



A COMPARATIVE STUDY OF LICHTENSTEIN'S TENSION-FREE HERNIOPLASTY AND LAPAROSCOPIC HERNIA REPAIR

General Surgery

Dr. Soumya Sree Nanduri

Postgraduate Department Of General Surgery Alluri Sitarama Raju Academy Of Medical Sciences Eluru, West Godavari District Andhra Pradesh 534005 India

Dr. S. Lavanya

Professor Department Of General Surgery Alluri Sitarama Raju Academy Of Medical Sciences Eluru, West Godavari District Andhra Pradesh 534005 India

Dr. G. Manoharsha

Assistant Professor Department Of General Surgery Alluri Sitarama Raju Academy Of Medical Sciences Eluru, West Godavari District Andhra Pradesh 534005 India

ABSTRACT

Background: Inguinal hernia repair is one of the most common surgical procedures worldwide. Despite advancements, the ideal surgical technique continues to be debated. This study compares Lichtenstein's tension-free hernioplasty (open repair) and laparoscopic hernia repair in terms of operative parameters, complications, recovery, and patient satisfaction. **Methods:** A prospective, non-randomized study was conducted involving 80 patients with inguinal hernias, of which 40 underwent Lichtenstein's open mesh repair and 40 underwent laparoscopic repair. Data collected included operative time, postoperative pain (VAS score), complications, duration of hospital stay, return to routine activities, recurrence, and patient feedback. **Results:** Laparoscopic repair had longer operative time (81 min vs. 51 min) but shorter hospital stay (4 days vs. 7 days), earlier return to daily activity (7 days vs. 15 days), and lower recurrence (0% vs. 5%). Postoperative pain and complications were also significantly lower in the laparoscopic group. Patient satisfaction was higher with laparoscopic repair. **Conclusion:** Laparoscopic repair offers superior short-term outcomes and improved patient experience, albeit at higher cost and surgical expertise requirements. Open repair remains a viable option, particularly in resource-limited settings.

KEYWORDS

INTRODUCTION

Hernia surgery has undergone major transformations over the centuries. Hippocrates and Galen laid early foundations with anatomical understanding, though surgical interventions remained rudimentary. During the Renaissance, detailed anatomical dissections advanced hernia understanding. In 1889, Edoardo Bassini introduced the first scientific method of inguinal hernia repair, focusing on reinforcing the posterior wall of the inguinal canal. His technique significantly reduced recurrence rates and laid the groundwork for future surgical innovations.

Shouldice's modification introduced multilayered tissue repair with remarkable outcomes, while Lichtenstein's tension-free mesh repair in the 1980s brought about a revolution with its simplicity and low recurrence. Concurrently, the rise of synthetic meshes, such as polypropylene and expanded PTFE, improved durability and reduced complications. The laparoscopic era began with Ger's pioneering work in 1977. The TAPP and TEP approaches offered minimally invasive options with comparable recurrence rates, reduced pain, and faster recovery.

Studies such as Neumayer et al. (2004) involving over 2000 patients demonstrated that while laparoscopic repair had longer operative times, it offered faster return to activities and reduced chronic pain. Similarly, Eklund et al. (2010) confirmed that chronic pain was significantly less common after laparoscopic repair even five years postoperatively. These findings have led to updated guidelines favoring minimally invasive techniques, especially for bilateral and recurrent hernias.

Inguinal hernias are a frequent surgical condition globally, particularly in males. The lifetime risk of developing an inguinal hernia is approximately 27% for men and 3% for women. A hernia occurs when intra-abdominal contents protrude through a weakened area in the abdominal wall. Despite numerous surgical advancements, there is no universally accepted 'gold standard' procedure.

The Lichtenstein tension-free mesh repair, introduced in the 1980s, remains one of the most widely practiced techniques due to its simplicity, effectiveness, and reproducibility. On the other hand, laparoscopic techniques such as TAPP (Transabdominal Preperitoneal) and TEP (Totally Extraperitoneal) have gained popularity for their minimally invasive nature, resulting in reduced postoperative pain and faster recovery.

