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# Outcomes of Laparoscopic Inguinal Hernia Repair: An Observational Study from a Tertiary Care Hospital in North-East India

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## ABSTRACT

**Background:** Inguinal hernia repair is one of the most commonly performed general surgical procedures. With the advancement of minimally invasive techniques, laparoscopic inguinal hernia repair has gained increasing acceptance due to its reduced postoperative morbidity, early recovery, and better cosmetic results. However, it is not without complications, and outcomes may vary depending on patient profile and surgical technique.

**Methods:** This cross-sectional observational study was conducted in the Department of General Surgery, AGMC & GBPH, over 18 months. A total of 45 patients undergoing laparoscopic inguinal hernia repair were included. Data were collected on demographics, risk factors, comorbidities, type of hernia, surgical procedure (TEP vs TAPP), intraoperative findings, postoperative complications, and hospital stay. Statistical analysis was performed using SPSS software, with significance considered at $p < 0.05$.

**Results:** Among 45 patients, 97.8% were male and 73.3% were above 50 years of age. TEP was performed in 53.3% and TAPP in 46.7%. No intraoperative complications were noted. Postoperatively, 22 patients (48.9%) developed complications, the most common being scrotal edema (22.2%) and urinary retention (13.3%). Significant association was found between postoperative complications and comorbidities ($p$=0.03), and the number of hernias ($p$=0.007). The mean hospital stay was 4.53 days. One patient (2.2%) developed recurrence during follow-up. There was no mortality.

**Conclusion:** Laparoscopic inguinal hernia repair is safe and effective with acceptable complication rates. Scrotal edema and urinary retention were the most frequent complications. Patients with comorbidities and bilateral hernias were at higher risk of postoperative complications. Proper patient counselling, optimization of comorbidities, and meticulous surgical technique are essential to achieve better outcomes.

**Key-words:** Inguinal hernia, Laparoscopic repair, TEP, TAPP, Complications, Hospital stay

## INTRODUCTION

Hernia is defined as an abnormal protrusion of an organ or tissue through a defect in its surrounding walls, most commonly occurring in the abdominal or groin region [1].

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Among these, inguinal hernia is the most frequent type, accounting for nearly 75% of all abdominal wall hernias [2]. The lifetime risk of developing an inguinal hernia is estimated at 27% in men and 3% in women, with increasing incidence with age [3]. In India, the prevalence of inguinal hernia is reported to be around 18%, with a clear male predominance due to occupational and anatomical factors [4].

Traditionally, inguinal hernias have been treated using open surgical approaches such as Bassini's repair, Shouldice repair, and Lichtenstein's mesh repair. However, with the advent of minimal access surgery in

 

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the late 20th century, laparoscopic inguinal hernia repair has emerged as a preferred technique due to its advantages, including reduced postoperative pain, faster recovery, shorter hospital stays, and better cosmetic outcomes [5,6].

Currently, two major laparoscopic approaches are widely practiced: the Totally Extraperitoneal Repair (TEP) and the Transabdominal Preperitoneal Repair (TAPP)**.** Both techniques utilize mesh placement in the preperitoneal space to reinforce the myopectineal orifice and reduce the risk of recurrence [7]. Although minimally invasive approaches are associated with several benefits, they are not free from complications. Reported intraoperative complications include injury to bowel, bladder, testicular vessels, vas deferens, and inferior epigastric vessels. In contrast, postoperative complications may involve seroma, scrotal edema, urinary retention, surgical site infection, and recurrence [8,9].

Several studies have demonstrated that laparoscopic hernia repair is associated with low recurrence rates and improved postoperative quality of life compared to open repair [10,11]. However, variations exist depending on patient profile, presence of comorbidities, and type of hernia, highlighting the importance of evaluating real-world outcomes in different settings.

This study was conducted at a tertiary care institute in Tripura to assess the outcomes of laparoscopic inguinal hernia repair, with special emphasis on intraoperative and postoperative complications, the need for re-exploration, and the duration of hospital stay.

## MATERIALS AND METHODS

**Study Design and Setting-** This was a hospital-based, cross-sectional observational study conducted in the Department of General Surgery, Agartala Government Medical College & GBP Hospital, Tripura, India. The study was carried out over a period of 18 months (July 2023 – January 2025).

**Study Population-** All patients who underwent laparoscopic inguinal hernia repair during the study period were included after fulfilling the eligibility criteria.

**Inclusion Criteria**

- Patients of either sex undergoing laparoscopic inguinal hernia repair.
- Patients willing to provide informed consent and participate in the study.

**Exclusion Criteria**

- Patients not willing to provide consent.
- Patients unfit for general anaesthesia or require open hernia repair due to intraoperative findings.

**Sample Size and Sampling Technique-** A total of 45 patients were included using a census sampling method, as all eligible cases during the study period were considered [5].

