

# A Comparative Analysis between Non-Mesh (Bassini's) and Mesh (Lichtenstein) Repair of Primary Inguinal Hernia

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**Abstract:** ***Background:** The groin hernia repair is one of the common operations in general surgery. The optimum repair method is under debate and the best mode of repair is yet to be decided. This study is conducted to compare the results of open non-mesh (Modified Bassini's) and Lichtenstein's mesh repair of primary inguinal hernia in terms of recurrence, postoperative complications and quality of life in the long term. **Methods:** This retrospective comparative analytical study includes 840 patients of which 40 patients were excluded from the study due to various reasons. The remaining 800 patients with unilateral primary inguinal hernia, above 16 years of age, operated during March 2019 to March 2020 in a teaching hospital are included in the study. Of the total number, 392 patients (49%) underwent Lichtenstein mesh repair, while remaining 408 patients (51%) were operated by modified Bassini's suture technique. Follow up was conducted 1, 5, 8 and 15 days; 1, 2, 6, 12 months. **Results:** The recurrence rate and postoperative pain were significantly low in Lichtenstein mesh repair compared to open non-mesh repair by modified Bassini's technique ( $p < 0.001$ ). Recurrence occurred in 8 (2.0%) out of 392 patients those with Lichtenstein mesh repair. On the other hand 29 (7.1%) patients with Bassini's repair reported recurrence within 1 year time. **Conclusion:** Mesh repair of inguinal hernia is much superior to non-mesh repair in terms of recurrence and postoperative chronic pain.*

**Keywords:** Inguinal hernia, open repair, Lichtenstein repair, morbidity, recurrence

## 1. Introduction

Repair of inguinal hernia remains the oldest and commonest operations performed by general surgeons all over the world. Various conventional methods like Bassini's and Shouldice repair using suture material are in practice despite the introduction of laparoscopic hernia repair. Suture repair is associated with a considerable tension on the suture line. This is likely to cause ischemia of the tissues and ultimate failure of repair leading to recurrence.<sup>1-3</sup> The concept of tension free hernia repair by using a synthetic proline mesh was first proposed by Lichtenstein and Schulman<sup>4</sup> ensuring promising results of hernia repair in the long term. Following this a number of studies claimed improved results of tension free mesh repair in terms of rate of recurrence compared to conventional suture repairs.<sup>5-10</sup> This decreased recurrence is highly desirable as the failure of surgery imposes a great economical burden as well as a lot of psychological trauma to the patient. Furthermore, surgery on a recurrent hernia is much difficult and is liable to cause serious damage to the vessels and other important structures due to adhesions and distorted anatomy of the inguinal region. Despite of promising results in mesh repair claimed by many authors, the non-mesh repair still continues and the best method of repair is yet to be decided.<sup>11</sup> To add further to the existing knowledge, a comparative analysis is done between Bassini's suture repair and Lichtenstein mesh repair in this study.

## 2. Material and Methods

This comparative study is conducted at a teaching hospital and included 840 patients, 16 years or above with unilateral inguinal hernia operated from March 2019 to March 2020. Of these, 40 patients were lost in follow up and were excluded from the study. Patients with bilateral hernias,

recurrent hernias and with serious co-morbidity were excluded from the study. The records of all patients of primary inguinal hernias repaired during this period were analyzed and data of individual patients was collected on a proforma containing demographic details, details of hernia, details of operation performed and the outcome in terms of operative and post operative complications, pain, wound infection and recurrences. Consultant as well as trainee registrars who had an adequate experience in hernia surgery performed the operations. The follow up of the study subjects was done up to three years following surgery to assess the outcome and efficacy of the surgical technique used.

For mesh repair a 6×11 cm proline mesh was used which was trimmed to fit in the defect as and when necessary. The mesh was secured by using alternate stitches by Proline 3/0. The modified Bassini's repair was done in the conventional way by using proline to approximate the floor and roof of the inguinal canal and repairing the stretched deep inguinal ring. The wound closure was almost similar in both the techniques. Pre-operative catheterization was done selectively.

