

**Research Article**

## **Comparison of Post-Operative Pain Between Skin Staples and Polypropylene Suture in Patients of Inguinal Hernia for Securing Mesh**

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### **ABSTRACT**

**Objective:** To compare the polypropylene suture and skin staples for securing mesh in Lichtenstein inguinal hernioplasty in terms of post-operative pain. **Material and methods:** This randomized controlled trial was conducted at Department of Surgery, Ahmad Pur East from January 2018 to June 2018 over the period months. Total 266 patients with inguinal hernia were selected for this study by using non-probability consecutive sampling technique. Post operative pain was compared between the both groups. **Results:** Total 266 patients inguinal hernia were selected for this study. Mean age of the patients was  $34.37 \pm 10.95$  years, mean weight, height, BMI, duration of hernia and VAS was  $69.26 \pm 16.690$  Kg,  $160.65 \pm 9.368$  cm,  $26.79 \pm 5.879$ ,  $5.52 \pm 3.312$  years and  $4.54 \pm 2.811$  respectively. Comparison of frequency of post-operative pain between both groups was done. Pain was noted in 39 (29.3%) patients of group A and in 59 (44.4%) patients of group B. Statistically significant ( $P = 0.0155$ ) difference between the frequency of post-operative pain was noted. **Conclusion:** Results of this study showed there is a significant difference between Polypropylene suture and skin staples for securing mesh in lichtenstein inguinal hernioplasty in term of post operative pain. Statistically significant difference was noted between the post operative pain in male patients of both groups but the difference was insignificant in female patients.

**Key words:** Lichtenstein inguinal hernioplasty. Polypropylene suture. Skin staples. Mean operative time. Postoperative pain

### **INTRODUCTION**

Inguinal hernias, constituting 73% of all external hernias are a common clinical problem.<sup>1</sup> Surgery is the treatment of choice for hernia in order to prevent complications.<sup>2,3</sup> Inguinal hernia repair is the most common operation undertaken in routine surgical practice with an annual incidence of 13 per 1000 population of all ages.<sup>1</sup> The importance of the postoperative disability period of hernia repair was brought to the attention of surgeons by Lichtenstein in 1966.<sup>4</sup> The tension-free hernioplasty project was started at the Lichtenstein Hernia Institute in June of 1989 to decrease

postoperative pain, recovery period and recurrence rate.<sup>5</sup> The Lichtenstein hernioplasty consists of reduction of the hernia contents followed by reinforcement of the inguinal floor with a prosthetic mesh and creation of a new internal ring.<sup>6</sup> The standard way of securing the mesh in position on the posterior wall of the inguinal canal is with polypropylene sutures.<sup>7,8</sup> With recent advancement, a modified hernioplasty using skin staples for anchorage of mesh is under trial which may reduce operative time and decrease postoperative pain.<sup>3</sup> A recent study compared the

results of both methods of mesh fixation. It showed that the technique of mesh fixation with skin staples is as effective as conventional fixation with polypropylene sutures with an important added advantage of fewer complications.<sup>3</sup>

## **MATERIAL AND METHODS**

This randomized controlled trial was conducted at Department of Surgery, Ahmad Pur East from January 2018 to June 2018 over the period months. Total 266 patients with inguinal hernia were selected for this study by using non-probability consecutive sampling technique.

### **Inclusion Criteria:**

- Patients who have inguinal hernia.
- Both male and female.
- Age from 20 to 60 years.
- Duration of hernia  $\geq$  6 months.

### **Exclusion Criteria:**

- Patients having complicated (irreducible, strangulated or obstructed) inguinal hernia.
- All the patients with history of diabetes mellitus.
- Patients with history of chronic renal failure.
- Patients with history of bleeding disorders, immunocompromised.
- Patients with history of recurrent and bilateral inguinal hernia

## **DATA COLLECTION PROCEDURE**

All patients with inguinal hernia were included in this study after scrutinized by inclusion criteria and after taking written consent from Institutional Review Board. Written consent was taken from every patient. All included patients for surgery were offered to pick up a slip from total mixed up slips (half-slips were contain letter "A" and other half-slips contain letter "B") and he/she was placed in that group (Group-A or Group-B according to slip). Group-A was include those patients who were managed with skin staples and Group-B was include those patients who were managed with polypropylene suture.

