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Inguinal Hernia Repair Outcomes Across Various Surgical Techniques: A Hospital Based Retrospective Study from a Tertiary Care Center

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Abstract

Background/Aim: Inguinal hernia repair is a common surgical procedure. This study aims to compare the effectiveness of different surgical techniques used for inguinal hernia repair at a tertiary care teaching hospital over a three-year period. ***Methods:*** This study will retrospectively analyze data from patients who underwent elective surgical repair of uncomplicated inguinal hernias between 2020 and 2022 at a single institution in Cuttack, Odisha. Patients were treated using various surgical techniques and followed prospectively for a defined post-operative period to assess outcomes. ***Results:*** Analysis of 260 inguinal hernia repairs demonstrated a procedural distribution where Lichtenstein hernioplasty was the most frequently employed technique, accounting for 80.8% of cases (n=210). Preperitoneal meshplasty was utilized in 10.4% of repairs (n=27), while transabdominal preperitoneal (TEP) repair was performed in 8.8% of cases (n=23). ***Conclusion:*** Comparative analysis demonstrates that Lichtenstein tension-free repair exhibits equivalent clinical efficacy to endoscopic/laparoscopic techniques in the management of hernias. However, the Lichtenstein procedure remains the prevailing standard of care, largely attributable to its well-established cost-effectiveness.

Keywords: ***Inguinal hernia, Meshplasty, Lichtenstein.***

Introduction

Around 75% of all hernias in the abdominal wall are found in the groin. Inguinal hernias are much more common in men, with a lifetime risk estimated between 27% and 43%, compared to 3% to 6% for women [1]. Inguinal hernia repair is a very common surgery worldwide; for example, over 800,000 such repairs are estimated to be done each year in the United States. While inguinal hernias affect people across all countries, races, and socioeconomic levels, there can be differences in how common they are and in access to treatment. Some studies have suggested possible variations in how often hernias occur among different racial groups, but these findings are often linked to socioeconomic factors and access to healthcare. The cost of hernia repair is significant worldwide, using up a considerable amount of healthcare resources [2]. The following factors were assessed for different methods of hernia repair.

Operative technique

- Operating time
- Postoperative pain & complications
- Long-term pain and Recurrence

Materials and Methods

A retrospective analysis was conducted on patients who underwent elective surgery for uncomplicated inguinal hernia between 2022 and 2022. Data was collected using a standardized form, encompassing a total of 260 inguinal hernia repairs performed during this period, with follow-up extending to 2023. All patients were admitted for planned surgical intervention following preoperative investigations and anesthetic assessment. The surgical repair was performed according to the indicated method, with 210 cases utilizing Lichtenstein's repair, 27 undergoing open preperitoneal meshplasty, and 23 receiving laparoscopic totally extra peritoneal repair (TEP).

Anesthetic consideration

Open mesh repairs were conducted utilizing local or regional anesthesia techniques, while laparoscopic hernia repairs necessitated the use of general anesthesia.

Method of patient selection

In our practice, Lichtenstein's tension-free prosthetic repair was the standard surgical approach for all unilateral inguinal hernias. Patients presenting with bilateral inguinal hernias underwent preperitoneal meshplasty. Laparoscopic totally extra peritoneal repair (TEP) was offered to patients deemed suitable candidates for general anesthesia and who could afford the procedure. However,

due to the increased technical complexity of laparoscopic repair in individuals with a history of prior laparotomy, these patients were managed using the Lichtenstein technique.

Relative contraindications for laparoscopic approach:

A. Obesity with BMI >30
B. Significant chest disease
C. Patient on anticoagulants
D. Massive hernias
E. Unfit for GA

Operating time

All surgeries were performed by the team led by corresponding author. Operative time for each procedure was obtained from the records and average was obtained.

Postoperative complications

Complications in postoperative period were noted as well as long term sequelae in the form of chronic pain and recurrences if any were also recorded.

Results

All patients were male with age ranging from 24 to 78 years with a median of 48.6years. Open mesh repairs were performed under local or locoregional anaesthesia. The laparoscopic procedure required general anesthesia (**Table 1**).

Table1: Type of procedure carried out

Type of procedure	Number of patients
Lichtenstein method of hernioplasty	210/260(80.76%)
Preperitoneal meshplasty	27/260(10.38%)
TEP	23/260(8.8%)

Out of 260 patients, 212 had unilateral inguinal hernia while 48 had bilateral inguinal hernia. Of these 260 patients 210 were operated by Lichtenstein method, 27 by preperitoneal meshplasty and 23 by TEP (**Table 2**).

