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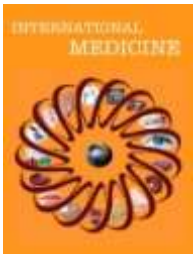

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Original Research

Laparoscopic TEP and TAPP Mesh Repair of Inguinal Hernia: A Comparative Study on Post-operative Recovery and Patient Experience

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Abstract
Background: Laparoscopic repair of inguinal hernia is widely accepted, but the postoperative course experienced by patients varies and is often shaped by pain, functional recovery, and ability to resume daily activity. Among laparoscopic techniques, Total Extra-Peritoneal (TEP) and Transabdominal Pre-Peritoneal (TAPP) repair are commonly performed, yet differences in postoperative recovery and patient experience remain inconsistently reported. **Objectives:** To compare postoperative recovery and patient experience following laparoscopic TEP and TAPP mesh repair of inguinal hernia. **Methods:** This prospective comparative study included sixty patients undergoing elective laparoscopic inguinal hernia repair at a tertiary care centre. Thirty patients underwent TEP repair and thirty underwent TAPP repair. Postoperative pain, duration of hospital stay, time to return to normal work, and overall patient-perceived outcome were recorded and analysed using appropriate statistical methods. **Results:** Postoperative pain scores, no statistically significant difference was observed in both groups, with most patients reporting mild pain. Mean duration of hospital stay did not differ significantly between TEP and TAPP repair. Patients in the TEP group resumed normal work slightly earlier than those in the TAPP group, although the difference was not statistically significant. Overall patient-perceived outcome was rated as good or excellent by the majority of patients in both groups, with no significant difference in outcome distribution. **Conclusion:** Postoperative recovery and patient experience following laparoscopic TEP and TAPP repair were broadly comparable. Differences in pain, hospital stay, and functional recovery were small and inconsistent. These findings suggest that recovery-related outcomes alone should not determine the choice of laparoscopic approach, which should continue to be guided by surgeon experience and clinical context.

Keywords: Inguinal Hernia, Laparoscopic Hernia Repair, Total Extra-Peritoneal Repair, Transabdominal Pre-Peritoneal Repair, Postoperative Recovery, Patient-Reported Outcomes.

Introduction

Recovery after inguinal hernia surgery is often discussed in broad terms. In practice, it is remembered in fragments. Pain on the first postoperative day. Discomfort while standing or walking. The moment a patient feels confident enough to return to work. These experiences tend to shape how patients judge the success of surgery, sometimes more strongly than technical outcomes. The cohort included patients engaged in a wide range of occupations, from manual labour to sedentary work, suggesting that the observed recovery patterns are applicable across different activity levels.

Open mesh repair reduced recurrence and simplified repair for many surgeons. It did not, however, eliminate postoperative discomfort. A proportion of patients continued to report groin pain, stiffness, or delayed return to normal activity, even when the operation itself was uncomplicated.[1] For patients involved in manual labour or physically demanding occupations, these delays were not trivial.

Laparoscopic approaches emerged partly in response to these concerns. By approaching the hernia from a posterior plane, disruption of the inguinal canal could be minimised. Early reports suggested advantages in terms of postoperative pain and recovery, although the extent of benefit varied across studies.[2] As experience grew, two techniques became established in routine practice.

Total Extra-Peritoneal (TEP) and Transabdominal Pre-Peritoneal (TAPP) repair differ in how the pre-peritoneal space is reached. TEP avoids entry into the peritoneal cavity altogether. TAPP requires peritoneal incision and closure. These differences are technical, but they may influence postoperative recovery in ways that are not always predictable.[3]

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Some studies have reported lower early pain scores and faster functional recovery after TEP. Others have found little difference once analgesic protocols and surgeon experience are accounted for.[4,5] Patient-reported outcomes are inherently variable. They are shaped not only by the procedure, but also by occupation, expectations, and baseline pain tolerance.

In the Indian setting, where laparoscopic repair has been shown to be feasible and effective, recovery-related outcomes often assume practical importance in everyday surgical decision-making.[6]

Despite this, postoperative recovery parameters are frequently treated as secondary outcomes. They are often grouped together or discussed briefly. This leaves uncertainty regarding whether the choice between TEP and TAPP meaningfully alters the patient's experience after surgery.

