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# Comparison of Laparoscopic Inguinal Hernioplasty with Open Inguinal Hernioplasty

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## ABSTRACT

**Overview:** Repairing an inguinal hernia is a common surgical procedure. For the management of an inguinal hernia, there is no conclusive therapy. My study's findings will be useful in highlighting an improved strategy for managing inguinal hernias, reducing the likelihood of post-operative complications and promoting early recovery for patients. **Materials and Methods:** This randomized controlled trial was done on 150 (75 in each group) patients at Department of Surgery, Madina Teaching Hospital, Faisalabad from 30 Nov 2024 to 29 Feb 2025. Patients of age ranges from 20–60 years of both genders undergoing inguinal hernioplasty for inguinal hernia were included. Recurrent irreducible and strangulated hernia, obstructed hernia, skin infections, concomitant conditions (type 2 diabetes mellitus, hypertension, coronary artery disease, or tuberculosis) were excluded. All the patients were randomly divided into two groups by using a computer-generated random number table. In group 1, patients were undergone open inguinal hernioplasty and in group 2, patients were undergone laparoscopic inguinal hernioplasty. Post-operative pain was assessed after 1st and 4th weeks of surgery. Wound seroma was assessed after 1st week of surgery. Hospital stay and return to normal activities was assessed. **Results:** Patients in the laparoscopic group had a statistically significant (p = 0.0001) lower mean length of hospital stay than those in the open group (1.06 ± 0.84 versus 2.43 ± 1.63 days). For laparoscopic repair, the mean days of return to normal activity was 5.57 ± 1.85, but for open repair, it was 9.51 ± 2.98 (p-value = 0.0001). There were 03 seromas (4.0%) following a week of laparoscopic hernia repair, 09 (12.0%) following a week of open hernia surgery. These differences were not statistically significant. At weeks one and four, patients who had laparoscopic surgery (6.67%) reported less post-operative pain than those who had open surgery (20.0%); this difference was statistically significant. **Conclusion:** Laparoscopic hernia repair is preferable over open surgery due to its reduced risk of complications, faster recovery period, and shorter hospital stay.

## INTRODUCTION

A hernia is a weakening in the abdominal wall that allows some of the contents of the abdominal cavity to bulge out.[1] Inguinal hernia accounts for 75% of all abdominal wall hernias and has a lifetime incidence of 27% in males and 3% in women.[2] Inguinal hernias are common and have become a common surgical problem; over the past few decades, their mode of repair has changed, and new studies are constantly being conducted in this area.[3] Among all surgeries, inguinal hernia repair is the most commonly performed surgery. It has been estimated that around 800,000 cases of inguinal hernia are operated annually in the United States while about 20 million per year throughout the world. Due to this high incidence of inguinal hernia repair, it is very important to choose an appropriate surgical procedure. It is the type of surgery in which the surgeon has multiple options to repair inguinal hernia.[4]

There are two methods for inguinal hernia repair: the open approach and the laparoscopic approach.[5] Open inguinal hernia repair has long been the method of choice for most surgeons and is often recommended in contemporary literature as the optimal approach for primary unilateral inguinal hernia, which is a hernia occurring for the first time on one side of the groin, without any prior repair. Open repairs have mainly been classified as open mesh (e.g. Lichtenstein) or open non-mesh (e.g. Shouldice) repairs based on whether a synthetic material has been used to reinforce the repaired posterior wall. Tension-free mesh repair (Lichtenstein technique) is usually considered the

repair method of choice among open repairs due to its easy reproducibility by non-specialist surgeons. However, there are concerns about the risk of chronic groin pain, although recurrence rates have been noticeably very low.[2]

Trans-abdominal preperitoneal repair (TAPP) and the totally extra-peritoneal repair (TEP) are two of the main laparoscopic (keyhole) techniques used. Laparoscopic approaches have grown in popularity recently with some surgeons appreciative of its significantly lower incidence of long-term post-operative pain, but there have been some concerns regarding a possible increased risk of recurrence after TEP repair. This has been reported more frequently in primary, unilateral inguinal hernia compared with recurrent hernia. Despite this concern, TEP has nonetheless been adopted as the procedure of choice because of a lower risk of intra-abdominal injuries compared to TAPP repair as well as the comparably good outcomes especially when it is done by skilled surgeons.[3] Laparoscopic approach is also the most cost-effective option, can be safely performed with little monitoring, and leads to faster postoperative recovery and discharge.[6] Post-operative pain at 1st and 4th week, wound seroma, hospital stay and return to normal activities in open vs laparoscopic inguinal hernioplasty were noted in 33.3% vs 7.1% , 11.9% vs 0%, 7.1% vs 21.4%, 2.21±0.41 vs 1.9±0.29 days and 14.5±1.7 vs 7±1.9 days respectively.[3]

Repairing an inguinal hernia is a common surgical procedure. For the management of an inguinal hernia, there is no conclusive therapy. My study's findings will be useful in highlighting an improved strategy for managing inguinal hernias, reducing the likelihood of post-operative complications and promoting early recovery for patients.