Review Of Literature: Historically, hernia repair evolved from

rudimentary methods described by the ancient Greeks to modern mesh-based techniques. Bassini revolutionized open hernia repair in 1889, followed by Shouldice and Lichtenstein. Ger introduced laparoscopic hernia repair in 1977, with TAPP becoming standardized by the early 1990s. Comparative studies, such as those by Neumayer et al. (2004) and Eklund et al. (2010), have shown favorable outcomes for laparoscopic methods in terms of recovery and chronic pain. However, these procedures demand technical expertise and resources.

This study aims to compare the outcomes of Lichtenstein's and laparoscopic repairs, evaluating surgical efficacy, patient recovery, and satisfaction in a tertiary care setting.

MATERIALS AND METHODS

Study Design: Prospective, non-randomized comparative study.

Sample Size: 80 patients diagnosed with inguinal hernia (40 underwent Lichtenstein's repair, 40 underwent laparoscopic repair).

Setting: Department of General Surgery, ASRAMS, Eluru (2022–2024).

Ethical Consideration: Approval obtained from Institutional Ethical Committee.

Inclusion Criteria:-

Patients aged 18 to 60 years.-

Diagnosed cases of unilateral or bilateral inguinal hernia.- Provided informed consent.

Exclusion Criteria:- Complicated hernias (strangulated/obstructed).-

Bleeding disorders.- Failed previous laparoscopic hernia repairs. - Age <18 or >60 years.

Follow-up Protocol: Patients were followed postoperatively at 1 week, monthly for 3 months, and at 6 months.

Surgical Techniques:

Lichtenstein's Repair: This open procedure involves a standard oblique inguinal incision made 2 cm above the inguinal ligament. After exposing the inguinal canal, the hernia sac is carefully dissected and reduced or excised depending on its type. A polypropylene mesh (typically 15x8 cm) is placed over the posterior wall, posterior to the spermatic cord, and anchored to the pubic tubercle, inguinal ligament, and conjoint tendon using non-absorbable sutures. The external oblique is closed over the mesh, and standard closure is completed.

Laparoscopic Repair: The TAPP (Transabdominal Preperitoneal) approach was employed in this study. The patient was placed in the

supine Trendelenburg position under general anesthesia. A 10-mm infra-umbilical port was used to access the peritoneal cavity, followed by placement of two 5-mm working ports in the lower quadrants. The peritoneum over the hernia site was incised, and the hernia sac reduced. A mesh was placed in the preperitoneal space and fixed using absorbable tackers. The peritoneum was closed over the mesh to prevent adhesion formation.

Follow-up Protocol: Patients were observed in the immediate postoperative period for complications. Pain scores were recorded using a Visual Analogue Scale (VAS) at 24 and 72 hours. Discharge criteria included ambulation, pain control, and tolerance of oral diet. Patients were followed up at 1 week, 1 month, 3 months, and 6 months. Each follow-up visit involved a clinical examination and questionnaire-based assessment of pain, return to work, and satisfaction.

RESULTS

Demographics:

- **Mean Age:** Laparoscopy Group – 40.95 years; Lichtenstein Group – 50.88 years.
- All patients were male.

Operative Time:

- **Mean duration:** Laparoscopy – 80.75 min; Lichtenstein – 51.08 min.

Postoperative Pain (VAS Scores):

- **Grade 1 Pain:** Laparoscopy – 92.5%; Lichtenstein – 70%.
- **Grade 2 And Above:** Significantly more common in Lichtenstein group.

Postoperative Complications:

- **Laparoscopy:** 1 port site infection, 1 seroma.
- **Lichtenstein:** 6 seromas, 3 wound infections.

Recurrence:

- **Laparoscopy:** 0 cases.
- **Lichtenstein:** 2 cases (5%).

Duration Of Hospital Stay:

- **Laparoscopy:** Mean 3.73 days.
- **Lichtenstein:** Mean 7.1 days.

Return To Daily Activity:

- **Laparoscopy:** Mean 7.1 days.
- **Lichtenstein:** Mean 15.25 days.

Patient Satisfaction:

- **Good Feedback:** Laparoscopy – 95%; Lichtenstein – 87.5%.
- **Poor Feedback:** Only 1 patient (Lichtenstein group).