Weighing machine was used to measure weight in kg and anthropometric tape was used to take height in meters to calculate the BMI. After

surgery for pain management Injection diclofenac sodium 75mg IM BD was given. After 24 hours of surgery pain was assessed by using Visual Analogue Scale (as per operational definition) and recorded on pre-designed proforma. Demographic data including age, gender was entered into a predesigned proforma.

## **DATA ANALYSIS PROCEDURE**

The data was entered in SPSS V16 for statistical analysis. Quantitative variable like age, weight, height, BMI and duration of hernia was presented as mean  $\pm$  SD, while qualitative variable like gender, and post-operative pain (Yes/No) were presented in frequency and percentages. Chi-square test was applied to compare the frequency of post-operative pain in both groups. Stratification was be done for age, gender, duration of hernia and BMI. Post stratification chi-square test was applied to see the level of significance. P-values  $\leq$  0.05 was considered statistically significant.

## **RESULTS:**

Total 266 patients inguinal hernia were selected for this study. Patients were equally divided into two groups A & B. Ppatients of group A were managed with skin staples and patients of group B were managed with polypropylene suture and post-operative pain was noted. Mean age of the patients was  $34.37 \pm 10.95$  years, mean weight, height, BMI, duration of hernia and VAS was  $69.26 \pm 16.690$  Kg,  $160.65 \pm 9.368$  cm,  $26.79 \pm 5.879$ ,  $5.52 \pm 3.312$  years and  $4.54 \pm 2.811$  respectively. Mean age of the patients of Group A was  $34.91 \pm 10.886$  years, mean weight, height, BMI, duration of hernia and VAS was  $69.40 \pm 16.002$  Kg,  $161.14 \pm 9.296$  cm,  $26.67 \pm 5.528$ ,  $5.53 \pm 3.327$  years and  $4.54 \pm 2.811$  respectively. Mean age of the patients of Group B was  $33.83 \pm 11.033$  years, mean weight, height, BMI, duration of hernia and VAS was  $69.12 \pm 17.411$  Kg,  $160.16 \pm 9.448$  cm,  $26.92 \pm 6.229$ ,  $5.50 \pm 3.309$  years and  $4.53 \pm 2.843$  respectively.

Comparison of frequency of post-operative pain between both groups was done. Pain was noted in

39 (29.3%) patients of group A and in 59 (44.4%) patients of group B. Statistically significant ( $P = 0.0155$ ) difference between the frequency of post-operative pain was noted. (Table 1)

Patients of both groups were divided into two age groups, age group 20-40 years and age group 41-60 years. Total 100 (75%) patients of group A belonged to age group 20-40 years and 33 (25%) patients belonged to age group 41-60 years. Total 107 (80%) patients of group B belonged to age group 20-40 years and 26 (20%) patients belonged to age group 41-60 years. In age group 20-40 years, out of 100 patients of group A, post operative pain was noted in 33 (33%) patients. Out of 107 patients of group B, post operative pain was noted in 49 (45.8%) patients. Difference between post operative pain for both groups was statistically in significant with p value 0.0658. In age group 41-60 years, out of 33 patients of group A, post operative pain was noted in 6 (18.2%) patients. Out of 26 patients of group B, post operative pain was noted in 10 (38.5%) patients. Difference between post operative pain for both groups was statistically in significant with p value 0.1391. (Table 2). In group A, male patients were 125 (94%) and female patients were 8 (6%). In group B, male patients were 123 (92%) and female patients were 10 (8%). After comparing

post operative pain between male patients of both groups, significant ( $P = 0.0243$ ) difference was noted between the frequency of post operative pain. After comparing post operative pain between female patients of both groups, insignificant ( $P = 0.6372$ ) difference was noted between the frequency of post operative pain. (Table 3)