## MATERIALS AND METHODS

This randomized controlled trial was done on 150 (75 in each group) patients at Department of Surgery, Madina Teaching Hospital, Faisalabad from 30 Nov 2024 to 29 Feb 2025. Patients of age ranges from 20 – 60 years of both genders undergoing inguinal hernioplasty for inguinal hernia were included. Recurrent irreducible and strangulated hernia, obstructed hernia, skin infections, concomitant conditions (type 2 diabetes mellitus, hypertension, coronary artery disease, or tuberculosis) were excluded. By using WHO sample size calculator for 2 proportions P1 = 7.1%3 P2 = 21.4%3 Level of significance = 5% Power of study = 80% Sample size od 150 (75 in each group) was calculated.

After taking approval from the hospital ethical committee, patients fulfilling the inclusion criteria were enrolled and informed consent was taken. All the patients were randomly divided into two groups by using a computer generated random number table. In group 1, patients were undergone open inguinal hernioplasty and in group 2, patients were undergone laparoscopic inguinal hernioplasty. All operations were performed by resident surgeons under supervision of consultants.

### Open Hernia Repair

In order to lower the risk of surgical site infection, all patients undergoing open hernia repair were given prophylactic antibiotics prior to surgery, as advised by clinical guidelines. Patients undergoing open hernia repair were given general anesthesia. An anesthesiologist and certified nurse anesthetists made up the anesthesia team that delivered the anesthetic. A group of skilled surgeons, comprising senior surgeons and surgical residents working under supervision, carried out the surgical procedures. In the patient records, it was specified whether the surgeon was a resident or a senior. The Lichtenstein approach, as described by Parviz K. Amid, served as the foundation for the open hernia repair process. A typical inguinal incision was one of the essential procedures for the open hernia surgery. Carefully dissected and isolated were the hernia sac and inguinal canal. Over the flaw was an appropriate mesh, usually composed of polypropylene. In accordance with accepted fixation methods, non-absorbable sutures or tacks were used to hold the mesh in place. A suitable skin closure method, such as skin staples or subcuticular sutures, was used to seal the incision.

### Laparoscopic Hernia Repair

Similar to open hernia repair, laparoscopic hernia repair (TEP) was performed. In order to prevent infection, patients undergoing laparoscopic hernia repair were given prophylactic antibiotics prior to surgery. The anesthesia team delivered general anesthesia for the laparoscopic repair of the hernia. Experienced surgeons, including senior surgeons and surgical residents working under supervision, carried out the laparoscopic treatment. The role of the particular surgeon was recorded in patient files. The following steps were involved in the laparoscopic hernia repair (TEP) operation. The preperitoneal space was created by balloon dissection. In order to provide access to the inguinal area, trocar ports were positioned using normal procedure. The preperitoneal area was lined with an appropriate mesh, which was frequently made of polypropylene or another material. Appropriate methods like tack fixation or self-fixating mesh were used to secure the mesh. Using normal laparoscopic closure techniques, the trocar incisions were closed.

Post-operative pain was assessed after 1st and 4th weeks of surgery. Wound seroma was assessed after 1st week of surgery. Hospital stay and return to normal activities was assessed. Follow up was done by taking the patient's contact number. All the information was collected on a specially designed proforma.

The data was entered and analyzed in SPSS version 25. Descriptive statistics including mean and standard deviation of numerical values like age, BMI, duration of hernia, hospital stay and return to normal activities. Frequency and percentage were calculated for all qualitative variables like gender, ASA status, post operative pain and wound seroma. Post operative pain and wound seroma were compared by using chi-square test between both groups. Hospital stay and return to normal activities were compared by independent sample t-test between two groups.

## RESULTS

The study's participants ranged in age from 20 to 60, with a mean age of 45.55 ± 9.64. Patients in groups 1 and 2 had mean ages of 45.77 ± 9.27 and 43.70 ± 9.91 years, respectively. According to Table I, the majority of the patients, 62.67%—were between the ages of 41 and 60.

Out of the 150 patients, 141 (94.0%) were male and 09 (6.0%) were female, with a male to female ratio of 15.6:1. The illness lasted 8.74 ± 3.61 months on average. The average length of illness for groups 1 and 2 was 9.23 ± 3.68 and 8.50 ± 3.57 months, respectively.

For both surgical and laparoscopic hernia repairs, the average repair times were 47.14 ± 7.2 and 84.24 ± 13.8 minutes, respectively. Patients in the laparoscopic group had a statistically significant (p = 0.0001) lower mean length of hospital stay than those in the open group (1.06 ± 0.84 versus 2.43 ± 1.63 days). For laparoscopic repair, the mean days of return to normal activity was 5.57 ± 1.85, but for open repair, it was 9.51 ± 2.98 (p-value = 0.0001) as shown in Table I.

