

Original article:

Comparative study of post-operative pain and quality of life between the Lichtenstein technique and laparoscopic technique for inguinal hernia repair

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Abstract:

Objective: This study aimed to compare the post-operative pain and quality of life between the Lichtenstein technique and laparoscopic technique for inguinal hernia repair.

Methods: A comparative study was conducted at a tertiary care hospital in India. Adult patients (n = 83) who underwent either Lichtenstein hernioplasty or laparoscopic hernia repair were enrolled. The patients' perception of pain was assessed at 6 hours, 24 hours, discharge, and after 2 months. Quality of life was evaluated using the SF-36 questionnaire at discharge and after 2 months. Data were analyzed using Chi-square test and unpaired t-test.

Results: Laparoscopic repair showed significantly lower mean Visual Analog Scale (VAS) scores for pain at all time-points compared to open repair (p < 0.05). At discharge, open repair group had better SF-36 scores in some components, but at 2 months follow-up, laparoscopic group showed significantly better scores in role limitation due to physical health, energy, emotional well-being, general health, and health change components (p < 0.05). Physical functioning and pain were comparable between the groups at 2 months follow-up.

Conclusion: Laparoscopic TAPP surgery resulted in lower post-operative pain and improved quality of life compared to the Lichtenstein technique for inguinal hernia repair.

Keywords: Inguinal hernia, Lichtenstein technique, Laparoscopic technique, Post-operative pain, Quality of life.

Introduction:

Inguinal hernias constitute the commonest type of abdominal wall hernias.¹ The incidence of inguinal hernia remains majorly unspecified; nevertheless, almost 500,000 cases have been estimated to come to attention every year globally. ²There is, however, a very large debate on relative merits of laparoscopic mesh repair done using 2-3 small abdominal incision as compared to open technique. Studies mentioned the benefits of laparoscopic hernia repair but still it is not being commonly performed due to various limitations like general anaesthesia and long learning curve. In addition, literature search revealed a dearth of Indian studies evaluating

Lichtenstein's hernia repair versus laparoscopic repair.^{3,4,5} In this context, the purpose of this study is to compare the most commonly practiced methods namely Lichtenstein's hernioplasty and laparoscopic hernia repair in the tertiary care hospital.^{6,7} This will help in adding important evidence from Indian context, comparing the open and laparoscopic surgeries for inguinal hernia repair, with respect to postoperative pain and quality of life which are patient reported outcomes. This can help in betterment of surgical practice in the country, considering how common inguinal hernia is in Indian population.⁸

Material and methods:

The study was conducted at the Department of General Surgery, Jaslok Hospital and Research Centre, Mumbai, Maharashtra, India. The sample population consisted of adult patients above 18 years of age who underwent hernioplasty either by the open method (Lichtenstein method) or laparoscopically. Data collection took place between September 2020 and March 2022. Patients were eligible to participate if they were diagnosed with inguinal hernia and were indicated for either open hernia repair surgery or laparoscopic hernioplasty. Additionally, patients needed to be willing to provide informed consent for their participation in the study.

Before commencing the study, institutional ethics committee permission was obtained, and the study was carried out in accordance with the ethical principles stated in the Declaration of Helsinki and the guidelines of Good Clinical Practice.

Certain screening criteria were applied to determine the eligibility of patients. Patients who did not meet the minimum age requirement of 18 years, as well as patients of any gender, were included. However, pediatric patients with inguinal hernia were excluded from the study. Furthermore, patients with contraindications to general or regional anesthesia, those with bleeding disorders, and those presenting with complicated hernia conditions such as strangulation or gangrene were also excluded from the study.

Post-operatively, the patients' perception of pain was assessed approximately 6 hours after the surgery. All patients received analgesia in the form of intravenous paracetamol, 100 ml, every 6 hours immediately after the surgery, with additional medication provided for pain relief as needed. No preoperative analgesia was administered to any patient. All participants were given standardized post-operative instructions, with an emphasis on not restricting their activities unless the activities caused pain.

By following this methodology, the researchers aimed to evaluate the pain experienced by patients after hernioplasty using the Lichtenstein method or laparoscopic approach. The study's findings could potentially contribute to improving post-operative pain management strategies and enhancing patient outcomes following hernioplasty procedures.

Results:

A total of 83 patients were enrolled in the study. 56 patients were enrolled in the laparoscopic repair group while 27 patients who underwent open repair were enrolled. The mean age was comparable between laparoscopic and open repair groups ($p > 0.05$). The age range was 28-82 years in laparoscopic group while it was 29-74 years in the open repair group. In both the study groups, majority of the enrolled cases were males.

78.57% of cases in laparoscopic group and 66.67% patients in open repair group respectively were males. Majority of the patients in both the study groups belonged to 51-60 years age group (6th decade), followed by the 5th decade.

