

# Lichtenstein Procedure for Inguinal Hernia Repair With or Without Fixation of Mesh

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## ABSTRACT

### Objective

To compare the safety and efficacy of the Lichtenstein repair with and without mesh fixation for inguinal hernia.

### Methodology

This randomized controlled trial was conducted at Department of Surgery, Khyber Teaching Hospital, Peshawar from 1<sup>st</sup> March 2020 to 30<sup>th</sup> September 2021. A total of 234 patients diagnosed as cases of inguinal hernia were included in the study and randomly allocated to group with mesh fixation (group A) or without mesh fixation (group B) by flip coin method. Visual analogue scale was used for assessment of pain after surgery. All the data was analyzed by using SPSS software version 26.

### Results

All the subjects included in the study were male in both groups. There was significant increase in the time of operation in group A (38.18±4.5 minutes) compared to group B (33.85±5.99 minutes) with a *p*-value of <0.001. There was no significant difference in the hospital stay in both groups. The Visual Analogue Scale for pain showed a significant reduction of pain in group B (2.40±0.810) as compared to group A (3.66±1.123) *p*-value <0.001. There was no recurrence noted in either group up to three months follow up.

### Conclusion

It is concluded that Lichtenstein procedure with no mesh fixation technique of inguinal hernia repair is safe, less time consuming, and less postoperative pain.

**Key words:** Lichtenstein Procedure, Inguinal Hernia Repair, Mesh Fixation, Visual Analogue Scale.

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## INTRODUCTION

In spite of all the advances in the surgery of inguinal hernia, the proportion of recurrent inguinal hernias still ranges from 12% to 13% in the world population.<sup>1,2</sup> Recurrence of the hernia can occur post operatively after one day or later quickly but depends on the cause of hernia.<sup>3,4</sup> There is variation in literature between the low and high recurrence rate of inguinal hernia as mentioned in individual studies<sup>5</sup>. This is particularly due to the fact that many researchers have a long follow-up time of 1 to 5 years and in some studies the recurrence rate was 40%.<sup>3</sup> Therefore, patients with inguinal hernia reconstruction should be monitored for a long time. The literature reviews the different surgical factors for the recurrence of inguinal hernia and now the new global guidelines for the management of inguinal hernias don't recommend the tissue supported suturing techniques such as Bassini, Shouldice and McVay<sup>5</sup>. These procedures are replaced substantially to tension free repair with meshes like Lichtenstein, mesh plug and laparoscopic procedures trans-abdominal pre-peritoneal (TAPP)

and total pre-peritoneal (TEP) procedures.<sup>6</sup>

The rates of recurrence and scrotal complications are high from conventional hernia repair. These complications provoked surgeons to find out new techniques. Various methods are used that rely on suturing of tissues with many advantages over tension free mesh hernia repair. The tissue suturing methods are Bassini, Halsted, Shouldice and McVay. The tension free mesh repair methods are Lichtenstein, mesh plug, Nyhus and minimal invasive laparoscopic.<sup>5</sup> Prosthetic mesh was initially used for incisional hernia and now become trend for inguinal hernia repair. More than eighty percent of all inguinal hernias are repaired with mesh in the United States. Mesh hernioplasty is also common in practice for inguinal hernia repair.<sup>6</sup>

*Ersoz F, et. al.*, showed that the average operation time was 32.37±7.96 minutes in the Lichtenstein technique with mesh fixation compared to 49.4±13.17 minutes without mesh fixation.<sup>5</sup> Despite various procedures for inguinal hernias repair, there is no gold standard. For patient satisfaction/reduction of discomfort

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and to reduce the recurrence rate there is still a space for new procedure. The repair of inguinal hernia also depends on the technique of operator which may affect the outcome of the procedure. Although inguinal hernia repair is common in surgical practice but there is no gold standard technique to adopt universally.

The rationale of this study is that we routinely fixed prosthetic mesh in Liechtenstein technique. The fixation of mesh may entrap the nerve or create tension on suturing which may be one of the cause of increase pain and discomfort for the patients. To avoid tension and entrapment of nerve mesh repair without fixation for inguinal hernia repair is recommended. Therefore, in this study we evaluated the two procedures and compared the pain, operating time and recurrences rates.

