

# Securing Mesh With Staples is a Safe and Time Saving in Lichtenstein Inguinal Hernioplasty

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## ABSTRACT

**Objective** To compare the operative time and early postoperative complications of securing mesh with skin staples versus polypropylene suture in Lichtenstein inguinal hernioplasty.

**Study design** Comparative study.

**Place & Duration of study** Department of Surgery, Dr. Ruth K.M. Pfau Civil Hospital Karachi, from March 2015 to September 2017.

**Methodology** All diagnosed cases of inguinal hernia of either gender between 18 to 70 years of age were randomly allocated in two groups. In group A, the mesh was secured with skin staples, while in group B, the mesh was secured with polypropylene suture. Operative time, postoperative pain scores and complications were recorded. On the fifth postoperative day, the surgical site was examined for infection and graded with the Southampton scoring system. Chi square and student t tests were applied for determining statistical significance.

**Results** Out of total 112 patients, the mean age of the patients in group A was 45.73 ±13.24 year and 47.27 ±14.16 year in group B. The rate of complication was same in both the groups and no significant difference was found. However operative time was short in group A (p=000).

**Conclusion** The mesh fixation technique with skin staples is safe and less time consuming than with polypropylene sutures.

**Key words** Hernioplasty, Mesh fixation, Staple, Inguinal hernia, Surgical site infection (SSI).

## INTRODUCTION:

Inguinal hernia is the commonest type of hernia in males.<sup>1</sup> It affects about 27% of males and 3% of females over the course of their lifetime.<sup>2</sup> Risk of developing inguinal hernia increases with age and by the age of 75 years it almost affects every other male.<sup>2</sup> Hence, repair of inguinal hernia is the most

frequent surgical procedure performed worldwide.<sup>3</sup> Although a variety of modern techniques have been used for inguinal hernia repair, Lichtenstein repair for inguinal hernia remains the most prevalent surgical procedure due to its low cost, simplicity and low recurrence rate of hernia.<sup>4,5</sup>

In Lichtenstein hernioplasty posterior fascial layer of inguinal canal is strengthened by fixing synthetic mesh with polypropylene sutures. Fixing of synthetic mesh with polypropylene sutures is associated with infection.<sup>6</sup> Hence, different modifications have been tried to avoid the use of polypropylene suture.<sup>7,8</sup> One of the notable modifications used in Lichtenstein mesh repair is the replacement of polypropylene sutures with skin staples.<sup>9</sup> This method of using staples for anchoring mesh and closing skin is reported to save operative time.<sup>10</sup> There is less

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handling of tissues, surgical wound infection and risks associated with prolonged anesthesia.<sup>6,11</sup>

Multiple studies have been carried out to compare outcome of staples versus polypropylene suture for fixation of mesh in terms of operative time, pain and postoperative wound infection. However, the majority of studies have focused on postoperative pain.<sup>12</sup> Limited data are available regarding postoperative wound infection rate in both groups. The purpose of this study was to weigh the use of skin staples against polypropylene suture for securing mesh in terms of surgical time, postoperative pain and early postoperative complications including wound infection.

#### **METHODOLOGY:**

This comparative study was performed in the Department of Surgery, Dr. Ruth K.M. Pfau Civil Hospital Karachi, from March 2015 to September 2017. Patients between 18-70 years of age with the diagnosis of unilateral inguinal hernia (reducible, of not more than two years duration) on the basis of history and clinical examination were included in the study. Patients with bilateral, recurrent, complicated inguinal hernia, diabetes mellitus, chronic renal failure, bleeding disorder, and immunocompromised status were excluded. Ethical approval was obtained from IRB and informed consent was taken from every patient. The sample size was calculated using Openepi software version 3.03. With 80% power of test, 95% confidence interval considering the operative time  $74 \pm 16.2$  in group B versus  $62 \pm 14.4$  in group A,<sup>13</sup> the sample size was 52 patients (26 in each group) but for statistical significance more patients were included making the study population of 112. A non-probability consecutive sampling technique was used to enroll patients.