There were 03 seromas (4.0%) following a week of laparoscopic hernia repair, 09 (12.0%) following a week of open hernia surgery. These differences were not statistically significant. At weeks one and four, patients who had laparoscopic surgery (6.67%) reported less post-operative pain than those who had open surgery (20.0%); this difference was statistically significant (Table II).

**Table I**

*Comparison of hospital stay and return to normal activity.*

| Outcome | Group 1 (n=75) | Group 2 (n=75) | p-value |
|---|---|---|---|
| | Mean ± SD | Mean ± SD | |
| Hospital stay (days) | 2.43 ± 1.63 | 1.06 ± 0.84 | 0.0001 |
| Return to normal activity | 9.51 ± 2.98 | 5.57 ± 1.85 | 0.0001 |

**Table II**

*Comparison of the post-operative pain and wound seroma (n=150).*

| | Group 1 (n=75) | | Group 2 (n=75) | | P-value |
|---|---|---|---|---|---|
| | Yes | No | Yes | No | |
| Pain at 1 week | 15 (20.0%) | 60 (80.0%) | 05 (6.67%) | 70 (93.33%) | 0.0 16 |
| Pain at 4th week | 10 (13.33%) | 65 (86.67%) | 02 (2.67%) | 73 (97.33%) | 0.0 16 |
| Wound seroma | 09 (12.0%) | 66 (88.0%) | 03 (4.0%) | 72 (96.0%) | 0.0 71 |

## DISCUSSION

Sixty three percent of research participants were between the ages of 41 and 60, and ninety-four percent were male. There were 150 inguinal hernia repairs that we recorded, comprising 75 open and 75 laparoscopic procedures. Inguinal hernias are 96% more common in men than in women, according to Gupta et al[7], despite Charles et al[8] reporting that 93.2% of their cases were in men. Participants in the study were 45.55 ± 9.64 years old on average.

For both surgical and laparoscopic hernia repairs, the average repair times were 47.14 ± 7.2 and 84.24 ± 13.8 minutes, respectively. Therefore, the time required to perform a laparoscopic hernia repair, was significantly longer (p<0.001) than open surgery, which was also in line with prior findings.[9] These results contradict with other studies that found no statistically significant difference in the mean operative times between the two groups[10,11], but they are in line with earlier research.[12-14] The significant dissection needed for tissue restoration may be the reason why the open repair in our study resulted in higher post-operative pain than the laparoscopic repair (TEP) (p-value<0.5).

The number of days of post-operative pain following a laparoscopic repair and a open repair is therefore not comparable because it is statistically significant. This study supported the findings of Shah et al.[15] Minimal post-operative discomfort improves post-operative satisfaction and facilitates patient early mobilization.[16]

The present study indicates that the patients in the laparoscopic group had a statistically significant (p = 0.0001) lower mean length of hospital stay than those in the open group (1.06 ± 0.84 versus 2.43 ± 1.63 days). According to the study, patients who had laparoscopic hernioplasty spent much less time in the hospital than those who had open surgery (p<0.001). In particular, the open group's mean hospital stay was 1.9 days, but the laparoscopic group's was 1.56 days (p=0.002).[17]

Seroma development occurred in nine patients following open hernia surgery and three cases following laparoscopic hernia repair (p>0.05). The use of a wider incision and/or the existence of a larger hernial sac may be linked to this variation in seroma incidence. Patients in the current study were able to resume their usual jobs after laparoscopic and open hernia surgeries. For laparoscopic repair, the mean days of return to normal activity was 5.57 ± 1.85, but for open repair, it was 9.51 ± 2.98 (p-value = 0.0001). Laparoscopic hernia repair was significantly faster to recover from than open repair (p <0.001) when compared to other research.[18] In contrast to this, the findings of other studies were unclear.[19,20]

One of the study's shortcomings is that it only included 150 patients, which may have limited how broadly the results may be applied. The experimental control of randomized controlled trials is inherent in the prospective observational approach used in this study. Therefore, confounding variables that were not taken into account in the study could have an impact on the results. Short-term outcomes, such as post-operative discomfort and return to normal activities, were the main focus of the study. In order to reach more thorough conclusions, more study with longer follow-up periods is required because long-term effects, like chronic discomfort and recurrence rates, were not thoroughly assessed. Due to its single-center design, the study may have low external validity. Results may vary depending on the patient demographic and healthcare environment.

## CONCLUSION

The purpose of the study was to compare the efficacy of open surgery with laparoscopic repair, as well as any possible drawbacks. Laparoscopic hernia repair is preferable over open surgery due to its reduced risk of complications, faster recovery period, and shorter hospital stay. All groups showed comparable results with no discernible variations in terms of post-operative issues including seroma development. Even though laparoscopic treatment has its own disadvantages, such as a lengthier recovery period, it is generally regarded as the better choice for correcting inguinal hernias. More research and longer follow-up are needed to evaluate persistent discomfort and recurrence rates following laparoscopic hernia surgery.

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