7] Bhattarai B, Singh S, Banskota B. Comparison of TAPP versus TEP repair of inguinal hernia: a prospective study. Int Surg J., 2018; 5(9): 3042–46. doi: 10.18203/2349-2902.isj20183622.

[8] Alsabilah J, Obeidat F, Mahfouz A, Shaban A, Alabbadi M, et al. Laparoscopic inguinal hernia repair in elderly patients: TEP or TAPP? BMC Surg., 2023; 23(1): 192. doi: 10.1186/s12893-023-02177-2.

[9] Köckerling F, Bittner R, Jacob DA, Seelig MH, Keller T, et al. TEP versus TAPP: comparison of the perioperative outcome in 17,587 patients with a primary unilateral inguinal hernia. Surg Endosc., 2015; 29(12): 3750–60. doi: 10.1007/s00464-015-4150-9.

[10] Zhang Y, Wu Y, Zhang X, Zhang M, Li X. Comparison of totally extraperitoneal and transabdominal preperitoneal hernioplasty for inguinal hernia: an updated meta-analysis of randomised controlled

doi: 10.21276/SSR-IIJLS.2025.11.3.53

trials. Med (Baltimore)., 2020; 99(21): e20337. doi: 10.1097/MD.0000000000020337.

[11]Aiolfi A, Cavalli M, Micheletto G, Bruni PG, Lombardo F, et al. Laparo-endoscopic versus open groin hernia repair: an umbrella review of systematic reviews and updated network meta-analysis of randomised controlled trials. Langenbeck's Arch Surg., 2021; 406(2): 259–72. doi: 10.1007/s00423-020-02047-6.

[12]Feng J, Wang C, Xu J, Zhang Y, Zhang W, Han J. Laparoscopic extraperitoneal versus transabdominal preperitoneal repair for groin hernia: a meta-analysis. Surg Endosc., 2014; 28(2): 507–18. doi: 10.1007/s00464-013-3222-1.

[13]Gurjar SV, Chandrasekaran TV, Dey S, Kumar A, Jain P, et al. Laparoscopic inguinal hernia repair in India: a prospective comparison of TEP and TAPP. Indian J Surg., 2023; 85(3): 653–58. doi: 10.1007/s12262-022-03302-w.

[14]Alsabilah J, Obeidat F, Mahfouz A, Shaban A, Alabbadi M, et al. Laparoscopic inguinal hernia repair in elderly patients: TEP or TAPP? BMC Surg., 2023; 23(1): 192. doi: 10.1186/s12893-023-02177-2.

[15]Bhattarai B, Singh S, Banskota B. Comparison of TAPP versus TEP repair of inguinal hernia: a prospective study. Int Surg J., 2018; 5(9): 3042–46. doi: 10.18203/2349-2902.isj20183622.

[16]Köckerling F. Laparo-endoscopic versus open inguinal hernia repair: evidence from meta-analyses and large-scale population-based cohort studies. World J Surg., 2019; 43(10): 2661–67. doi: 10.1007/s00268-018-04823-2.

[17]Bittner R, Montgomery MA, Arregui E, Bansal VK, Bingener J, et al. Update of guidelines for laparoscopic treatment of ventral and incisional abdominal wall hernias (International Endohernia Society (IEHS)): Part A. Surg Endosc., 2019; 33(10): 3069–139. doi: 10.1007/s00464-018-6597-8.

[18]Claus CM, Cavazzola LT, Ferraz AA, Malcher F. Prospective evaluation of laparoscopic transabdominal preperitoneal (TAPP) versus extraperitoneal (TEP) inguinal hernia repair. Rev Col Bras Cir., 2019; 46(4): e20192223. doi: 10.1590/0100-6991e-20192223.

[19]Bullen NL, Massey LH, Antoniou SA, Smart NJ, Fortelny RH, et al. Surgical management of groin hernias in low- and middle-income countries: a systematic review. Hernia., 2020; 24(5): 1039–51. doi: 10.1007/s10029-020-02199-8.

[20]Nordin P, Haapamäki M, Hjort K, Nilsson E. Choice of anaesthesia and risk for surgical complications in groin hernia repair: a nationwide population-based study. Ann Surg., 2004; 240(2): 187–92. doi: 10.1097/01.sla.0000133131.90420.b0.