All the patients underwent Lichtenstein inguinal hernioplasty in elective setting under spinal block. All patients received a single dose of injection co-amoxiclav 1.2 gram half hour prior to surgery. Patients were randomly divided into two groups by envelope method. In group A, the mesh was secured with Proximate Plus MD (multidirectional) Release Skin Stapler (Ethicon, Johnson & Johnson, USA) containing 35 preloaded stainless-steel staples. In group B, polypropylene 2/0 was employed to secure the mesh. External oblique muscle was closed in both groups with polyglycolic suture size 2/0 and the skin with remaining staples from the same stapler in group A and with polypropylene 2/0 in group B.

Operative time was recorded in both the groups

from incision making to the end of closure of wound. Postoperatively, patients in both groups received similar medications and visual analogue scale (VAS) was used at 12 and 24 hours following surgery to assess pain. The wound was examined at the fifth postoperative day for infection upon first follow-up visit in outpatient clinic and graded by Southampton scoring system, according to which, patients with Southampton grade 0, 1 were labeled as no surgical site infection and grades 2, 3, 4 as having SSI. Patients were directed to come on regular visits in outpatient clinics for a period of one month.

Statistical analysis was carried out using statistical software SPSS version 20.0. The mean and the standard deviation were computed for numerical variables like age, operative time and pain score. Frequencies and percentages were calculated for qualitative variables like gender, type of the hernia, Southampton grade, and postoperative complications. Student t test was used for numerical data to compare mean operative time and Chi-square test was applied to compare the frequencies of wound infection in both groups. A p-value of  $< 0.05$  was considered significant.

#### **RESULTS:**

A total of 112 patients with inguinal hernia were included. The mean age of the patients was  $46.5 \pm 13.67$  year (table I). There were 109 (97.3%) male and 3 (2.7%) female patients. Direct inguinal hernia was observed in 57 (50.9%) patients, while 51 (45.5%) had indirect and 4 (3.6%) patients had both direct and indirect inguinal hernia (Pantaloon hernia). No statistical difference existed amongst the groups with regard to age, gender, and type of hernia.

Mean operative time was more in group B ( $48.50 \pm 8.37$ ) as compared to group A ( $40.57 \pm 5.75$ ) which was significant (table I). Pain score assessed on VAS at 12 and 24 hours after surgery and mean pain score in both groups did not differ significantly (table II). No patients had bleeding, bowel / bladder / nerve injury, urinary retention, hematoma, or scrotal abscess in both groups. The rate of complication in both groups had no significant difference (table III). The overall frequency of SSI was 7.1%. In 3 (5.4 %) patients of group A and 5 (8.9 %) of group B SSI was recorded which was not significant. No recurrence of hernia was noted at follow up.

#### **DISCUSSION:**

The studies conducted earlier favored staple against suture for affixing mesh in Lichtenstein repair.<sup>10-13</sup> Magnate et al reported in their study that,

Table I: Demographic and Clinical Details				
Characteristics		Group A	Group B	P-value
Mean age (Year)		45.73±13.245	47.27±14.167	0.553
Male (n %)		55 (98.21)	54 (96.43)	0.924
Female (n %)		1 (1.78)	2 (3.57)	0.564
Type of Hernia	Right	36	34	0.811
	Left	20	22	0.758
	Direct	27	30	0.691
	Indirect	27	24	0.674
	Pantaloon Hernia	2	2	1.00
Mean Operative Time(Minutes)		40.57±5.75	48.50±8.37	0.000*

Table II: Postoperative Pain			
	Group A	Group B	P-value
Pain VAS Score (12 hours)	5.32±1.72	5.21±2.55	0.795
Pain VAS score (24 Hours)	2.21±1.20	2.05±1.22	0.485
Mean Pain Score	3.74±1.02	3.58±1.47	0.506