The present study was undertaken with this question in mind. By comparing laparoscopic TEP and TAPP repair with specific focus on postoperative pain, duration of hospital stay, return to normal work, and overall patient-perceived outcome, the study aims to examine differences in recovery and patient experience within a uniform clinical cohort.

The biofilm production retards the antimicrobial therapy against bacteria because the biofilm develops a barrier which reduces the drug penetration leading to treatment failure as well as hindering the recognition of the microorganisms by immune system. In view of the above mentioned facts, the objective of the current study was to phenotypically and genotypically evaluate the biofilm production ability of multi drug resistant Pseudomonas aeruginosa from clinical samples.[7]

The most extreme case of decreased metabolism, also found in the biofilm, is represented by the persisters. [8,9]This is a special growth state that means less than 0.1% of the biofilm population, refractory to antibiotics, a kind of spore-like cell state activity that can become active after finishing the treatment. [10]

Materials and Methods

This study was conducted as a prospective comparative analysis involving patients diagnosed with inguinal hernia and planned for elective laparoscopic mesh repair. The study was carried out at Kempegowda Institute of Medical Sciences, Bangalore, over a period extending from December 2007 to October 2009. Institutional approval was obtained prior to initiation of the study, and informed consent was taken from all participants.

Study Population

A total of sixty adult patients were included. All patients were aged eighteen years or older and had a clinical diagnosis of unilateral or bilateral inguinal hernia. Patients were considered eligible if they were fit to undergo laparoscopic surgery under general or regional anaesthesia.

Patients presenting with complicated hernias, including obstruction, strangulation, or incarceration requiring emergency surgery, were excluded. Those with a history of failed laparoscopic inguinal hernia repair were also excluded from the study.

Group Allocation

Patients were allocated into two equal groups based on the laparoscopic technique employed. Thirty patients underwent laparoscopic Total Extra-Peritoneal (TEP) mesh repair, and thirty patients underwent laparoscopic Transabdominal Pre-Peritoneal (TAPP) mesh repair. Allocation was based on surgeon discretion after preoperative evaluation and patient counselling.

Operative Technique

Both procedures were performed using standard laparoscopic equipment. In the TEP group, access to the pre-peritoneal space was achieved without breaching the peritoneal cavity, followed by dissection of the myopectineal orifice and placement of polypropylene mesh. In the TAPP group, pneumoperitoneum was established, the peritoneum was incised, pre-peritoneal dissection was performed, mesh was placed, and the peritoneum was closed.

Polypropylene mesh of appropriate size was used in all cases. Mesh fixation was performed as per surgeon preference. All procedures were carried out by surgeons experienced in laparoscopic hernia repair.

Peri-Operative Management

All patients underwent routine preoperative evaluation, including laboratory investigations and anaesthetic assessment. Prophylactic antibiotics were administered prior to surgery. Postoperatively, patients were monitored for pain, complications, and recovery parameters. Early ambulation was encouraged once patients were clinically stable.

Analgesia was provided according to institutional protocol, with transition from parenteral to oral medication as tolerated. Discharge planning was based on clinical recovery rather than fixed timelines.

Outcome Measures

The primary outcomes assessed in this study related to postoperative recovery and patient experience. These included postoperative pain scores, duration of postoperative hospital stay, time taken to resume normal work, and overall patient-perceived outcome grading.

Postoperative pain was assessed using a numerical pain scale ranging from 0 to 10, where 0 indicated no pain and 10 indicated the worst pain experienced. Pain scores were grouped as 1–2 (mild), 3–4 (moderate), and 5–6 (distressing), reflecting the observed distribution in the study cohort.

Follow-up

Patients were followed up postoperatively at regular intervals primarily to assess recovery parameters and patient-perceived outcomes. Follow-up duration ranged from a minimum of ten days to a maximum of eighteen months. During follow-up visits, patients were assessed for pain, complications, recurrence, and overall satisfaction.

Statistical Analysis

Data were entered into a structured proforma and analysed using standard statistical software. Continuous variables were expressed as mean with standard deviation, while categorical variables were presented as frequencies and percentages. Comparisons between the two groups were performed using appropriate statistical tests. A p-value of less than 0.05 was considered statistically significant.

