

# Comparison of Postoperative Outcomes of Open Lichtenstein and Laparoscopic Transabdominal Preperitoneal Repair for Uncomplicated Unilateral Inguinal Hernia

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## ABSTRACT

**Objective:** To compare the postoperative outcomes following open Lichtenstein's mesh repair and laparoscopic transabdominal preperitoneal (TAPP) repair for unilateral uncomplicated inguinal hernia.

**Methodology:** It was a quasi-experimental study conducted at Sir Ganga Ram Hospital, Lahore from January to December 2021. A total of 88 patients were recruited with the non-probability consecutive sampling technique. Patients were divided into two groups. Patients in group A were operated by TAPP repair and group B was treated with Lichtenstein's mesh repair. The efficacies of both procedures were compared in terms of postoperative pain, hospital stay, operative time, seroma formation, infection, and recurrence.

**Results:** The mean ages of the patients in TAPP and Lichtenstein groups were  $31.90 \pm 18.18$  and  $33.40 \pm 15.04$  years, respectively. The majority of patients (62.5%) had a right-sided hernia. The mean operative time in the TAPP group was prolonged ( $76.4 \pm 13.1$  min) as compared to the Lichtenstein group ( $56.4 \pm 11.3$  min). The postoperative pain score at 8 hours in the TAPP group was  $3.21 \pm 1.23$  and in the Lichtenstein group, it was  $4.84 \pm 1.41$ . The duration of hospital stay for the TAPP group was less as compared to Lichtenstein group ( $p$ -value  $< 0.001$ ). The majority of wound infections (4.55%) occurred in the Lichtenstein group. However, the incidence of seroma formation with scrotal edema was slightly higher in the TAPP group [ $10(11.35\%)$ ].

**Conclusion:** Transabdominal preperitoneal (TAPP) repair is more effective in terms of less pain, early recovery, and less seroma formation. However, the operative time was longer in TAPP group patients as compared to the Lichtenstein procedure.

**Keywords:** Inguinal hernia. Open hernioplasty. Laparoscopic hernioplasty.

## INTRODUCTION

Surgical repair of an inguinal hernia is one of the most common procedures performed by general surgeons. Approximately 20 million inguinal hernia repair surgeries are performed annually worldwide.<sup>1</sup> The incidence of the disease is about 25% in males and 2% in females and it can occur at any age.<sup>2</sup> Various open surgical & laparoscopic techniques can be used for the treatment of inguinal hernia. The best-known open method for repairing inguinal hernias is Lichtenstein tension-free hernioplasty.<sup>3</sup> Literature proved this method of repair as an effective procedure in terms of early recovery, less hospital stays, and postoperative pain as compared to other open techniques of repair. Lichtenstein used mesh to repair which follows the basic principle of hernia repair that it should be tension-free. Among the open techniques, Lichtenstein free repair is considered to be a gold standard approach.<sup>4</sup>

Since the advent and the incorporation of a laparoscope as an alternate modality, laparoscopic repair has also gained popularity.<sup>5</sup> Transabdominal preperitoneal

(TAPP) and total extraperitoneal (TEP) are two laparoscopic surgery techniques that are gradually replacing open techniques.<sup>6</sup> Laparoscopic repair of the inguinal hernia was started in 1999. It is a minimally invasive procedure and is a preferred procedure by surgeons.<sup>7</sup> Decreased postoperative pain, faster recovery, early return to normal activities, and better cosmetics have been recognized as definitive postoperative outcomes in laparoscopic surgeries.<sup>8</sup> The introduction of a laparoscopic technique has started a debate over the superiority of the laparoscopic method. Laparoscopic repair is widely recommended for recurrent and bilateral hernias. Still, the ideal preferred approach is questionable. Therefore, we endeavored to conduct this study to compare the outcome of laparoscopic repair (TAPP) and open methods (Lichtenstein) for non-complicated unilateral hernias.