Table III: Postoperative Complications					
Complications		(n=112)	Group A (n=56)	Group B (n=56)	P-value
Seroma		11(9.8%)	4 (7.1%)	7 (12.5%)	0.71
Scrotal edema		8 (7.1%)	4 (7.1%)	4 (7.1%)	1.00
Wound Infection (SSI)		8 (7.1%)	3 (5.4%)	5 (8.9%)	0.638
Southampton Grade	0:Normal Healing	87	46	41	0.592
	1:Mild Bruising	17	7	10	0.467
	2:Erythema/Tenderness/Heat	4	1	3	0.317
	3:Serous Discharge	4	2	2	1.00
	4:Purulent Discharge	0	0	0	

the rate of infection significantly diminished by utilizing staples for anchoring mesh. SSI was observed in only two patients of the staple group and twelve patients in polypropylene suture group. In their prospective study Shivhare and colleagues reported that securing mesh with staples in Lichtenstein repair is associated with lower frequency of SSI when compared to polypropylene sutures.<sup>14</sup> Abu Ella et al reported 10% SSI in the polypropylene group and none in the staple group.<sup>15</sup> Overall surgical site infection was observed in 7.1% patients in our study. The frequency of SSI in group A was 5.4% while in group B, it was 8.9%. Though the number of patients having Southampton grade 2 or above was comparatively lower in group A but the difference in the frequency of SSI between the two groups was found to be statistically insignificant. The findings

of our study are in agreement to those of Damani<sup>10</sup> and Garg<sup>11</sup> whereas in contrast to studies conducted earlier.<sup>10,11,3-15</sup> This finding may be due to the longer mean operative time in these studies in comparison to ours.<sup>16,17,18</sup>

The staples are considered to be inert due to its coating and reduction in the duration of surgery is also suggested to decrease the frequency of SSI in Lichtenstein repair. The time required to apply staples is much less as compared to polypropylene suture group. This led to the reduction in operative time and less frequency of SSI in staple group. Same has been the conclusion in other studies where staples were used.<sup>16,17</sup>

In our study, the mean operative time was less in group A and the difference was statistically significant.

The fixation of mesh with sutures demand more time than fixation with staples. The results obtained in this study are in consensus with other studies in which staple fixation required less operative time compared to suture fixation.<sup>10-15</sup> However, despite the statistically significant difference in operative time there was no statistically significant difference between the groups in terms of frequency of SSI and postoperative pain.

In our study, four patient in the staple group and seven patients in the suture group developed seroma. Four patients in each group developed testicular swelling. No recurrence was noted during the follow up. There have been raised concerns regarding nerve entrapment with the use of stapler during inguinal hernia surgery. However, no patient in our study encountered this complication.

#### CONCLUSIONS:

Fixing mesh with staples does not cause increase in postoperative complications and is time-conserving compared to fixation with polypropylene suture.

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- Received for publication: 17-03-2020
- Accepted after revision: 28-04-2020
- Author's Contributions:  
Attaullah: Conception, design, data collection, reference search.  
Syed Ali Haider: Conception, design, data collection, statistical analysis, manuscript writing.  
Akram Rajput: Conception, design, data collection.  
Saeed Ahmed: Conception, design, data collection. reference search.  
Muhammad Abid Owais: Data collection, data interpretation, drafting, revising.  
Wardah Jabeen: Data interpretation, data collection, drafting, revising
- Conflict of Interest:  
The authors declare that they have no conflict of interest.
- Source of Funding: None
- How to cite this article:  
Attaullah, Haider SA, Rajput A, Ahmed S, Owais MA Jabeen W. Securing mesh with staples is a safe and time saving in Lichtenstein inguinal hernioplasty. *J Surg Pakistan.* 2020;25 (1):\_\_\_\_\_. Doi:10.21699/jsp.25.1.\_\_\_\_.