Table2: Average time taken for procedure

Procedure	Time taken in minutes
Lichtenstein method of hernioplasty	42minutes
Preperitoneal meshplasty	48minutes
TEP	65minutes

As per table it is clear that for TEP average time taken was more than other methods. It may be because of more expertise requiring for this procedure (**Table 3**).

Table 3: Early complications in different procedures

Complications	Lichtenstein method (210)	Preperitoneal meshplasty (27)	TEP (23)
Seroma/ Hematoma	11(5.2)	0	1(4.3)
Wound infection	8(3.8)	2(7.4)	0
Postoperative pain (7days or more)	72(34.2)	3(11.1)	0
Testicular atrophy	0	0	0
Mesh infection	0	0	0

On comparison of early complication post operative pain was most common (34.2%) in Lichtenstein method. Similarly hematoma formation was most common with same technique (**Table 4**).

Table 4: Late complications in different procedures

Late complications	Lichtenstein method (210)	Preperitoneal meshplasty (27)	TEP (23)
Chronic pain (6 months or more)	42(20)	2 (7.4)	2(8.6)
Recurrence	2(0.9)	0	0
Sinus formation	0	0	0

Following Lichtenstein repair, approximately 20% of patients experienced chronic pain as a late-stage complication, whereas this and other delayed complications were infrequent with alternative surgical approaches. Postoperative observation was conducted for all patients, and the average duration of hospital stay was documented for each technique. The mean length of stay was 4.2 days for the Lichtenstein method, 4.6 days for the preperitoneal approach, and 2.8 days for the totally extra peritoneal (TEP) repair.

Discussion

This study retrospectively analyzed 260 male patients with uncomplicated inguinal hernias who presented to our surgical department over a three-year period, with a median age of 48.6 years. Given that age is a known risk factor for inguinal hernias, with incidence increasing with age, this cohort reflects a common demographic for this condition [3]. Inguinal hernia repair remains a prevalent surgical procedure. All included patients presented with uncomplicated hernias; 212 cases were unilateral, while 48 were bilateral. Over time, various surgical techniques for inguinal hernia repair have been developed, with three significant historical milestones marking their evolution.

1. Tissue repair (Bassini and Shouldice etc)
2. Tension-free repair (anteriormethod_Lichtenstein, open posterior method)
3. Laparoscopic hernia repair

Contemporary surgical practice for inguinal hernia repair has largely transitioned from traditional tissue repair techniques to tension-free prosthetic repair methods, which can be performed via either an anterior or posterior approach. Evidence consistently demonstrates the superiority of mesh-based repairs over non-mesh tissue-suture techniques in terms of outcomes.

Laparoscopic inguinal hernia repair involves positioning the mesh within the preperitoneal space, utilizing either a transabdominal preperitoneal (TAPP) or totally extra peritoneal (TEP) approach. While offering potential benefits, this technique typically requires a more extensive learning period for surgeons and incurs higher costs compared to traditional open repair.

Careful patient selection is crucial, considering factors such as their anesthetic fitness, financial capacity, and prior surgical history. Loco-regional anesthesia presents a suitable and cost-effective approach for open hernia repairs, particularly in a day-care setting. Patients with pre-existing respiratory or cardiovascular conditions are often unsuitable candidates for general anesthesia. Furthermore, individuals with a history of lower abdominal surgery may not be eligible for preperitoneal repair or TEP. Laparoscopic techniques tend to increase costs due to the requirement for general anesthesia and the use of specialized mesh fixation devices.

At our center in Cuttack, Odisha, the standard surgical approach for unilateral inguinal hernia is the Lichtenstein method. For bilateral or recurrent cases, we typically perform preperitoneal meshplasty. Transabdominal preperitoneal (TAPP) or totally extra peritoneal (TEP) laparoscopic repair is offered to patients who are suitable candidates for general anesthesia and can afford the procedure. It's important to note that laparoscopic hernia repair necessitates general anesthesia, generally involves a longer operative duration, and carries a potentially higher risk of serious complications compared to open techniques [4].

In our study, the average surgical duration for the Transabdominal Preperitoneal (TEP) repair (65 minutes) was marginally extended compared to both the Lichtenstein repair (45 minutes) and the preperitoneal method (48 minutes). When contrasted with findings from Lau H et al. [5] which reported a mean TEP operative time of 50 +/- 13.2 minutes, our observed time was somewhat prolonged, likely attributable to the initial phase of experience with the TEP technique.