Majority of cases in both laparoscopic repair group (50%) and open repair group (51.85%) were discharged on post-operative day 2. The discharge status in both study groups was noted to be statistically comparable ($p > 0.05$).

Post-operative day	Laparoscopic repair (n=56)	Open repair (n=27)
Day 1	6 (10.71%)	6 (22.22%)
Day 2	28 (50%)	14 (51.85%)
Day 3	18 (32.14%)	5 (18.52%)
Day 4	4 (7.14%)	2 (7.41%)
P value	0.40, considered not significant by Chi-square test	

Post-op Time of assessment	Laparoscopic repair (n=56)	Open repair (n=27)	P value
6 hours	2.63 ± 1.69	3.67 ± 1.59	0.01*
24 hours	1.88 ± 1.32	2.52 ± 1.4	0.01*
At discharge	1.05 ± 0.95	1.3 ± 0.99	0.04*
After 2 months	0.76 ± 0.7	0.96 ± 0.81	0.03*

VAS score status comparison between the study groups:

The mean pain VAS score comparison showed that at all time-points of comparison, viz. at 6 hours, 24 hours, at discharge and after 2 months, the mean VAS score was significantly lower in the laparoscopic repair group versus the open repair group ($p < 0.05$).

$P < 0.05$ considered significant by Unpaired t test

In the laparoscopic group, 44.64% patients had mild pain at 6 hours' post-op, while 33.93% cases had no pain. On 24 hours' post-op, mild pain was noted in 57.14% cases while 37.5% cases had no pain. On discharge, 39.29% patients had mild pain while 60.71% cases had no pain. After 2 months of discharge, 23.21% patients had mild pain while 66.07% cases had no pain,

<i>Pain status</i>	<i>On 6 Hours</i>	<i>On 24 Hours</i>	<i>On Discharge</i>	<i>After 2 Months</i>
Mild	25 (44.64%)	32 (57.14%)	22 (39.29%)	13 (23.21%)
Moderate	10 (17.86%)	3 (5.36%)	0	0
None	19 (33.93%)	21 (37.5%)	34 (60.71%)	37 (66.07%)
Severe	2 (3.57%)	0	0	0

Failure to follow-up	0	0	0	6 (10.71%)
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In the open repair group, 44.44% patients had mild pain at 6 hours' post-op, 37.04% had moderate or severe pain, while 18.52% cases had no pain. On 24 hours' post-op, mild pain was noted in 40.74% cases while same proportion of other cases had no pain. On discharge, 48.15% patients had mild pain while 51.85%% cases had no pain. After 2 months of discharge, 33.33% patients had mild pain while 55.56% cases had no pain.

<i>Pain status</i>	<i>On 6 Hours</i>	<i>On 24 Hours</i>	<i>On Discharge</i>	<i>After 2 Months</i>
Mild	12 (44.44%)	11 (40.74%)	13 (48.15%)	9 (33.33%)
Moderate	8 (29.63%)	5 (18.52%)	0	0
None	5 (18.52%)	11 (40.74%)	14 (81.85%)	15 (55.56%)
Severe	2 (7.41%)	0	0	0
Failure to follow-up	0	0	0	3 (11.11%)

On 6 hours, the proportion of patients in Laparoscopic group with no pain was significantly higher as compared to open repair group (33.93% vs 18.52%, $p = 0.01$ considered significant)

On 24 hour assessment – the proportion of the patients in Laparoscopic group with moderate pain was significantly lower as compared to open repair group (5.36 vs 18.52 %, $p = 0.01$ considered significant)

On discharge and on 2 month follow up though numerically more proportion of patients in laparoscopic group had no pain versus open surgery group,

This was not found to be significant ($p > 0.05$)

Comparison of SF-36 components between Laparoscopic and Open repair group

The intragroup analysis was done for all individual components of SF- 36 by paired t test, while the intergroup analysis at a time-point was done by unpaired t test.

Intragroup analysis revealed that in laparoscopic group, there was significant increase and betterment in the SF-36 scores for all components at 2-month follow-up versus at discharge ($p < 0.05$).

For the open surgery group, there was no significant change or betterment in the SF-36 scores for all components [except “role limitation due to emotional problem”] at 2-month follow-up versus at discharge ($p > 0.05$).

At discharge, all components except emotional well-being and general health were significantly better in the open repair group versus laparoscopic group ($p < 0.05$).