**Study Tools and Data Collection-** Data were collected using a pretested case record proforma. Clinical details such as demographic characteristics, addiction history, comorbidities, body mass index (BMI), and type of hernia were documented. Operative details included the type of procedure performed (TEP or TAPP), operative time, intraoperative findings, and complications. Postoperative complications such as scrotal edema, urinary retention, seroma, surgical site infection (SSI), recurrence, and length of hospital stay were noted. Patients were followed up at 1 week, 2 weeks, 1 month, and 3 months postoperatively [6,7].

**Statistical Analysis- This study** was compiled in Microsoft Excel and analyzed using SPSS software (version 21.0; IBM Corp., Armonk, NY). Results were expressed in terms of frequency and percentage. Associations between categorical variables and complications were analyzed using the Chi-square test or Fisher's exact test, as appropriate. A *p-value* of <0.05 was considered statistically significant [9].

**Ethical Considerations**- The study protocol was reviewed and approved by the Institutional Ethics Committee of AGMC & GBPH. Written informed consent was obtained from all participants before enrolment in the study, in accordance with the Declaration of Helsinki [8].

## RESULTS

A total of 45 patients who underwent laparoscopic inguinal hernia repair were included in the present study. The findings related to demographic distribution, surgical procedures, intraoperative and postoperative complications, and hospital stay are described in detail below.

 

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Most patients were males (97.8%), with a male-to-female ratio of 44:1. The majority of cases (73.3%) were observed in patients aged 50 years or older. A normal BMI (18.5–24.9 kg/m²) was observed in 77.8% of patients, while 20% were either overweight or obese. Smoking was the predominant addiction (60%), while 31.2% had no addiction. More than half of the patients (55.6%) had no comorbidities, while hypertension (22.2%) and diabetes mellitus (17.8%) were the most frequent comorbid illnesses (Table 1).

**Table 1.** Demographic Profile and Risk Factors of Patients (n=45)

| Variables | Categories | Frequency | Percentage (%) |
|---|---|---|---|
| Gender | Male | 44 | 97.8 |
| | Female | 1 | 2.2 |
| Age (years) | < 50 | 12 | 26.7 |
| | ≥ 50 | 33 | 73.3 |
| BMI (kg/m²) | < 18.5 | 1 | 2.2 |
| | 18.5 – 24.9 | 35 | 77.8 |
| | 25 – 29.9 | 7 | 15.6 |
| | ≥ 30 | 2 | 4.4 |
| Addiction | No addiction | 14 | 31.2 |
| | Smoking | 27 | 60.0 |
| | Alcohol | 2 | 4.4 |
| | Both | 2 | 4.4 |
| Comorbidities | None | 25 | 55.6 |
| | Diabetes Mellitus | 8 | 17.8 |
| | Hypertension | 10 | 22.2 |
| | Both DM & HTN | 2 | 4.4 |

Out of 45 cases, TEP was slightly more common (53.3%) than TAPP (46.7%). Unilateral hernia was seen in 80% of patients, while 20% had bilateral hernia. Indirect hernia (60%) was the predominant type, followed by direct hernia (26.6%). Most surgeries were completed within 1–2 hours (60%), whereas 33.3% were finished within 1 hour (Table 2).

**Table 2.** Distribution of Surgical and Clinical Characteristics (n=45)

| Variables | Categories | Frequency | Percentage (%) |
|---|---|---|---|
| Procedure | TEP | 24 | 53.3 |
| | TAPP | 21 | 46.7 |
| Number of Hernias | Unilateral | 36 | 80 |
| | Bilateral | 9 | 20 |
| Type of Hernia | Indirect | 27 | 60 |
| | Direct | 12 | 26.6 |
| | Pantaloon | 3 | 6.7 |
| | Direct (one side) + Indirect (other | 3 | 6.7 |

 

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| | side) | | |
|---|---|---|---|
| Operation Time | < 1 hour | 15 | 33.3 |
| | 1–2 hours | 27 | 60 |
| | > 2 hours | 3 | 6.7 |

No intraoperative complications were observed in either TEP or TAPP groups. Overall, 22 patients (48.9%) developed postoperative complications. Scrotal edema was the most common (22.2%), more frequently seen in the TAPP group (33%). Urinary retention occurred in 13.3% of patients, while seroma was exclusively noted in the TEP group (13%). Surgical site infection (4.4%) and recurrence (2.2%) were infrequent (Table 3).