In group A & B, obese patients were 33 (24.81%) and in 100 (75.19%) patients were non-obese. Insignificant ( $P = 0.6372$ ) difference of post operative pain between obese patients were observed but significant ( $P = 0.0286$ ) difference was noted in non-obese patients of both groups. (Table 4) Distribution of patients were done according to duration of hernia and two groups were made 1-5 years group and 6-10 years group. In group A, 60 (45%) patients belonged to 1-5 years of duration of hernia and 73 (55%) patients found with 6-10 years duration of hernia. In group B, 62 (47%) patients belonged to 1-5 years of duration of hernia and 71 (53%) patients found with 6-10 years duration of hernia.

In patients of 1-5 years of duration of hernia of group A & B, insignificant ( $P = 0.1463$ ) difference between post operative pain noted and significant ( $P = 0.0504$ ) difference was observed in patients with 6-10 years of duration of hernia. (Table 5)

**Table 1:** Comparison of frequency of post-operative pain between both groups

Group	Post-operative pain		Total	P. Value
	Yes (%)	No (%)		
A	39 29.3%	94 70.7%	133 100.0%	0.0155
B	59 44.4%	74 55.6%	133 100.0%	

**Table 2:** Comparison of post-operative pain between the both groups for age

Group	Post-operative pain		Total	P. Value
	Yes (%)	No (%)		
<b>Age group 20-40 years</b>				
A	33 33.0%	67 67.0%	100	0.0658
B	49 45.8%	58 54.2%	107	
<b>Age group 41-60 years</b>				
A	6 18.2%	27 81.8%	33	0.1391
B	10 38.5%	16 61.5%	26	

**Table 3:** Comparison of post-operative pain between the both groups for gender

Group	Post-operative pain		Total	P. Value
	Yes (%)	No (%)		
<b>Male patients</b>				
<b>A</b>	36 28.8%	89 71.2%	125 100.0%	0.0243
<b>B</b>	53 43.1%	70 56.9%	123 100.0%	
<b>Female patients</b>				
<b>A</b>	3 37.5%	5 62.5%	8 100.0%	0.6372
<b>B</b>	6 60.0%	4 40.0%	10 100.0%	

**Table 4:** Comparison of post-operative pain between the both groups for obesity

Group	Post-operative pain		Total	P. Value
	Yes (%)	No (%)		
<b>Obese patients</b>				
<b>A</b>	9 27.3%	24 72.7%	33 100.0%	0.6372
<b>B</b>	13 39.4%	20 60.6%	33 100.0%	
<b>Non-obese patients</b>				
<b>A</b>	30 30.0%	70 70.0%	100 100.0%	0.0286
<b>B</b>	46 46.0%	54 54.0%	100 100.0%	

**Table 5:** Comparison of post-operative pain between the both groups for duration of hernia

Group	Post-operative pain		Total	P. Value
	Yes (%)	No (%)		
<b>1-5 years duration of hernia</b>				
<b>A</b>	21 35.0%	39 65.0%	60	0.1463
<b>B</b>	30 48.4%	32 51.6%	62	
<b>6-10 years duration of hernia</b>				
<b>A</b>	18 24.7%	55 75.3%	73	0.0504
<b>B</b>	29 40.8%	42 59.2%	71	

**DISCUSSION:**

Inguinal hernia repair is a common disorder affecting 5% of the male population.<sup>9</sup> Edward Bassini originally described the basis of the current open method of inguinal herniorrhaphy more than 100 years ago.<sup>10</sup> Many modifications have been made to this procedure in the interim, with varying degrees of efficacy.<sup>11</sup> Lichtenstein

described the tension free inguinal hernia repair with the help of prosthetic mesh.<sup>12</sup> Originally, the mesh is fixed on the posterior wall of inguinal canal with the help of polypropylene 2/0 suture.<sup>13</sup> But Quality of life has increasingly been a matter of consideration in the assessment of medical, and above all, surgical procedures. In inguinal hernia repair, several factors of postoperative quality of

life, such as pain and recovery, have recently been assessed.<sup>14-15</sup> A new modification in the repair of inguinal hernia has been developed in which prolene mesh is being fixed on the posterior wall of inguinal canal with staples instead of polypropylene suture.<sup>16</sup>

Total 266 patients with inguinal hernia were selected for this study. Patients were equally divided into two groups A & B. Patients of group A were managed with skin staples and patients of group B were managed with polypropylene suture and post-operative pain was noted.