## METHODOLOGY

This study was conducted at the Department of Surgery, Khyber Teaching Hospital, Peshawar from 1<sup>st</sup> March 2020 to 30<sup>th</sup> September 2021 after taking ethical approval from Institutional Review Board. Sample size was calculated at a 95% confidence level with power of 80% and  $\alpha = 5\%$ . Sample size was 234 using mean and standard deviation of hospital stay at  $1.14 \pm 0.35$  days and  $1.29 \pm 0.46$  days. 117 patients were in group A (with mesh fixation) while 117 were in group B (without mesh) fixation. The method used for sampling was non-probability consecutive sampling. After taking informed consent, patients of both gender with inguinal hernia, 18-50 years of age and grades 1 and 2 of American Society of Anesthesiologist score were included. Patients with diagnosis of femoral hernia, bilateral inguinal hernia, or taking immunosuppressive pills were excluded.

Demographics of each patient, age, gender, duration of hernia, diabetes, weight, height, and body mass index were recorded. The flip coin method was used for randomization of subjects in each group.

All patients were operated under general anesthesia. In group B patients, new technique was applied in which mesh was not fixed with inguinal ligament and conjoint tendon. Slit made at the lateral edge of mesh and both limbs are sutured around the spermatic cord at internal ring with 2/0 prolene. Mesh was placed behind the spermatic cord on posterior wall of inguinal canal. In group A mesh was fixed with inguinal ligament and conjoint tendon behind the spermatic cord.

The assessment of the severity of pain was done with Visual Analogue Scale on 1<sup>st</sup> post-operative day. Patient were asked to rate their severity pain of in the last 24 hours from 0 to 10. For recurrence patients were examined clinically and labeled as recurrence when there is swelling in operation site which increase in size with cough. Data of duration of surgery, stay in hospital, pain rating on 1<sup>st</sup> postoperative day, and recurrence of hernia of all patients were noted in proforma.

Data were analyzed using a statistical evaluation program (IBM-SPSS version 26). Safety was measured in terms of postoperative pain and efficacy in terms of recurrence of hernia up to three

months. Both groups were compared for duration of surgery, hospital stay, pain score and recurrence of hernia and student t test applied to find any differences in both groups. P value of  $\leq 0.05$ , was consider significant statistically.

## RESULTS

A total of 234 patients were studied in both groups. All patients were male in both groups. In Group A (With Mesh Fixation), mean and SDs for age, weight and height were  $39.6 \pm 8.3$  years,  $76.26 \pm 5.48$  kg and  $5.85 \pm 0.354$  feet respectively. BMI, duration of hernia, duration of surgery, hospital stay and pain score were  $27.47 \pm 2.02$ ,  $9.40 \pm 1.57$  months,  $38.18 \pm 4.50$  minutes,  $3.8 \pm 1.054$  days and  $3.66 \pm 1.123$  respectively are shown in table no. 1. In Group B (Without Mesh Fixation), mean and SDs for age, weight and height were  $37.9 \pm 8.7$  years,  $77.22 \pm 5.542$  kg and  $5.85 \pm 0.354$  feet respectively. Mean and SDs for BMI, duration of hernia, duration of surgery, hospital stay and pain were  $27.8 \pm 2.08$ ,  $9.78 \pm 1.63$  months,  $33.85 \pm 5.99$  minutes, and  $2.40 \pm 0.810$  respectively are shown in table no. 1.

Eighty two (70.1%) patients were above 35 years of age in group A and in Group B, 63 (53.8%) patients were above 35 years of age are shown in table no. 2. Stratification of outcome with respect to age, BMI, duration of hernia, duration of operation and pain are shown in table no.3. There was no recurrence noted in either group.

Treatment Groups	Parameters	Mean	Std. Dev
Group A (With Mesh Fixation)	Age	39.66	8.28
	Weight (Kg)	76.26	5.48
	Height (Feet)	5.85	0.35
	Body Mass Index (Kg/m <sup>2</sup> )	27.47	2.03
	Duration of Hernia (Months)	9.40	1.58
	Duration of Surgery (Minutes)	38.18	4.50
	Hospital Stay (Days)	3.77	1.05
	Pain Score	3.66	1.12
Group B (Without Mesh Fixation)	Age	37.9	8.7
	Weight (Kg)	77.22	5.54
	Height (Feet)	5.85	0.35
	Body Mass Index (Kg/m <sup>2</sup> )	27.8	2.08
	Duration of Hernia (Months)	9.78	1.63
	Duration of Surgery (Minutes)	33.85	5.99
	Hospital Stay (Days)	3.9	.111
	Pain Score	2.40	1.81

**Table 1** Descriptive statistics of both the groups in terms of the variables observed during the history and examination of the patients

