

RESEARCH PAPER

Minimally Invasive Inguinal Hernia Repair Using Laparoscopic Trans-Abdominal Pre-Peritoneal Mesh Repair Technique: Experience from 50 Cases

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Abstract

Background: Inguinal hernia is one of the most common surgical conditions. The laparoscopic approach has revolutionized modern surgical practice and has taken an upper hand to all the practiced procedures from the past. Owing to its minimally invasive nature, it offers significant advantages for both surgeons and patients.

Objective: The aim of this study was to evaluate the outcomes of laparoscopic trans-abdominal pre-peritoneal (TAPP) mesh repair in patients with inguinal hernia.

Methods: This descriptive observational study was conducted at a private hospital in Sylhet, Bangladesh from January 2023 to December 2024. The study included a total of 50 male patients, aged between 20 and 70 years, diagnosed with inguinal hernia.

Results: A total of 50 male patients, aged 20–70 years (mean \pm SD: 46.8 ± 16 years), were included in the study. Right-sided inguinal hernia was observed in 44% (22), left-sided in 12% (6), and bilateral in 44% (22). The duration of surgery was less than 60 minutes in 52% (26) and more than 60 minutes in 48% (24). The mean hospital stay was 1.24 ± 0.5 days. The most common postoperative complications included seroma, which was observed in 4% (2) of cases, followed by hematoma in 2% (1), chronic pain in 4% (2), and recurrence in 2% (1). No incidence of mesh infection was reported.

Conclusion: Laparoscopic TAPP for inguinal hernia is a safe and effective technique, offering favorable outcomes with minimal complication rates. The procedure is associated with short operative time, early discharge, and low recurrence. These findings support TAPP repair as a reliable approach for the management of inguinal hernia.

Keywords: Inguinal hernia, laparoscopy, TAPP, mesh.

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INTRODUCTION:

Inguinal hernia repair is one of the most commonly performed surgical procedures worldwide. Several repair techniques are available, ranging from simple tissue repair to the Lichtenstein mesh repair, which had long been regarded as the gold standard until the emergence of laparoscopic techniques [1].

Since the introduction of laparoscopic inguinal hernioplasty by Ger and colleagues in 1990, it has become an increasingly attractive alternative to open repair. Consequently, both surgeon and patient preferences have rapidly shifted toward laparoscopic hernia repair [2].

Laparoscopic hernia surgery offers several advantages over open repair; however, its long learning curve and longer operative time are considered notable limitations. Two main laparoscopic techniques are practiced for inguinal hernia repair: trans-abdominal pre-peritoneal (TAPP) mesh repair and totally extra-peritoneal (TEP) mesh repair [3].

Laparoscopic TAPP repair can be performed for all types of inguinal hernia, including both direct and indirect, and is feasible even in complicated cases. Relative contraindications include patients with significant comorbidities (such as chronic respiratory disease or heart failure) in whom general anesthesia is unsuitable [4,5]. TAPP repair is particularly advantageous in bilateral hernias, as it eliminates the need for two separate groin incisions required in open repair. It is also a valuable option in recurrent hernias previously treated with open anterior approaches, as the pre-peritoneal space remains undisturbed, facilitating dissection. Due to its minimally invasive nature and reduced tissue trauma, laparoscopic TAPP repair provides several benefits compared with open repair, including less postoperative pain, shorter recovery time with earlier return to normal activity, fewer wound-related complications, and better cosmetic outcomes [6].

The aim of this study was to ascertain the clinical profile and outcomes of laparoscopic TAPP repair for inguinal hernia.

MATERIALS & METHODS

This descriptive observational study was conducted at Popular Medical Centre & Hospital,

Sylhet, Bangladesh, between January 2023 and December 2024. All male patients who underwent laparoscopic TAPP repair for inguinal hernia during this period were included in the study. Data were collected from medical records. Detailed medical history and clinical examination findings were documented using a predesigned data sheet. Baseline investigations, including chest X-ray and abdominal ultrasonography, were also recorded. Operative notes were reviewed meticulously, with particular attention to intra-operative events and postoperative complications. Follow-up records at 3 and 6 months after surgery were analyzed. Data were summarized and presented as percentages.

SURGICAL TECHNIQUE

The procedure was performed using a standard three-port technique. The initial 5-mm port was inserted above the umbilicus using a closed technique to establish pneumoperitoneum. A telescope was then introduced to inspect the peritoneal cavity and confirm the presence of the hernia. Two additional 5-mm ports were placed at the level of the umbilicus along the linea semilunaris. Subsequently, the supraumbilical port was converted to a 10-mm port under direct visualization.

A peritoneal flap was created approximately 3–4 cm above the level of the deep inguinal ring (Figure 1) by making an incision with laparoscopic scissors, followed by careful dissection of the preperitoneal space (Figure 2). The hernia sac was then dissected and completely reduced. In cases of large inguinal hernia, the sac was left open. A 3D mesh was introduced into the peritoneal cavity through the 10-mm trocar after spraying with gentamicin for infection prophylaxis. The mesh was positioned in the preperitoneal space and secured with intracorporeal sutures using Vicryl 1-0 R/B, particularly at Cooper's ligament, the lateral edge, and the upper margin (Figure 3). No tacking device was used for fixation.

The peritoneal flap was closed with a continuous interlocking intracorporeal suture using Vicryl 1-0 R/B (Figure 4). Pneumoperitoneum was gradually released, and the 10-mm port site was closed with a transfascial suture by Vicryl 1-0 R/B. Then, all the ports were closed intradermally with Vicryl 3-0 R/B. The duration of surgery was recorded in minutes, measured from the first incision to skin closure.

Figure-1. Peritoneal incision line.