Mean age of the patients was  $34.37 \pm 10.95$  years, mean weight, height, BMI, duration of hernia and VAS was  $69.26 \pm 16.690$  Kg,  $160.65 \pm 9.368$  cm,  $26.79 \pm 5.879$ ,  $5.52 \pm 3.312$  years and  $4.54 \pm 2.811$  respectively. Mean age of the patients of Group A was  $34.91 \pm 10.886$  years, mean weight, height, BMI, duration of hernia and VAS was  $69.40 \pm 16.002$  Kg,  $161.14 \pm 9.296$  cm,  $26.67 \pm 5.528$ ,  $5.53 \pm 3.327$  years and  $4.54 \pm 2.811$  respectively. Mean age of the patients of Group B was  $33.83 \pm 11.033$  years, mean weight, height, BMI, duration of hernia and VAS was  $69.12 \pm 17.411$  Kg,  $160.16 \pm 9.448$  cm,  $26.92 \pm 6.229$ ,  $5.50 \pm 3.309$  years and  $4.53 \pm 2.843$  respectively.

Khan et al<sup>6</sup> reported mean age in polypropylene group was  $48.99 \pm 14.27$  years and in staple group was  $46.37 \pm 14.12$  years with the average age in both groups was  $47.68 \pm 14.23$  years. Bawahab et al<sup>17</sup> reported mean age of the with inguinal hernia as  $35.83 \pm 13.338$  years.

In present study post operative pain was noted in 29.3% patients of group A and in 44.4% patients of group B. Statistically significant ( $P = 0.0155$ ) difference between the frequency of post-operative pain was noted. In one study by Khan et al,<sup>6</sup> on 3rd postoperative day, 31 (23.3%) in polypropylene group had no pain, 68 (51.1%) had mild pain, 18 (13.5%) had moderate pain and 16 (12.0%) had severe pain. On 3rd postoperative day in the staple group, 39 (29.3%) had no pain, 79 (59.4%) had mild pain, 9 (6.8%) had moderate pain and 6 (4.5%) had severe pain ( $p = 0.026$ ).

Findings of this study are in agreement with my study. Similarly Zwaal et al reported that postoperative pain was reduced when staples were used to fix the mesh (66%) for polypropylene group versus 51% for staple group).<sup>3</sup> This study showed that the technique of mesh fixation with skin staples is as effective as conventional fixation with polypropylene sutures with an important added advantage; fewer complications.<sup>3</sup> Shaikh et al<sup>18</sup> also found significant difference between post operative pain between the both groups.

Damani et al<sup>19</sup> also reported that postoperative pain by using the visual analogue scale. was less in skin staples group than in Polypropylene suture group. Interpretation of the results shows that anchoring mesh with staples in Lichtenstein inguinal hernioplasty is superior as compared to fixation with polypropylene suture in term of post operative pain.

On the other hand, Shivhare et al<sup>20</sup> reported no significant difference in post-operative pain in both groups after surgery. Mills et al<sup>21</sup> have reported that there was no difference in pain score between the two groups. Garg et al<sup>22</sup> also stated that there was no difference in the pain duration in both groups of their study. Van der Zwaal et al<sup>23</sup> also reported that pain scores were similar in term of post-operative pain.

## CONCLUSION

Results of this study showed there is a significant difference between Polypropylene suture and skin staples for securing mesh in lichtenstein inguinal hernioplasty in term of post operative pain. Statistically significant difference was noted between the post operative pain in male patients of both groups but the difference was insignificant in female patients.

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