## METHODOLOGY

This quasi-experimental study was conducted from January to December 2021 at the Department of Surgery, Sir Ganga Ram Hospital, Lahore. The study was approved by the ethical committee of the hospital (Letter No: 52-Synop-Surgery-II-FJ/ERC, 24-09-2020). A total of 88 patients were recruited with the non-probability consecutive sampling technique. Male patients presenting with primary uncomplicated unilateral direct or indirect inguinal hernia between the ages of 15-65 years were included. These patients also fulfilled the American Society of Anesthesiologists

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(ASA) I or II criteria. Patients with incarcerated or obstructed hernia requiring emergency surgery, previous history of pelvic surgery, and recurrent inguinal hernias were excluded. Informed consent was taken from all included patients. They were divided into two equal groups with 44 patients in each group. Group A was treated with the TAPP procedure and group B underwent Lichtenstein repair. A single dose of a second-generation cephalosporin antibiotic was administered half hour before surgery and all the patients received general anesthesia.

The transabdominal preperitoneal (TAPP) method of laparoscopic repair was used with a 3-port technique. An optical port was placed at the supraumbilical level and the two working ports were inserted at the lateral border of the rectus in the midclavicular line. The port on the side of the hernia was placed at the level of the umbilicus whereas the contralateral port was placed about two centimeters below the level of the umbilicus. After insufflation and visualization of the inguinal region, dissection was done to create a preperitoneal space on the side of the hernia by dividing the peritoneum. This was followed by dissection of the sac and parietalization of cord contents (vas-deferens and testicular vessels). A polypropylene mesh of 12-15 cm was used to place and cover all the potential hernial defects in the groin region.

Surgery was performed in the Lichtenstein group with a transverse incision 1.25 cm above the inguinal ligament extending from deep to the superficial ring. Identification and separation of the sac from the cord contents were followed. A mesh of size 6-11 cm was fixed with a monofilament polypropylene 3/0 suture. The lower end of the mesh was sutured to the inguinal ligament and the upper end to the conjoint tendon. The analgesia in the form of intramuscular Diclofenac sodium (75 mg) was administered immediately following surgery and was repeated after 6 hours. The duration of the operation was noted in minutes from the start of the incision till the completion of each

procedure.

A visual analog scale (VAS) was used to measure the patient’s pain at 8 and 24 hours after surgery. The complications like seroma, hematoma formation, and infections were noted. The hospital stay of the patients was recorded in hours. The patients were followed-up after 3 months for recurrence.

### STATISTICAL ANALYSIS

Statistical Package for the Social Sciences (SPSS) version 24 was used for data assessment. For all the quantitative data, the mean and standard deviation were determined. Frequency and percentage were calculated for wound complications and recurrence. An independent t-test was used to compare study outcomes in both groups. A p-value  $\leq 0.05$  was considered significant.

### RESULTS

The mean age of patients in the TAPP and Lichtenstein groups were  $31.90 \pm 18.18$  years and  $33.40 \pm 15.04$  years, respectively. Patients in this study ranged in age from 21 to 60 years. The majority of patients in this study had right-sided hernias 55(62.5%) and indirect hernias 71(80.68%). The mean operative time in the TAPP group was prolonged ( $76.4 \pm 13.1$  min) as compared to the Lichtenstein group ( $56.4 \pm 11.3$  min). The postoperative pain score at 8 hours in the TAPP group was  $3.21 \pm 1.23$  and in the Lichtenstein group was  $4.84 \pm 1.41$ . Similarly, the pain score after 24 hours of operation in the TAPP group was  $2.34 \pm 0.94$  and in the Lichtenstein group was  $3.02 \pm 0.95$  (Figure 1). The duration of hospital stay for the TAPP group and Lichtenstein group was  $22.6 \pm 5.7$  hours and  $35.8 \pm 10.9$  hours, respectively (Table 1). The occurrence of complications like seroma formation and infection in both groups are depicted in Table 2. There was no reported case of recurrence in both group during the three months follow-up period.