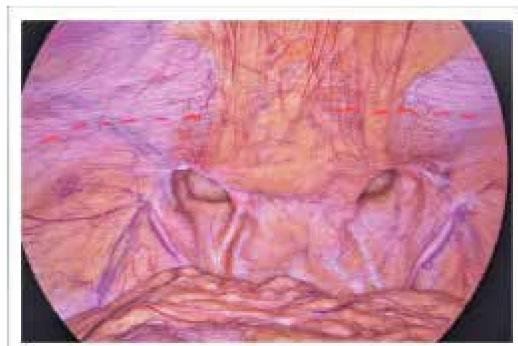


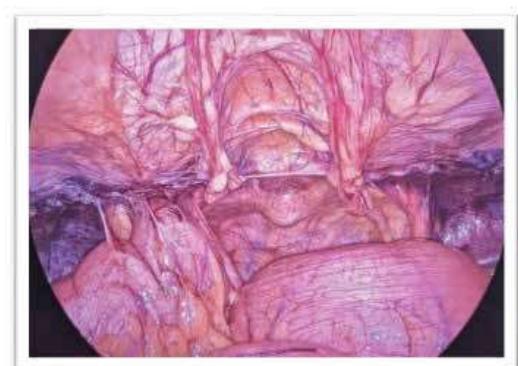
Figure-2. Dissection of the pre-peritoneal space.



Figure-3. 3D mesh in the pre-peritoneal space.



Figure-4. After closure of peritoneal flap.



RESULTS:

TABLE-I: Age distribution of the patient

Age group	Number of cases	Percentage
20-30	12	24%
31-40	07	14%
41-50	09	18%
51-60	10	20%
61-70	12	24%

A total of 50 male patients, aged 20–70 years (mean \pm SD: 46.8 ± 16 years), were included in the study. Majority cases (48%) belong to 20-30 and 61-70 years age group.

TABLE-II: Characteristics of the hernia

Hernia	Number of cases	Percentage
Type		
Direct	08	16%
Indirect	34	68%
Both Direct & Indirect (Pantaloone type)	08	16%
Direction		
Right side	22	44%
Left side	06	12%
Bilateral	22	44%

About 68% cases were indirect inguinal hernia and 16% were suffering from pantaloone hernia. Right-sided inguinal hernia was observed in 44% (22), left-sided in 12% (6), and bilateral in 44% (22).

TABLE-III: Operative time, post-operative pain, and hospital stay

Variable	Number of cases	Percentage
Operative time		
<60 minutes	26	52%
>60 minutes	24	48%
Post-operative pain		
<3 (mild)	35	70%
3-6 (moderate)	13	26%
>6 (severe)	02	04%
Hospital stay		
1 day	40	80%
2 days	08	16%
3 days	02	04%

The mean operative time in this study was 65 minutes with less than 60 minutes in 52% (26) and more than 60 minutes in 48% (24). About 70% patient experience only mild post operative pain. The mean hospital stay was 1.24 ± 0.5 days, 80% cases were discharged at first post operative day.

TABLE-IV: Post-operative complications

Post-operative complications	Number of cases	Percentage
Seroma	02	04%
Haematoma	01	02%
Mesh infection	00	00%
Chronic pain	02	04%
Recurrence	01	02%

Postoperative complications included seroma, which was the most common and observed in 4% (2), followed by hematoma in 2% (1), chronic pain in 4% (2), and recurrence in 2% (1). No incidence of mesh infection was reported.

DISCUSSION

In our study of laparoscopic TAPP repair for inguinal hernia, the most common age groups were 20–30 years (24%) and 61–70 years (24%), with a mean age of 46.8 ± 16 years. This is consistent with Bansod et al. [7], who reported a mean age of 43 ± 15 years.

Regarding the direction of the hernia, a right-sided inguinal hernia was observed in 44% of cases, while a bilateral hernia was also noted in 44% of cases. Mamunur et al. [8] reported similar findings, with 62.5% right-sided and 37.5% left-sided hernias.

In terms of hernia type, 68% of cases were indirect inguinal hernias, 16% were direct, and the remaining 16% were combined direct and indirect (pantaloan) hernias. This aligns with previous studies: Pankaj S. et al. [9] reported 72% indirect and 28% direct, while B.S. Gedam et al. [10] found 65.21% indirect and 35.79% direct hernias.

The mean operative time in this study was 65 minutes, with 52% of surgeries completed in under 60 minutes and 48% taking more than 60 minutes. Singh et al. [11] reported an operative time range of 70–150 minutes, which is broadly comparable.

Postoperative pain, assessed using the Visual Analogue Scale, was mild in 70% of patients, moderate in 26%, and severe in 10%. M. Elwan et al. [12] reported that 60% of patients experienced mild pain (score <3), showing a similar trend.

The mean hospital stay was 1.24 ± 0.5 days, with 80% of patients discharged on the first postoperative day. In comparison, Xuan NT et al. [13] reported a mean postoperative hospital stay of 3.9 ± 1.4 days, indicating that TAPP repair can significantly reduce hospital stay.

At 3 and 6-month follow-up, postoperative complications in our study included seroma in 4% of cases, hematoma in 2%, chronic pain in 4%, and recurrence in 2%, with no cases of mesh infection. In contrast, Shivakumar et al. [14] reported higher complication rates, with hematoma in 20% and seroma in 15% of patients after laparoscopic TAPP repair.

Conclusion

Laparoscopic TAPP repair of inguinal hernia is a relatively safe and effective procedure with favorable outcomes. It offers multiple advantages for both patients and surgeons. The technique is particularly beneficial in the management of bilateral and recurrent inguinal hernias.

LIMITATION

This study was a single-center analysis with a relatively small sample size and included only male patients. The outcomes might have been influenced by the individual surgeon's experience.

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