**Table 3.** Intraoperative and Postoperative Complications (n=45)

| Complications | TEP (n=24) | TAPP (n=21) | Total (n=45) | Percentage (%) |
|---|---|---|---|---|
| Intraoperative | | | | |
| Vascular injury | 0 | 0 | 0 | 0 |
| Visceral injury | 0 | 0 | 0 | 0 |
| Vas deferens injury | 0 | 0 | 0 | 0 |
| Postoperative | | | | |
| Scrotal edema | 3 | 7 | 10 | 22.2 |
| Urinary retention | 4 | 2 | 6 | 13.3 |
| Seroma | 3 | 0 | 3 | 6.7 |
| SSI | 1 | 1 | 2 | 4.4 |
| Recurrence | 0 | 1 | 1 | 2.2 |
| No complications | 13 | 10 | 23 | 51.1 |

The mean hospital stay was 4.53 days. Most patients (40%) were discharged on the 3rd postoperative day. Extended stay beyond 7 days was observed in patients who developed complications such as SSI or seroma. No mortality occurred during the study period (Table 4).

**Table 4.** Length of Hospital Stay (n=45)

| Duration of Stay (days) | Frequency | Percentage (%) |
|---|---|---|
| 2 days | 6 | 13.3 |
| 3 days | 18 | 40 |
| 4 days | 2 | 4.4 |
| 5 days | 9 | 20.0 |
| 6 days | 2 | 4.4 |
| 7 days | 3 | 6.7 |
| 10 days | 4 | 9.0 |
| 12 days | 1 | 2.2 |
| Total | 45 | 100 |

 

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## DISCUSSION

The present cross-sectional observational study evaluated the outcomes of laparoscopic inguinal hernia repair in 45 patients at a tertiary care institute in Tripura. The findings were compared with existing literature.

In the current study, 97.8% of patients were male, and 73.3% were over 50 years of age. The male predominance observed in our series is consistent with previous studies showing that inguinal hernia is more common in men due to anatomical and occupational factors [12]. The high proportion of elderly patients corresponds to the known age-related increase in abdominal wall weakness and risk of herniation [13].

In our series, TEP was slightly more frequent (53.3%) compared to TAPP (46.7%). No intraoperative complications were recorded in either group. This finding aligns with Saini *et al*., who reported low rates of intraoperative complications in both the TEP and TAPP groups [14]. Similarly, Yildiz also found no significant difference in complication rates between the two techniques [15].

Overall, 48.9% of patients developed complications, the most common being scrotal edema (22.2%) and urinary retention (13.3%). In our study, scrotal edema was more frequent in the TAPP group, while urinary retention was more common after TEP. These findings are comparable to those of Saini *et al*., who reported scrotal edema in 16–22% and urinary retention in about 12% of patients [14]. Seroma occurred in 6.7% of cases, exclusively in the TEP group, which is consistent with the findings of Lau and Lee, who observed seroma rates ranging from 5.7% to 22.9% depending on hernia size [16]. Cihan also emphasized the higher incidence of seroma in large hernias after TEP [17].

One patient (2.2%) developed recurrence, which is within the recurrence rates reported in other series (1–12%) [18]. Our recurrence rate was lower than that reported in the multicentric series by Phillips et al., who noted recurrences up to 19% with the TAPP technique [19].

In our study, significant associations were observed between complications and comorbidities (p=0.03) and number of hernias (p=0.007). Patients with bilateral hernias and those with diabetes or hypertension were more likely to develop complications. Chen *et al*. similarly reported a statistically significant correlation between comorbidities and postoperative complications [20]. Smoking did not show a statistically significant effect in our series, which is comparable to the findings of Yergin *et al*. [21]. BMI and operative time were not significant predictors of complications, consistent with previous observations [14].

The mean hospital stay in our study was 4.53 days, with most patients discharged on day 3. This is slightly longer than the 2–3 days reported in other series, possibly due to the higher proportion of elderly patients and those with comorbidities [14,22]. All patients were discharged successfully, and no mortality occurred, a finding similar to that in other observational series [23].

Thus, our study reinforces the safety and efficacy of laparoscopic hernia repair while highlighting that patients with comorbidities and bilateral hernias are at greater risk of complications and may require closer perioperative monitoring.

## CONCLUSIONS

This study concluded that Laparoscopic inguinal hernia repair is a safe and effective procedure with acceptable complication rates. In the present study, scrotal edema and urinary retention were the most common postoperative complications. The presence of comorbidities such as diabetes and hypertension, as well as bilateral hernias, was significantly associated with higher complication rates. No intraoperative complications or mortality were observed, and the mean hospital stay was 4.53 days. Proper patient selection, optimization of comorbid conditions, and meticulous surgical technique are essential for achieving favorable outcomes.

## CONTRIBUTION OF AUTHORS

**Research concept-** Dr. Nilotpal Chakma
**Research design-** Dr. Nilotpal Chakma
**Supervision-** Dr. Nilotpal Chakma
**Materials-** Dr. Pritam Das
**Data collection-** Dr. Sourav Das
**Data analysis and interpretation-** Dr. Nazaru Debbarma
**Literature search-** Dr. Bijit Lodh
**Writing article-** Dr. Pritam Das
**Critical review-** Dr. Bijit Lodh
**Article editing-** Dr. Nazaru Debbarma
**Final approval-** Dr. Nilotpal Chakma

 

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