

Comparison of the Effectiveness and Safety of Laparoscopic (TAPP) and Conventional Open (Lichtenstein) Repair and Their Outcome in the Management of Inguinal Hernia

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Abstract

Background and Aim: Several tension-free surgical techniques, including the Lichtenstein approach, have been successfully applied to treat both primary and recurring inguinal hernias. The trans-abdominal preperitoneal procedure (TAPP), on the other hand, is a method for hernia repair using an intraperitoneal approach. Present study compared the operating time, post-operative hospital stay, and return to work, as well as cost effectiveness, complications, scar size, and the detection of clinically insignificant (occult) hernia on the contralateral side in TAPP.

Material and Methods: The current randomized clinical trial was carried out from 1st January 2022 to 31st December 2022 at Nootan medical college and research center, Visnagar, Gujarat. The chosen patients were divided into two groups: group 1 received the TAPP repair for inguinal hernia repair, and group 2 underwent the Lichtenstein technique for inguinal hernia repair, each group consisting of 50 patients. The study outcome was the hernia recurrence, chronic pain, hematoma, seroma, wound infection, operation time, hospital stay, and return-to work days.

Results: The mean age of the patients in the TAPP technique group was 55.6 ± 12.85 years compared with 54.8 ± 10.34 years in the Lichtenstein group. The two groups also showed no statistically significant variation for the side involved ($p > 0.05$). Direct hernias were more common in both groups. In unilateral cases the pain scores on postoperative day 0, day 1 and day 7 were significantly lower in the TAPP group compared with the Lichtenstein group for each day. Regarding the bilateral cases the pain scores on postoperative day 0, day 1 and day 7 were also significantly lower in the TAPP group compared with the Lichtenstein group, on the same days on day 0, 1, and 7.

Conclusion: Both the TAPP and Lichtenstein methods are secure and dependable for treating inguinal hernias. Early oral feed tolerance, less post-operative pain, faster hospital discharge, quicker resumption to normal activities, and less persistent pain were all related with TAPP repair.

Keywords: Hernia, Lichtenstein method, Recurrence, Transabdominal preperitoneal procedure

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Introduction

One of the most prevalent disorders in the world, inguinal hernia affects 5% to 10% of the population.[1,2] Inguinal hernias can be fixed using numerous procedures. Soon after laparoscopic cholecystectomy became the gold standard for cholelithiasis, inguinal hernias were treated in this way.

Laparoscopic hernia repair, on the other hand, has continued to be a contentious topic ever since it was introduced, in contrast to laparoscopic cholecystectomy, which was swiftly embraced by

the surgical community. One of the most frequent surgical issues and a major contributor to lost productivity and disability is an inguinal hernia.[3] The advancement of open surgery for inguinal hernias has gone through several stages. In the middle of the eighteenth century, cadaver dissection was used to appreciate and comprehend the anatomy of hernias. The aseptic approach and improved anesthetic were two developments that substantially aided the progress of hernia surgery.

Patients with inguinal hernias are typically symptomatic and require surgery; however, even those who are asymptomatic have a 70% chance of doing so after five years of attentive waiting.[4] The risk factors for inguinal hernia formation can be further broken down into patient-related risk variables, such as age and sex,[5,6], and external risk factors, such as physically demanding occupation.[7,8] Although medial (direct) hernias have a higher risk of recurrence after treatment, lateral (indirect) hernias are more frequent.[9,10] Despite differences in age, sex, and recurrence rates indicating various etiologies, both medial and lateral hernias are frequently treated in the same way.[11] The best method for treating primary inguinal hernias has been extensively researched, however there is currently a dearth of data on the best method for repairing recurring inguinal hernias. Additionally, there is controversy concerning their choice of surgical procedure for this illness.[12]

Several tension-free surgical techniques, including the Lichtenstein approach, have been successfully applied to treat both primary and recurring inguinal hernias. Since it may be done under local anesthetic, many surgeons frequently use this anterior open technique.[14] The trans-abdominal preperitoneal procedure (TAPP), on the other hand, is a method for hernia repair using an intraperitoneal approach. TAPP can be helpful in addressing major hernia defects, bilateral hernia repairs, and recurrence after open surgery. Using this method, it is possible to cover the direct, indirect, and femoral spaces with a substantial mesh.[15] Although a few RCT studies have compared Lichtenstein, TAPP, and TEP in the past, their insufficient sample sizes and poor quality have prevented us from reaching a firm conclusion.