In the early postoperative phase following Lichtenstein repair, while generally mild and manageable with basic pain medication, pain persisted in a notable proportion of patients (34.2%) at the one-week mark. Immediate postoperative complications occurred in 19 individuals, primarily hematoma and seroma formation necessitating drainage, observed in eight and three patients, respectively. Superficial surgical site infections were noted in eight patients. Importantly, no instances of abscess formation or acute infection associated with the mesh were recorded [6-9]. Testicular atrophy, a recognized but infrequent complication with significant medicolegal implications, was not observed in any of the patients within this study.

Preperitoneal meshplasty demonstrated a zero incidence of seroma or hematoma formation in this study. Two patients experienced superficial wound infections. Postoperatively, mild pain was still reported by three patients at the 7-day mark. This technique was associated with a short recovery period and minimal postoperative pain [10].

In the Transperitoneal Endoscopic Preperitoneal (TEP) group, one patient developed a hematoma that was successfully managed non-surgically; no wound infections were reported. Postoperative pain was minimal, with all patients reporting no pain by day seven. Consistent with the findings of Kulacoglu et al. [11], the laparoscopic approach (which includes TEP) demonstrated a lower incidence of hematoma and seroma formation compared to the Lichtenstein repair group.

The average hospital stays for patients undergoing Transabdominal preperitoneal (TEP) repair (2.8 days) was significantly shorter compared to both the preperitoneal open method (4.6 days) and the Lichtenstein repair (4.2 days). This decreased length of hospitalization associated with laparoscopic repair likely translates to reduced direct hospital expenditures and broader societal costs. For surgeons favoring an open surgical approach, the preperitoneal procedure presents a viable alternative to the standard Lichtenstein technique, demonstrating a lower incidence of persistent pain at six months post-surgery. The higher likelihood of neuropathic pain and numbness following the Lichtenstein procedure is likely attributable to the increased risk of nerve injury inherent in its anterior surgical approach [12].

The Transabdominal Preperitoneal (TEP) technique, while requiring marginally longer operative times, is associated with significantly reduced postoperative pain, lower rates of wound infection, and a faster return to routine activities and employment compared to the Lichtenstein and preperitoneal approaches. Notably, chronic pain, a significant complication following open inguinal hernia repair, has been reported in a substantial proportion of patients, ranging from 25% to 30% [13-15]. In this specific study, chronic pain persisting for six months or longer was observed in 20% (42 out of 210) of patients undergoing the Lichtenstein method, with only two cases each reported in the TEP and preperitoneal groups. Furthermore, no instances of delayed mesh infection or sinus formation were recorded across the study population.

The recurrence rate observed with the Lichtenstein technique in our study, ranging from 0 to 0.7%, aligns with findings reported in other research [16-18]. We did not observe any recurrences in the TEP and preperitoneal meshplasty groups, likely due to the smaller sample sizes for these procedures. Based on these initial observations, laparoscopic extra peritoneal hernia repair appears to be at least equivalent to, and potentially superior to, the open Lichtenstein repair regarding postoperative pain, length of hospital stay, time to return to work, and cosmetic outcomes, contingent on comparable long-term recurrence rates [19]. However, laparoscopic surgery presents limitations, including the necessity for general anesthesia, the cost of specialized equipment, and the required learning curve for surgeons.

Comparative studies have shown that open and laparoscopic/endoscopic techniques achieve similar clinical outcomes in hernia repair. While laparoscopic approaches are generally associated with higher initial costs due to instrumentation and disposable materials, as evidenced by studies in North America [20], the UK, and Sweden, the Lichtenstein method remains a cost-effective standard, particularly considering its ease of learning and safety even for surgeons with less experience [20-23]. Currently, laparoscopic repair is often favored for patients with bilateral or recurrent hernias, or for those with unilateral hernias seeking a faster return to normal activities [24].

Conclusion

The Lichtenstein tension-free mesh repair for inguinal hernias is a straightforward, secure, and easily mastered technique demonstrating high effectiveness and minimal complications both in the short and long term, along with a notably low incidence of hernia recurrence. While laparoscopic hernia repair is also safe and offers reduced postoperative morbidity, presenting several benefits compared to open surgery, the laparoscopic approach is particularly recommended for bilateral and recurrent inguinal hernias.

Declarations

Ethical Approval and Consent to participate

Not applicable as retrospective nature of study.

Consent for publication

Not applicable as retrospective nature of study.

Availability of supporting data

Upon request to the corresponding author.

Competing interests

Nil

Funding Statement

Nil

Authors contributions

All authors made substantial contributions to the reported work, including in the areas of conception, study design, execution, data collection, analysis, and interpretation. They participated in drafting, revising, and critically reviewing the article, gave final approval for the version to be published, agreed on the journal for submission, and accepted responsibility for all aspects of the work.

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