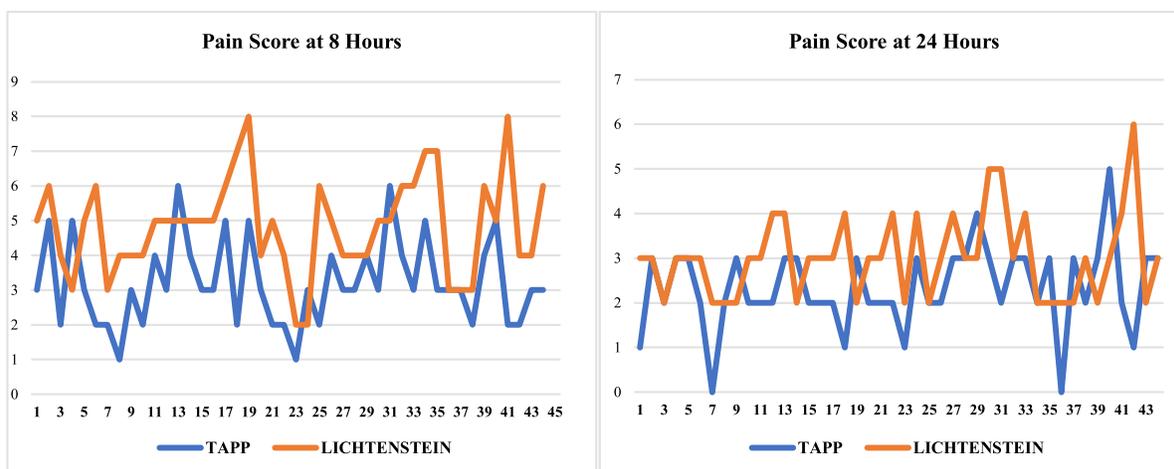


Figure 1: Comparison of Pain Score in Study Groups

**Table 1: Comparison of Outcome between TAPP and Lichtenstein's Repair**

Study Variables	TAPP Repair	Lichtenstein Repair	p-value
Mean Operative Time (min)	76.4±13.1	56.4±11.3	<0.001*
Pain Score at 08 Hours	3.21±1.23	4.84±1.41	<0.0001*
Pain Score at 24 Hours	2.34±0.94	3.02±0.95	0.001*
Mean Hospital Stay (Hours)	22.6±5.7	35.8±10.9	<0.001*

\*Significant p-value

**Table 2: Comparison of Complications between TAPP and Lichtenstein Group**

Complications	TAPP Frequency & Percentage	Lichtenstein Frequency & Percentage
Wound Infection	1(1.14%)	4(4.55%)
Seroma Formation	10(11.35%)	6(6.81%)
Recurrence	Nil	Nil

## DISCUSSION

Inguinal hernia repair has traditionally been done by open techniques for decades with or without the placement of mesh.<sup>9</sup> Lichtenstein mesh hernioplasty is an open method for inguinal hernia repair with varied results.<sup>10</sup> Laparoscopic procedures are being used by general surgeons as an alternative to open surgery since the development of minimally invasive surgery. This minimally invasive approach has the potential to become a gold standard with the development of more skills and expertise.<sup>11</sup>

According to our findings, the mean operating time in the TAPP group (76.4±13.1 min) was longer than in the Lichtenstein group (56.4±11.3 min). Postoperative pain score at 8 and 24 hours was less in the TAPP group as compared to the Lichtenstein group. The duration of hospital stay for the TAPP group was less as compared to Lichtenstein group (p-value <0.001).

The majority of wound infections [4(4.55%)] occurred in the Lichtenstein group. However, the incidence of seroma formation with scrotal edema was slightly higher in the TAPP group [10(11.35%)]. The same findings were observed in another study conducted by Salma et al.<sup>12</sup>

Another study was conducted in a tertiary care hospital to compare open & laparoscopic hernia mesh repair. Fifty inguinal hernia patients were included. The study found that 1 patient who underwent laparoscopic surgery and 4 individuals who underwent open hernioplasty experienced wound infection. In 2 cases of open hernioplasty, seroma, and hematoma were present at the operated site; the same complications were not seen in the laparoscopic repair group. Inpatient stays for open hernioplasty and laparoscopic

hernia were 3.23 days and 3.5 days, respectively. Laparoscopic surgery took 84.25 minutes whereas open surgery took 71.5 minutes. They concluded that patients who underwent laparoscopic surgery had less postoperative problems.<sup>13</sup>