Results

Sixty patients who underwent laparoscopic inguinal hernia repair were included in the analysis. Thirty patients underwent Total Extra-Peritoneal (TEP) repair and thirty underwent Transabdominal Pre-Peritoneal (TAPP) repair. Postoperative recovery parameters and

patient experience outcomes were available for all patients.

Postoperative Pain

Postoperative pain was assessed using a numerical pain score and categorised into three ranges. In the TEP group, 66.7% of patients reported mild pain (score 1-2), 26.7% reported moderate discomfort (score 3-4), and 6.7% reported higher pain scores (score 5-6). In the TAPP group, 80.0% reported mild pain, 16.7% reported moderate discomfort, and 3.3% reported higher pain scores.

The distribution of postoperative pain was statistically similar between the two groups (P = 0.510). Pain score distribution is summarised in **Table 1** and illustrated in **Figure 1**.

Pain score	TEP (n=30) No (%)	TAPP (n=30) No (%)
1-2 (Mild)	20 (66.7)	24 (80.0)
3-4 (Moderate)	8 (26.7)	5 (16.7)
5-6 (Distressing)	2 (6.7)	1 (3.3)

Table 1. Postoperative Pain score Distribution

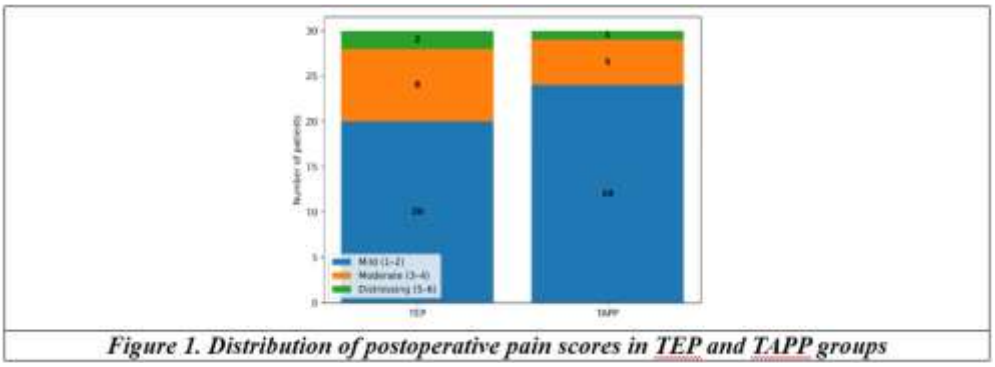

Figure 1. Distribution of postoperative pain scores in TEP and TAPP groups

This chart represents Distribution of postoperative pain scores (mild: 1-2; moderate: 3-4; distressing: 5-6) in the TEP and TAPP groups.

Postoperative Hospital Stay

The duration of postoperative hospital stay ranged from 1 to 5 days in the TEP group and from 1 to 7 days in the TAPP group. Mean hospital stay was 2.27 ± 0.69 days for TEP repair and 2.53 ± 1.17 days for TAPP repair. The difference was not statistically significant (P = 0.286). Hospital stay data are presented in **Table 2** and graphically compared in **Figure 2**.

Parameter	TEP	TAPP
Min-Max (days)	1-5	1-7
Mean ± SD (days)	2.27 ± 0.69	2.53 ± 1.17

Table 2. Comparison of postoperative hospital stay

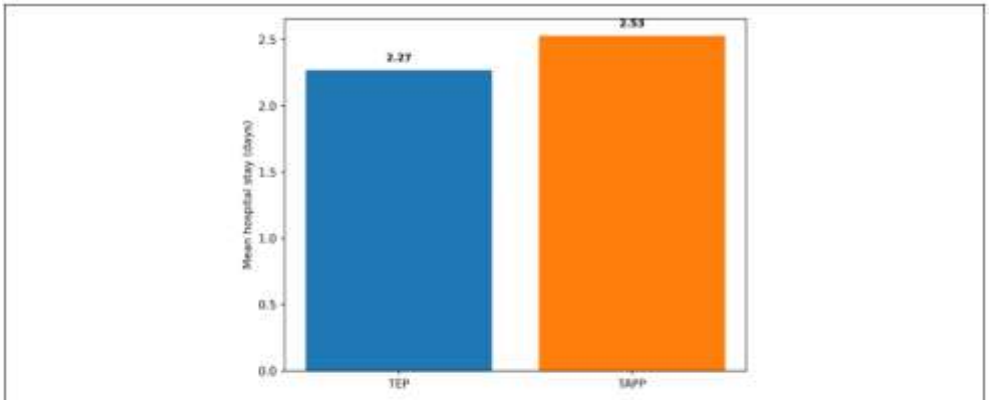

Figure 2. Comparison of mean postoperative hospital stay

Bar chart showing mean hospital stay in days for both groups with values displayed above bars.