Treatment Group		Frequency	Percent
Group A (With Mesh Fixation)	< 35 Years	35	29.9%
	> 35 Years	82	70.1%
	<b>Total</b>	<b>117</b>	<b>100.0%</b>
Group B (Without Mesh Fixation)	< 35 Years	54	46.2%
	> 35 Years	63	53.8%
	<b>Total</b>	<b>117</b>	<b>100.0%</b>

**Table 2:** Age wise distribution in both groups

Parameters	Mean and Standard Deviation		p-value
	Group A	Group B	
Age (Years)	39.6±8.3	37.9±8.7	0.129
BMI (Kg/m <sup>2</sup> )	27.47±2.02	27.8±2.08	0.195
Duration of hernia (Months)	9.40±1.57	9.78±1.63	0.074
Operative time (Minutes)	38.18±4.50	33.85±5.99	0.000
Hospital Stay (Days)	3.8±1.054	3.9±1.1	0.548
Pain VAS	3.66±1.123	2.40±.810	0.000

**Table 3:** Comparison between group A (With Mesh Fixation and B (Without Mesh Fixation).

## DISCUSSION

Inguinal hernia is comprising 80-83% of all hernia and are seen in 3-8% of population. Different primary tissue repair techniques were used before the introduction of tension free methods. But still there is gold standard procedure.<sup>7</sup> Lichtenstein hernia repair was first described in 1989. It is widely accepted and popularized due to its tension free using polypropylene mesh repair, safety and low recurrence rate. Although it is safe procedure but still enduring groin pain, which is a major challenge to surgeons that accounts from 0.7% to 62.9%.<sup>8</sup> The effectiveness of hernia repair is typically concerned with complications like hematoma, seroma, wound infection, length of hospitalization, recovery time, chronic groin pain and recurrence. Various factors are accountable for these complications including patient factors, surgical techniques and sterilization of instruments are the main causes of complications.<sup>9</sup>

Traditionally mesh has been secured with sutures, tacks or staples. A study in which hernias were repaired without mesh fixation were associated with less postoperative pain than with mesh fixation repair.<sup>10</sup> In our study all patients were male in both groups. Mean age was 39.6±8.3 years in group A while in group B

it was 37.9±8.7 years with P-value of 0.129. Mean and standard deviation for duration of hospital stay and operation time were 3.8±1.054 days and 38.18±4.502 minutes in group A as compared to 3.9±1.11 days and 33.85±5.99 minutes in group B with P-values 0.548 and 0.000 respectively. Similar outcomes were also reported by *Ersöz F, et. al.*, with a mean operative time was 32.37±7.96 minutes in Lichtenstein procedure with mesh fixation as compare to 49.4±13.17 minutes without mesh fixation.<sup>5</sup> In addition, the pain score using VAS was 3.66±1.123 in group A as compared to 2.40±0.810 in group B with P value 0.000. Similar results were also reported by *Lionetti* in which suture less Lichtenstein repairs had significantly lower average pain score than in standard Lichtenstein hernioplasty.<sup>11</sup> *Ersöz F et al.* also reported significantly low postoperative pain in the intervention group.<sup>5</sup> Theoretically it seems that mesh will increase pain after operation due to more damages of nerves, inflammatory reaction to foreign body.<sup>12</sup> Mesh without fixation may lead to pain reduction but its displacement may lead to increase in recurrence.<sup>13,14</sup> The functional discomfort may be due to nerve compression or vessel injury with mesh fixation but studies have reported favorable results with non-fixation of mesh.<sup>15</sup>

There was no recurrence in either group in our study. *McGillicuddy* also reported recurrence rate of 0.2% in Lichtenstein and 1% in Shouldice techniques respectively.<sup>16</sup> *Amid et al.* also reported in their clinical trials that the recurrence rate was 0.1% on studied 400 patients.<sup>17</sup> Another study conducted by *Koniger* in which he reported similar results. *Koniger* reported that the recurrence rate was 0.3% in a tension free repair.<sup>18</sup> There is no recurrence rate noted in our study which may be due short duration of follow up in these subjects. Although theoretically mesh without fixation have chances of recurrence but there is no evidence found in the literature.<sup>19,20</sup>

Limited follow up of only three months, single Centre study are the limitations of this study. Multicenter studies are required with prolong follow up to bear out the fall outs.

## CONCLUSION

Suture less Lichtenstein repair is safe and valuable technique for inguinal hernia treatment in terms of postoperative pain and recurrence. We concluded that inguinal hernia repair without fixation of mesh have less operative time and pain in the study group. So we recommend Lichtenstein mesh repair without fixation for the treatment of inguinal hernia.

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