The data is analysed statistically on SPSS version 11.0. The Fisher's exact and Pearson's Tests of chi-square were applied among the categorical variables. The Independent Sample (2-tailed) *t*-test was used to compare the means among the continuous variables. The level of  $p < 0.05$  was statistically considered as significant.

## 3. Results

The demographic details of the study subjects are shown in Table-1. The common presentation was an inguino-scrotal swelling without pain. Surgery was performed after preliminary investigations and those with treatable co-

existing medical problems were admitted in a medical ward until fitness was given. The details of the hernia are shown in Table-2.

61 to 90 Min.	31	(7.90%)	75	(18.40%)
91 to 120	3	(0.80%)	7	(1.70%)

\*statistically highly significant

**Table 1:** Demographic Detail (n=800)

Variables	n (%)	
Age (in years), Mean±SD (Range)	44.1±16.5, (16–88)	
<b>Age in group:</b>		
16 to 49 years	590	(73.8)
50 or above	210	(26.3)
<b>Gender:</b>		
Males	776	(97)
Females	24	(3)
<b>Co-Morbidities:</b>		
Hypertension	137	(17.1)
Diabetes Mellitus	83	(10.4)
COPD	66	(8.3)
IHD	49	(6.1)
Prostatism	22	(2.8)
<b>Occupation</b>		
Labourers and farmers (heavy manual work)	517	(64.62%)
Moderate manual workers	210	(26.25%)
Sedentary jobs	63	(7.87%)
Minimal physical activity	10	(1.25%)

**Table 2:** Characteristics of Hernia

Variable	Type of Repair (n=800)			
	Mesh Repair (n=392, n (%))		Non-Mesh Repair (n=408, n (%))	
<b>Site:</b>				
Right	334	(85.20%)	244	(59.80%)
Left	66	(16.8%)	156	(38.20%)
<b>Duration:</b>				
<4 weeks	13	(3.30%)	10	(2.40%)
4 weeks to 1 year	343	(87.50%)	245	(60.00%)
>1 year	44	(11.2%)	145	(35.50%)
Direct	93	(23.7%)	76	(19%)
Indirect	307	(78.30%)	324	(81%)
Irreducible	23	(5.80%)	86	(21%)
<b>Scrotal:</b>				
Complete	163	(41.50%)	58	(14.2%)
Incomplete	327	(83.40%)	252	(61.70%)

The anaesthesia employed was determined in accordance with the patient's preference and as decided by the anaesthetist. Six hundred and thirty nine (79.87%) patients were operated under regional anaesthesia, 143 (17.87%) under general anaesthesia and remaining 18 (2.25%) received a combination of both. The operative time in mesh repair was significantly lower compared to non-mesh repair and maximum patients were operated with in 60 minutes as shown in Table-3. The postoperative complications were found in both the groups and were divided into complications observed during the same hospitalization and those found/reported during the follow up. The common complications and their incidence in both the groups are shown in Table-4.

**Table 3:** Comparison of operative time in two groups

Duration of Surgery	Type of Repair (n=800)		p-value
	Mesh Repair (n=392, n (%))	Non-Mesh Repair (n=408, n (%))	
30 to 45 Min.	280	(71.40%)	<0.001*
46 to 60	78	(19.90%)	

**Table 4:** Comparison of complications in two groups

	Lichtenstein's Mesh Repair (n=392, n (%))	Bassini's Suture Repair (n=408, n (%))	p-value
<b>Early Post Operative Complications:</b>			
Retention of Urine	21 (5.4%)	35 (8.6%)	<0.05
Wound Infection	26 (6.6%)	21 (5.1%)	
Haematoma	17 (4.3%)	31 (7.6%)	
Wound dehiscence	7 (1.8%)	3 (0.7%)	
Seroma	9 (2.3%)	15 (3.7%)	
<b>Late post operative complications</b>			
Persistent pain	14 (3.6%)	20 (4.9%)	<0.001*
Testicular Atrophy	0	1 (0.2%)	
Recurrence of hernia	8 (2.0%)	29 (7.1%)	