In order to compare the results of inguinal hernia repair using the TAPP & Lichtenstein techniques, this study compared the operating time, post-operative hospital stay, and return to work, as well as cost effectiveness, complications, scar size, and the detection of clinically insignificant (occult) hernia on the contra-lateral side in TAPP.

Material and Methods

The current randomized clinical trial was carried out from 1st January 2022 to 31st December 2022 at Nootan medical college and research center, Visnagar Gujarat.

Inclusion Criteria

- Age: 18 years to 75 years
- Sex: Male
- Unilateral and Bilateral uncomplicated inguinal hernia
- Patient fit for general or spinal anesthesia.
- Patient willing (consent) for surgery and study

Exclusion Criteria

- Age: < 18 years and >70 years
- Sex: Female
- Complicated hernia like obstructed and strangulated hernia
- Hernia with grossly enlarge prostate.
- History of lower abdominal surgery for TAPP
- Patient not fit for spinal or general anesthesia.
- Patient not willing (consent) for surgery and study

The Lichtenstein method of groin hernia repair was contrasted with the transabdominal pre-peritoneal approach (TAPP). One surgeon, skilled in both approaches for repairing an inguinal hernia, accompanied by one helper, performed all of the procedures. A day before surgery, study participants were admitted to the hospital. A thorough history was obtained and a physical examination was done after the admission. The tests that were carried out included Hemogram, Renal function test, HIV test, HBsAg, Liver function test, Chest radiograph, an electrocardiogram, and pelvic ultrasound. In every patient, an intravenous antibiotic was given a half-hour prior to surgery. The patients were evaluated every day up to discharge and then again at the 7-day follow-up for any problems and pain levels. The patients were then monitored for another month; according to the proforma, data on the patients' pain level, return to work, scar size, recurrence, and complications (if any) were noted.

The outcomes included the length of the procedure, the pain scores (measured using the Visual Analogue Scale, or VAS), and any problems, such as early recurrence, scar size, hematoma formation, seroma formation, infection, and groin pain.

The chosen patients were divided into two groups: Group 1 received the TAPP repair for inguinal hernia repair, and Group 2 underwent the Lichtenstein technique for inguinal hernia repair, each group consisting of 50 patients.

Statistical analysis

The collected data was organized, inputted, and exported to the data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA) after being combined and entered into a spreadsheet programme (Microsoft Excel 2007). The level of significance and confidence level for each test were set at 5% and 95%, respectively.

Results

The analysis comprised 100 patients in total. There were 50 people in each of the two groups (Lichtenstein's methods and TAPP). Patients using the TAPP approach had a mean age of 55.6± 12.85 years, whereas those using the Lichtenstein technique had a mean age of 54.8±10.34 years. The

youngest patient in the TAPP group was 26 years old, while the oldest was 75. The youngest patient in the Lichtenstein group was 28 years old, while the oldest was 71. The age of the patients did not differ across the groups in a statistically significant way ($p>0.05$). The right side was more frequently implicated in both groups than the left side. (46% in the TAPP group, and 50% in the Lichtenstein group). Additionally, there was no statistically significant difference between the two groups for the affected side ($p>0.05$). Both groups had a higher prevalence of direct hernias (66% in the TAPP group and 54% in the Lichtenstein group). The two groups did not differ statistically in terms of the type of inguinal hernia ($p>0.05$). (Table 1) In unilateral cases, the TAPP group's operating time was longer (mean 55.6 min) than the Lichtenstein group's (mean 40.2 min); this difference was statistically significant ($p\leq 0.05$) in favor of the TAPP group. However, in the bilateral cases, the operating time for the Lichtenstein group was substantially longer (mean 75.1 min) than for the TAPP group (mean 65.8 min), $p\leq 0.05$. (Table 2) In unilateral patients, the TAPP group had significantly lower pain scores on postoperative days 0, 1, and 7 (mean 31.9, 21.1, and 8.2 respectively) than the Lichtenstein group (mean