Return to Normal Work

Patients in the TEP group resumed normal work earlier compared to those in the TAPP group. The mean time to return to normal activity was 6.43 ± 2.76 days in the TEP group and 7.20 ± 2.31 days in the TAPP group. Although TEP patients returned earlier on average, the difference was not statistically significant (P = 0.253).

Return-to-work data are summarised in **Table 3** and illustrated in **Figure 3**.

Parameter	TEP	TAPP
Min-Max (days)	3-15	4-14
Mean ± SD (days)	6.43 ± 2.76	7.20 ± 2.31

Table 3. Comparison of return to normal work

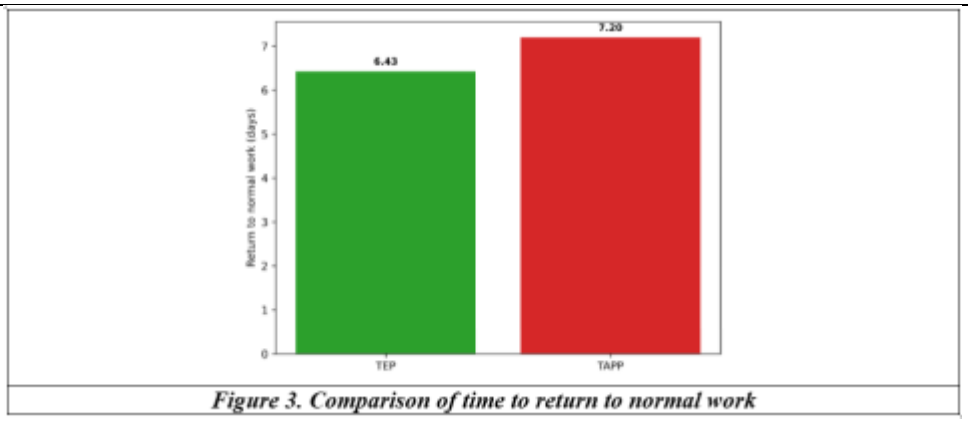

Figure 3. Comparison of time to return to normal work

Bar chart comparing mean duration to resume normal activity with bold values above bars.

Overall patient-perceived outcome

Overall outcome was graded as excellent, good, or poor based on patient perception and clinical assessment. In the TEP group, 66.7% of patients reported excellent outcomes, 20.0% reported good outcomes, and 13.3% reported poor outcomes. In the TAPP group, 53.3% reported excellent outcomes, 26.7% reported good outcomes, and 20.0% reported poor outcomes.

The distribution of outcome grades was statistically similar between the two groups (P = 0.622). Outcome grading is detailed in **Table 4** and shown in **Figure 4**.

Outcome	TEP (n=30) No (%)	TAPP (n=30) No (%)
Excellent	20 (66.7)	16 (53.3)
Good	6 (20.0)	8 (26.7)
Poor	4 (13.3)	6 (20.0)