\*statistically highly significant

There is a significant number of wound infection in Lichtenstein mesh repair compared to suture repair and this seems to have a relation with the recurrence of hernia. During the follow up period between 2 months and 36 months, recurrence was much lower in mesh repair compared to suture repair ( $p < 0.001$ ). The earliest recurrence in non-mesh group occurred in 10 months time following operation while first recurrence in Lichtenstein group occurred after 03 months following surgery. In 2 patients the mesh was heavily infected and were removed on 7<sup>th</sup> post-operative day. The remaining patients settled on antibiotics. Persistent pain, numbness and discomfort were found in 21 (5.25%) patients with non-mesh repair even up to three years despite symptomatic treatment. Too much of tissue manipulation may lead to nerve entrapment/compression and can explain this troublesome complication. On the other hand, 13 patients in Lichtenstein group experienced un-easiness; numbness, chronic pain and foreign body sensation after surgery, which persisted up to three years. The other complications, were not significantly different in two groups.

#### 4. Discussion

Tissue based suture repair by different techniques (Bassini's, Shouldice etc.) has remained the most conventional surgical treatment of inguinal hernia. These techniques shared many things in common such as excessive tension on the suture line as well as the neighbouring tissues, a lot of dissection, trauma and undue operative time. These factors were found to be responsible for a number of recurrences, persistent pain after surgery and morbidity leading to an undue economical Burden on the patient.<sup>12</sup>This led to the introduction of mesh repair in the late 1980's with the concept of tension free repair of hernias.<sup>13</sup>Since then a number of studies have claimed improved results with mesh repair in terms of recurrence of hernia.<sup>14,15</sup>

This study compares and demonstrates the efficacy of non-mesh (Bassini's) and mesh (Lichtenstein) repair. The overall operative time differs significantly in two techniques and the mean operative time in mesh repair is much less

than mean operative time in Bassini's repair ( $p < 0.001$ ). The total duration of hospitalization also differs and the average hospital stay of mesh repair group was 2 days compared to 3 days with non-mesh repair. These findings are consistent with other similar studies.<sup>16-20</sup> Recurrence of hernia occurred earlier in mesh group with an overall incidence of 2% at 3 years in this study. The earliest reported case of recurrence following mesh repair was within 3 months of primary surgery. Bisgaard T *et al*<sup>21</sup> and Butters<sup>22</sup> claim a similar recurrence rate and found mesh repair (Lichtenstein) superior to suture repair of inguinal hernia. There was an unduly high rate of wound infection in the mesh repair group in the present study (26 patients versus 21 patients in non-mesh group). This high rate of post-operative wound infection underlies most of the recurrences in the study subjects; however, obesity, malnutrition and cough contribute in the same way. Other similar studies have, however, pointed out technical difficulties as underlying factors for recurrence.<sup>23</sup> Twenty-nine patients with suture repair developed recurrent hernia and majority of them had wound infection, cough or haematoma in the early postoperative period. The recurrence in this group occurred late and maximum number reported during 12 to 18 months follow up period. The other late complications worthy of note were chronic pain, numbness along medial side of thigh and discomfort. It was present in both the groups but more so with non-mesh group and patients' satisfaction about the outcome was not up to high levels with non-mesh repair. A number of studies have published severe pain in 3-6 percent and mild pain up to 30% of the study population following hernia repair leading to significant effect on daily activities.<sup>24-26</sup> This seems to be a very untoward outcome and causes a lot of psychological disturbance to the patients.

## 5. Conclusion

The mesh repair is superior to the non-mesh repair of inguinal hernias especially in terms of recurrence and postoperative pain; however, continuous clinical trials have to be undertaken to find out the optimum surgical treatment of hernias.

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