41.1, 29.9, and 15.11 respectively), with a p-value of 0.05 for each day. Regarding the bilateral instances, the pain scores on postoperative days 0, 1, and 7 were likewise significantly lower in the TAPP group than in the Lichtenstein group on those same days (mean 36.9, 23.15, and 10.8 respectively; $p\leq 0.05$ on days 0, 1, and 7). (Table 2). It was significantly lower in unilateral cases in the TAPP group (mean 1.7) compared to the Lichtenstein group (mean 2.1), $p\leq 0.05$, in the TAPP group. It was also significantly lower in bilateral cases in the TAPP group (mean 1.4) compared to the Lichtenstein group (mean 3.3), $p\leq 0.05$ (Table 2). The spectrum of complications varied between the two groups, with seromas and urine retention and wound infections in the Lichtenstein group being more prevalent. Between the two groups, there was no statistically significant difference in the total complication rate.

In unilateral cases, patients in the TAPP group significantly resumed work earlier than those in the Lichtenstein group ($p\leq 0.05$). In bilateral situations, patients in the TAPP group significantly resumed work earlier than those in the Lichtenstein group. $p < 0.001$ (Table 2).

Table 1: Demographic Distribution of study participants

| Variables | TAPP | Lichtenstein |
|-------------------------|--------------|--------------|
| Age (Years) | 55.6 ± 12.85 | 54.8 ± 10.34 |
| Right-sided involvement | 23 (46) | 25 (50) |
| Left-sided involvement | 18 (36) | 18 (36) |
| Bilateral involvement | 9 (18) | 7 (14) |
| Direct | 33 (66) | 27 (54) |
| Indirect | 17 (34) | 16 (32) |
| Pantaloon | 0 | 7 (14) |

Table 2: Outcomes for both groups

| Outcomes | TAPP | Lichtenstein |
|--|--------------|--------------|
| Operation Time (minutes) (Unilateral cases) | 55.6 ± 12.40 | 40.2 ± 8.10 |
| Operation Time (minutes) (Bilateral cases) | 65.8 ± 6.10 | 75.1 ± 2.14 |
| Pain scores (VAS) Day 0 (Unilateral cases) | 31.9 ± 5.12 | 41.1 ± 5.32 |
| Pain scores (VAS) Day 1 (Unilateral cases) | 21.1 ± 9.22 | 29.9 ± 4.10 |
| Pain scores (VAS) Day 7 (Unilateral cases) | 8.2 ± 5.32 | 15.11 ± 5.32 |
| Pain scores (VAS) Day 0 (Bilateral cases) | 36.9 ± 2.64 | 44.9 ± 4.65 |
| Pain scores (VAS) Day 1 (Bilateral cases) | 23.15 ± 4.10 | 35.58 ± 3.47 |
| Pain scores (VAS) Day 7 (Bilateral cases) | 10.8 ± 2.95 | 18.3 ± 2.63 |
| Postoperative stay (Days) (Unilateral cases) | 1.7 ± 0.801 | 2.1 ± 0.711 |
| Postoperative stay (Days) (Bilateral cases) | 1.4 ± 0.89 | 3.3 ± 1.25 |

Discussion

Operating times for surgical procedures vary significantly between surgical centers and between individual surgeons. It is crucial since the length of the surgery can have an impact on the cost. The operating time for TAPP repair in the current study's unilateral instances was noticeably longer than that of the Lichtenstein repair. While this was

going on, we discovered that in bilateral situations, TAPP repair took less time to complete than Lichtenstein repair when done on both sides simultaneously, one after the other. The mean operating time for laparoscopic inguinal hernia repair significantly increased by 15.20 minutes, according to a prior meta-analysis.[16] According

to a recent study by Sun et al., the Lichtenstein approach may shorten operating time.[17]

In comparison to open mesh repair, the laparoscopic procedures considerably reduced early post-operative pain, allowing for quicker mobilization and return to work. Furthermore, compared to open surgery, laparoscopic surgery resulted in higher patient satisfaction and superior cosmetic outcomes. Based on these preliminary findings, laparoscopic hernia repair appears to be on par with, if not better than, the current open Lichtenstein repair in terms of shorter hospital stays, quicker return to work, and cosmetic results, assuming that long-term recurrence rates are equivalent.