However, at 2-month follow-up, role limitation component due to physical health, energy, emotional well-being, general health and health change components were significantly better in laparoscopic group versus the open surgery group ($p < 0.05$)

Other components like physical functioning, social functioning and pain were statistically comparable between the study groups at 2-month follow-up ($p>0.05$). (Table 5.12)

Discussion:

Inguinal hernia is one of the most common condition tackled by the surgeons globally. The situation in India is no different, with a high prevalence of inguinal hernia leading to surgeons tackling the condition regularly. Presently available repair alternatives for inguinal hernias are Lichtenstein repair, Laparoscopic total extra peritoneal repair, Open type through inguinal incision, and Transabdominal pre-peritoneal repair^{9,10}

Prosthetic repairs are recognized to be better to "non-mesh" suture repairs in many studies and clinical practice.⁸ In the late 20th century, the tension-free repair, presented by Irving Lichtenstein, led to a major decrease in recurrence frequencies and developed into the technique of choice.⁹

Laparoscopic hernioplasty mainly divided into two types i.e trans-abdominal preperitoneal repair (TAPP) and totally extraperitoneal repair (TEP). There is no invasion of peritoneal cavity in TEP. Technically it eliminates the hazards of intra operational injuries. Real disagreement began in 1990, when laparoscopic Tension-Free repair came in to forefront, and was regularly advocated as well as belligerently marketed by promising lower pain and less recovery time, but many other things were ignored.¹¹ The Lichtenstein Open Repair as well as Laparoscopic surgeries both have their pros and cons, and hence it becomes important to generate evidence which compares the two kinds of surgeries in the local population.¹⁰

A total of 83 patients were enrolled in the study. 56 patients were enrolled in the laparoscopic repair group while 27 patients who underwent open repair were enrolled. The mean age was comparable between laparoscopic and open repair groups ($p>0.05$). The age range was 28-82 years in laparoscopic group while it was 29-74 years in the open repair group. In both the study groups, majority of the enrolled cases were males. 78.57% of cases in laparoscopic group and 66.67% patients in open repair group respectively were males. Majority of the patients in both the study groups belonged to 51-60 years' age group (6th decade), followed by the 5th decade. Table 6.1 below gives a tabular comparison of the mean age and the gender distribution in various similar studies.

Intragroup analysis revealed that in laparoscopic group, there was significant increase and betterment in the SF-36 scores for all components at 2-month follow-up versus at discharge (**$p<0.05$**).

For the open surgery group, there was no significant change or betterment in the SF-36 scores for all components [except "role limitation due to emotional problem"] at 2-month follow-up versus at discharge (**$p<0.05$**). *This shows that over the long term, laparoscopic surgery provided a progressively better quality of life after discharge while the same cannot be said about open surgery group based on present study findings.* At discharge, all components except emotional well-being and general health were significantly better in the open repair group versus laparoscopic group (**$p<0.05$**). *This indicates that quality of life till the period of discharge can be comparatively better in open surgery group.* However, at 2-month follow-up, role limitation component due to physical health, energy, emotional well-being, general health and health change components were significantly better in laparoscopic group versus the open surgery group (**$p<0.05$**). Other components like physical functioning, social functioning and pain were statistically comparable between the study groups at 2-month follow-up ($p>0.05$).

From these findings, it can be considered that after discharge, quality of life is better with laparoscopic group on most parameters, however physical functioning and pain were similar between both open and laparoscopic surgery groups. Not many studies have evaluated and compared the quality of life aspect between

open surgery and laparoscopic surgery for hernia repair. In the study by Myers et al.,¹¹ done in 2010 there was a significant difference between the laparoscopic and open groups in terms of

- a) physical function ($p = 0.0001$),
- b) physical role ($p < 0.0001$),
- c) bodily pain ($p = 0.0029$),
- d) general health ($p = 0.0025$),
- e) emotional role ($p < 0.0001$).

There was no significant difference between the groups in terms of vitality ($p = 0.2501$), mental health ($p = 0.08$), or social functioning ($p = 0.1677$).

When overall results for the study were calculated, Laparoscopic TEP repair resulted in a significantly better quality-of-life outcome for both mental ($p < 0.0001$) and physical ($p < 0.0001$) health compared to Lichtenstein repair.

In the study by Abbas et al.,¹² done in 2012 quality of life was assessed using Short Form-36 questionnaire in the first visit (after 4 weeks). Quality of life showed better and significant outcomes in TAPP laparoscopic group for physical function ($p \leq 0.001$), role physical ($p \leq 0.011$), bodily pain ($p \leq 0.017$), general health ($p \leq 0.047$), and total physical health ($p \leq 0.008$). However, mental health showed no statistical significance in its four scales, but with better outcomes in laparoscopic TAPP group. Total quality outcomes showed significantly better outcomes in the laparoscopic group ($p \leq 0.031$).

Conclusion:

Laparoscopic TAPP surgery for inguinal hernia repair was noted to be better than Lichtenstein technique in reducing post-operative pain, and improving the quality of life of patients after 2 months of discharge. The time to ambulation of patients as well as the duration of hospital stay was noted to be comparable between the Lichtenstein technique and Laparoscopic TAPP surgery groups.

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