A study compared unilateral laparoscopic inguinal hernia surgery with Lichtenstein tension-free mesh repair. Sixty patients were included; 30 got laparoscopic inguinal hernia treatment, while the remaining 30 underwent open inguinal hernia repair. Postoperative pain, hospital stays, and times for returning to work were noted in both groups. Patients who underwent open surgery were 46.73 years old, whereas those who underwent laparoscopic surgery were 42.10 years old. In the open hernioplasty group, 23.3% of patients developed seroma & hematoma in the postoperative period, whereas in the laparoscopic group, 10% had seroma collection. Both groups did not experience recurrence. In the early postoperative phase, there was no significant difference in pain score. The pain score was significantly decreased in the laparoscopic group at the third and seventh postoperative days. Inpatient stays averaged 7.8 days for open hernia repairs and 3.07 days for laparoscopic repairs. The average time it took to return to work after an open hernioplasty was 14.37 days, while it took 9.13 days after a laparoscopy. In comparison to Lichtenstein repair, the study found that laparoscopic inguinal hernia repair for unilateral inguinal hernias is a better procedure in terms of postoperative pain, hospital stay, and return to work.<sup>14</sup>

Another study compared the postoperative consequences of unilateral inguinal hernia repair using laparoscopic TAPP repair and Lichtenstein mesh

repair. Patients with unilateral inguinal hernias and ASA grades I/II were randomly assigned to two groups. Patients in group I underwent Lichtenstein open mesh repair, whereas those in group II underwent laparoscopic TAPP surgery. According to the study, individuals who had TAPP repair experienced less postoperative pain than those who had Lichtenstein mesh repair. Postoperative complications were more in Lichtenstein open mesh repairing group. In comparison to Lichtenstein mesh surgery, they found that laparoscopic TAPP repair for inguinal hernias is associated with fewer postoperative pain, complications, and a shorter hospital stay.<sup>15</sup>

A randomized controlled trial was conducted at Quaid-e-Azam Medical College, Bahawalpur. Fifty patients over the age of 18 were included, 32 of them underwent Lichtenstein surgery and 18 underwent laparoscopic surgery. They found that the median age of the patients in Lichtenstein was 45.9 years, while in the laparoscopic group it was 44.95 years. In the Lichtenstein and laparoscopic groups, the operating time was  $37.96 \pm 13.66$  and  $48.77 \pm 9.99$  minutes, respectively. The hospital stay & recovery time in open surgery and laparoscopic groups was  $2.28 \pm 0.79$  days and  $13.20 \pm 4.75$  days, respectively. In laparoscopic group hospital stay was  $1.55 \pm 0.63$  days and the recovery time was  $10.47 \pm 3.59$  days. In the Lichtenstein group, the pain score was  $6.1 \pm 1.9$ , while in the laparoscopic group, it was  $5.2 \pm 0.94$ . Less postoperative discomfort, a shorter hospital stay, and an earlier return to work were all advantages of laparoscopic hernia repair over Lichtenstein repair.<sup>16</sup>

To compare the results of TAPP and Lichtenstein techniques, a systematic review and meta-analysis was conducted. Operation time, hospital stay, acute and chronic postoperative pain, and the amount of time needed to resume normal activity, as well as wound infections, hematomas, seromas, neuralgia, and recurrence were noted. Compared to TAPP, the Lichtenstein repair had less operative time. Patients who operated with the laparoscopic method showed less postoperative chronic pain. A comparison of other outcomes did not show any difference between the two methods. So, it was seen that less chronic postoperative pain is the only advantage of TAPP over the Lichtenstein operation.<sup>17</sup>

Another meta-analysis conducted by Aiolfi et al. showed that postoperative acute and chronic pain, return to work, wound infections, and the hematoma was significantly reduced in minimally invasive TAPP. No significant difference was found when hospital stay, seroma, and hernia recurrence were compared in both treatment groups.<sup>18</sup>

## CONCLUSION

Transabdominal laparoscopic repair is associated with less pain and hospital stay. However, the complication rates of both procedures are comparable.

## LIMITATIONS & RECOMMENDATIONS

Short follow-up period of 3 months and enrolment of patients with unilateral hernia are limitations of this study. Further, clinical trials on large scale with inclusion of bilateral are recommended to validate this approach.

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