Due to thick adhesions at the operative site, one patient in the TAPP group in this trial had to undergo an open repair on a table. In the 3130 laparoscopic repairs that were allotted, 2.7% of the operations were converted to open surgery, according to McCormack K et al.¹⁸. For unilateral cases, the mean pain scores in the TAPP group were 31.9 on day 0, 21.1 on day 1, and 8.2 on day 7, compared to 41.5, 29.9, and 15.11 in the Lichtenstein group. We observed a similar pattern in the bilateral instances, with somewhat greater pain levels in both groups. Leigh Neumayer et al.[19], on the other hand, discovered that although the VAS in the laparoscopic group was higher than the open group on the day of surgery, the score difference diminished after two weeks.

Early hospital discharge and quicker return to work are results of the TAPP group's lower pain scores. The difference was particularly noticeable in the bilateral group, where the TAPP groups mean postoperative stay was 1.4 days compared to the Lichtenstein group's 3.3 days. In the TAPP group, patients reported going back to work earlier. This is made clear by the tension-free repair, lower complication rate, and lack of an inguinal incision or groin muscle dissection during laparoscopic surgery. If the rules are strictly followed, good standards can be attained even when the surgeon is still learning.[20] when compared to open Lichtenstein hernia repair, the TEP approach required no more time to complete, and it was also linked to a shorter sick leave and a quicker recovery. Currently, patients with bilateral or recurrent hernias as well as those with unilateral hernias who want a short recovery time benefit most from laparoscopic hernia surgery.[21]

In order to repair an open hernia, a muscle must first be divided, followed by an incision in the area of greatest weakness. Before the wound is secure, this harm must heal. The length of discomfort is unaffected by the type of anaesthetic used to impact the repair. In a laparoscopic repair, there is no groin incision. The little incisions that are made have

been demonstrated to cause very little postoperative pain and to heal quickly. This looks like a more reasonable position to avoid peritoneal contents bursting out of a muscle defect than placing a mesh on the exterior of the defect: additional mesh is placed inside the groin muscle in the pre-peritoneal layer. There is no postoperative surgical weakening with laparoscopic repair.

TAPP hernia repair is more expensive for the patient and the medical centre than open Lichtenstein surgery since it calls for a laparoscopic setup, a fixation device, and greater size mesh. With a shorter postoperative hospital stay and quicker return to work, the unilateral group's surgical time is longer than the bilateral group's. Additionally, the TAPP group's cosmetic results were unquestionably better. The big 6-8 cm groin scars were much more obvious than the tiny (5 mm) port site scars. In our trial, there were no early recurrences in either group, but the follow-up period was brief. Laparoscopic hernia repair is not appropriate in all cases of groin hernia because it is dangerous for individuals who have strangulated hernia, sliding hernia, irreducible hernias, or co-morbid diseases. There is little chance of experiencing severe intestinal or visceral damage after an open hernia repair. All groin hernia types, including strangulated, irreducible, sliding, or in elderly or co-morbid patients, can be repaired with open mesh surgery.

Conclusion

Both the TAPP and Lichtenstein methods are secure and dependable for treating inguinal hernias. Early oral feed tolerance, less post-operative pain, faster hospital discharge, quicker resumption to normal activities, and less persistent pain were all related with TAPP repair. Although TAPP treatment was more expensive for the patient, the cosmetic results were superior. In the TAPP, occult hernias on the opposite side may also be seen and maybe treated in the same session. And lastly, greater study is encouraged.

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