Table 4. Overall patient-perceived outcome

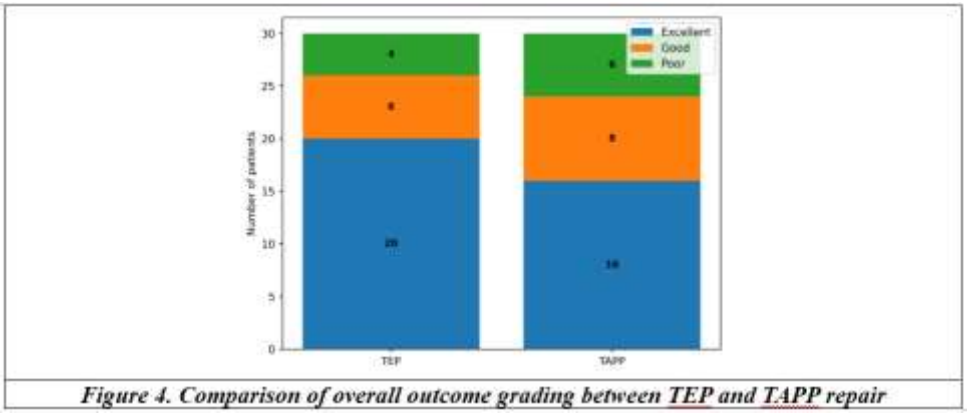

Figure 4. Comparison of overall outcome grading between TEP and TAPP repair

Stacked bar chart illustrating outcome categories with colour-coded segments and numeric labels.

Summary of Postoperative Recovery Outcomes

Pain scores, hospital stay, return to normal work, and patient-perceived outcomes were statistically similar between the two techniques, although trends favoured earlier functional recovery in the TEP group.

Discussion

When postoperative recovery was examined across the two groups, the most noticeable feature was not a clear separation between techniques, but the similarity in how patients recovered. Both TEP and TAPP repairs were followed by an uncomplicated recovery in the majority of patients. Differences, where present, were modest and became apparent only when individual recovery parameters were examined in detail.

Postoperative pain did not differ substantially between the two groups. Most patients reported mild pain in the early postoperative period, and only a small proportion experienced higher pain scores. Although distressing pain was reported slightly more often in the TEP group, the difference was not statistically significant. Similar patterns have been described in other comparative studies, where early postoperative pain following laparoscopic hernia repair showed wide overlap between techniques and tended to resolve quickly.[7]

Hospital stay was short in both groups. Mean duration differed only marginally, and most patients were discharged within a few days of surgery. In current practice, length of hospital stay after laparoscopic hernia repair is influenced by discharge policies and social factors as much as by surgical recovery itself.[8] The narrow range of stay observed in this study reflects this pattern and suggests that both techniques permit early discharge when uncomplicated.

Return to normal work provided a more functional view of recovery. Patients in the TEP group resumed work slightly earlier than those in the TAPP group, although the difference did not reach statistical significance. Similar trends have been reported in earlier studies, where TEP was associated with marginally faster return to activity without consistent statistical separation from TAPP.[9] In practical terms, recovery appeared to be shaped by individual occupation and personal circumstances rather than by the operative approach alone.

Overall patient-perceived outcome followed the same course. Most patients in both groups rated their outcome as good or excellent. While excellent outcomes were more frequent in the TEP group, overall satisfaction was comparable. Previous work has shown that patient satisfaction after hernia repair is closely linked to relief of symptoms and ability to resume routine activity, rather than to awareness of the specific laparoscopic technique used.[10]

These findings are particularly relevant in the Indian setting. Many patients return to physically demanding work soon after surgery, often out of necessity. Under such circumstances, small differences in pain scores or hospital stay may carry limited practical importance. Studies from similar populations have highlighted the influence of occupational and socioeconomic factors on postoperative experience following hernia repair.[11]

The study has limitations. Recovery parameters were assessed over a limited follow-up period, and long-term issues such as chronic pain or quality-of-life changes could not be evaluated. Patient-reported outcomes are also subjective and may vary with individual expectations. Even so, by focusing on postoperative recovery and patient experience, the study draws attention to outcomes that are central to patient-centred assessment of laparoscopic hernia repair. The study was not randomized, and allocation to TEP or TAPP was based on surgeon preference. This may introduce selection bias and limits the generalizability of the findings.

Overall, postoperative recovery following TEP and TAPP repair was broadly similar. Differences in pain, hospital stay, and return to normal work were small and inconsistent. These observations suggest that recovery and patient experience alone are unlikely to dictate choice of laparoscopic approach, which should continue to be guided by surgeon experience and clinical context.

Conclusion

Postoperative recovery following laparoscopic TEP and TAPP repair was broadly similar in this study. Early pain scores, hospital stay, return to normal work, and patient-perceived outcome showed no statistically meaningful separation between techniques, although minor trends favoured earlier functional recovery after TEP. These findings suggest that patient experience alone is unlikely to dictate technique selection, and the choice of approach should continue to be guided by surgeon experience and clinical context.

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