Statistical analysis revealed a significant difference in the mean duration of hospital stay and time to return to daily activities between the two groups ($p < 0.001$). Chi-square tests confirmed that postoperative complications, particularly seroma and wound infections, were significantly more frequent in the Lichtenstein group ($p = 0.041$). VAS pain scores were lower in the laparoscopic group, with 92.5% of patients reporting Grade 1 pain versus 70% in the Lichtenstein group ($p = 0.033$).

Fisher's Exact Test showed that intraoperative vascular injuries were more likely in open surgeries, although the results were not statistically significant ($p = 0.152$). Patient feedback was overwhelmingly positive for laparoscopic repairs, with 95% rating the experience as 'good' compared to 87.5% in the open repair group. Though two cases of recurrence occurred in the Lichtenstein group, none were observed in laparoscopic repairs, suggesting improved long-term integrity of the laparoscopic mesh fixation.

DISCUSSION

The results of this study align with existing literature supporting laparoscopic repair for its minimally invasive nature and faster recovery. Although operative duration was longer in the laparoscopic group, postoperative pain, complications, and recurrence rates were lower. Early mobilization and quicker return to daily activities contributed to better patient satisfaction. Studies by Neumayer et al. and Eklund et al. have emphasized similar benefits of laparoscopic techniques. However, the need for advanced equipment and technical

proficiency can limit widespread adoption, especially in rural or under-resourced hospitals.

Lichtenstein's repair, despite slightly higher complications and pain, remains a dependable method in terms of simplicity, cost-effectiveness, and shorter operative time.

While the advantages of laparoscopic repair are well-documented, several practical challenges remain. The requirement for general anesthesia, longer operative time, and increased costs are notable constraints. Furthermore, the steep learning curve can be a barrier for surgeons in smaller centers. However, when performed by experienced surgeons, laparoscopic repair consistently demonstrates reduced incidence of chronic groin pain, a common issue in open repairs.

Notably, the recurrence rate is closely linked to surgical expertise and patient selection. Our study reaffirms the importance of a structured surgical training program for laparoscopic techniques to reduce the learning curve and achieve consistent outcomes. It also highlights the need for patient-tailored approaches, taking into account individual risk profiles, comorbidities, and socioeconomic factors.

Comparing our findings with studies such as those by Felix et al. and Kumar et al., we observe a similar trend in terms of complication reduction and improved quality of life. These data advocate for broader adoption of laparoscopic methods in suitable candidates, supported by continuous medical education and investment in laparoscopic infrastructure.

Cost-Effectiveness Considerations:

Despite its clinical advantages, laparoscopic repair remains more expensive due to the requirement for general anesthesia, specialized equipment, and longer operative time. In contrast, Lichtenstein's repair can be performed under local or regional anesthesia, making it more suitable in low-resource settings. The higher upfront costs of laparoscopic surgery might be offset by faster return to work and fewer complications, but these indirect benefits may not be immediately tangible in all healthcare models.

Global Practice Guidelines: According to the European Hernia Society (EHS) and the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES), laparoscopic techniques are recommended for bilateral, recurrent, and young active patients, while open mesh repair is preferred in elderly or high-risk patients. These recommendations reflect the need for personalized surgical planning that aligns with patient characteristics and institutional resources.

CONCLUSION

This comparative study demonstrates that laparoscopic hernia repair offers significant advantages in postoperative recovery, pain control, and recurrence prevention. However, it demands higher surgical expertise and costs. Lichtenstein's open repair remains a strong alternative in facilities where laparoscopic surgery may not be feasible. Surgeons should tailor the choice of technique to individual patient needs, surgeon expertise, and resource availability.

Future Directions: - Larger randomized controlled trials with longer follow-up periods are necessary to assess the durability and cost-effectiveness of both techniques.

- Development of newer mesh materials and fixation techniques may further reduce chronic pain and recurrence.
- Integration of robotic-assisted laparoscopic repair could refine precision and outcomes, though cost remains a limiting factor.

Ultimately, the decision regarding surgical approach must remain patient-centered, involving shared decision-making between surgeon and patient, balancing medical indications with patient preferences and institutional capabilities.

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