

# Outcome of Mesh Anchoring Using Stainless Steel Skin Staples Versus Polypropylene Suturing in Lichtenstein's Tension Free Inguinal Hernia Repair

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## ABSTRACT

**Objective** To find out the effectiveness of anchoring mesh using stainless steel skin staples versus polypropylene sutures in inguinal hernia surgery with Lichtenstein's technique in terms of operation time, postoperative pain and recurrence of disease.

**Study design** Randomized controlled trial.

**Place & Duration of study** Department of Surgery ward 26 surgery, Jinnah Postgraduate Medical Centre Karachi, from February 2014 to January 2016.

**Methodology** Patients above 18 year of age who underwent inguinal hernia repair using mesh were included. They were randomly assigned in to Group A in which the mesh was secured using stainless skin staples and Group B where mesh was anchored using polypropylene (Prolene) 2/0 sutures. The operative time was recorded in both the groups. All the patients were followed up in outpatient department for recording the postoperative pain on the visual analogue scale (VAS).

**Results** Sixty-four patients fulfilling the inclusion criteria were included. They were randomly divided into two groups of 32 patients each. The mean age of Group A and B patients was  $45.85 \pm 13.50$  year and  $48.56 \pm 14.56$  year respectively. Total operation time and from mesh placement to skin closure was found significant in favor of group A ( $p < 0.001$ ). At 7<sup>th</sup> postoperative day in Group A twelve patients had no pain, Fifteen had mild, four with moderate and one patient had severe pain. In Group B ten patients reported no pain, fourteen had mild, five moderate and three with severe pain. Three patients in group A and four in Group B developed seroma postoperatively. Wound infection developed in one patient in group B. There was neither mesh related infection nor recurrence of hernia in either of the groups.

**Conclusions** Operation time was shorter in patients where staples were used. Postoperative pain was also less in intensity in this group.

**Key words** Lichtenstein repair, Stainless steel skin staple, Polypropylene suture, Operative time, Postoperative pain.

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## INTRODUCTION:

The inguinal hernia is the most common hernia with the incidence of 27% and 3% in males and females respectively. Globally the inguinal hernia repair is the most commonly performed procedure accounting for about twenty million repairs per year.<sup>1,2</sup> Lichtenstein was of the view that the excessive tension on the suture line leads to postoperative disability like pain and high recurrence rate.

He introduced tension free hernioplasty project to address these issues.<sup>3</sup> Lichtenstein hernioplasty comprises of the reduction of hernia contents followed by the strengthening of the posterior wall of inguinal canal (fascia transversalis) without disturbing the anatomy and creation of a new internal ring.<sup>4</sup> The standard way of anchoring the mesh to the posterior wall is with polypropylene suture.<sup>5,6</sup>

This study was conducted to find out effectiveness of anchoring the mesh in position using the stainless steel skin staples. It is hypothesized that this method would be less time consuming, easy to use with minimal postoperative pain without the risk of wound infection.

#### **METHODOLOGY:**

This study was carried out in the Department of General Surgery ward 26 surgery, Jinnah Postgraduate Medical Centre Karachi, from February 2014 to January 2016. All patients above 18 year of age with inguinal hernia were included. Patients with known co morbid (diabetes mellitus, hypertension, chronic renal failure, coagulation disorders and immunocompromized) and complicated hernias (irreducible, strangulated, recurrent) and bilateral inguinal hernias were excluded.

Sixty-four patients fulfilled the inclusion criteria. They were randomly divided into two equal groups. In Group A mesh was secured with skin staples (n = 32) and in Group B mesh was anchored using the polypropylene 2/0 sutures (n = 32). Patients were given single dose of 1.2 gram intravenous Amoxiclav half an hour before the induction of anesthesia. The direct hernias were plicated and the indirect hernias were dissected from the spermatic cord and then sac was divided and transfixed. Distal portion of the sac was excised. A polypropylene mesh sheet of size 11cm x 6cm was tailored and laid over on the posterior wall in such a way that it at least overlapped the pubic tubercle by one cm medially. Superiorly mesh covered the conjoint tendon and extended 2cm lateral to the inguinal ring.

In Group A the mesh was anchored using the skin staples. One staple was placed on the pubic tubercle, four to five staples were placed along the inguinal ligament at least one cm apart (slightly along the upper edge to avoid injury to the underlying vessels). Furthermore 3-4 staples were applied to the internal oblique and transversalis fascia medially and superiorly. The spermatic cord was passed through the slit in the mesh and the overlapping edges of the mesh were stapled with two staples lateral to

the cord. In Group B the mesh was secured using polypropylene 2/0 continuous sutures along the inguinal ligament starting inferiorly from the pubic tubercle whereas interrupted sutures placed medially and superiorly into the internal oblique and transversalis fascia. In both the groups the external oblique aponeurosis was closed using polyglycolic 2/0 sutures, subcutaneous tissues if needed approximated using polyglycolic 2/0 sutures. The skin in Group A was approximated with staples while in Group B interrupted polypropylene suture 2/0 was used.

The operative time in both the groups was recorded in minutes from the time of skin incision to mesh placement and from mesh placement to the skin closure as well as total time of operation was recorded. All the patients were discharged on the first postoperative day and followed up in outpatient department on 7<sup>th</sup> postoperative day for recording the postoperative pain on the visual analogue scale. This was graded as no pain, mild pain, moderate pain and severe pain. The skin stitches and staples were removed on the first follow up visit. Further follow ups were done after one month then at three monthly intervals till one year. Data was analyzed using SPSS version 14. The quantitative data like age and operative time were calculated as mean and standard of deviation and qualitative data (pain and postoperative complications) as frequency and percentages. Statistical analysis was done using student unpaired "t" test.

#### **RESULTS:**

The mean age for Group A was 45.85 ± 13.50 year and 48.56 ± 14.56 year in Group B. Mean operative time from the start of the skin incision to the beginning of the mesh repair was not significant among the groups.

The mean operating time from the mesh anchoring to the skin closure was found significant in favor of group A with p value of <0.001. The total operative time in group A and B was 34.50 ± 3.92 minutes and 42.91 ± 4.35 minutes for group A and B respectively, with p <0.001 which is statistically significant (table I).

The postoperative pain recorded at follow up on day 7 using the visual analogue scale. The postoperative pain was less in group A than in group B (table II). No major intraoperative complication occurred in either of the groups. Wound infection was found in one patient of group B that was superficial. There was no case of mesh infection, testicular atrophy nor recurrence during the follow up (table III).

Operative Time	Group A (n = 32) minutes	Group B (n = 32) minutes	p value
Skin incision to the beginning of the mesh placement	22.50 ± 2.00	22.86 ± 2.50	> 0.10
Mesh placement to skin closure	12.00 ± 1.92	20.05 ± 1.85	< 0.001
Total operative time	34.50 ± 3.92	42.91 ± 4.35	< 0.001

Group	No Pain	Mild Pain	Moderate Pain	Severe Pain
A	12 (37.5%)	15 (46.8%)	4 (12.5%)	1 (3.1%)
B	10 (31.25%)	14 (43.75%)	5 (15.6%)	3 (9.37%)

Complications	Group A (n = 32)	Group B (n = 32)	Total
Seroma	3 (9.3%)	4 (12.5%)	7 (10.9%)
Hematoma	0	0	0
Gapping wound	0	1 (3.1%)	1 (1.56%)
Scrotal edema	1 (3.1%)	2 (6.2%)	3 (4.6%)
Wound infection	0	1 (3.1%)	1 (1.56%)

**DISCUSSION:**

Inguinal hernia is the most common clinical problem.<sup>7</sup> Lichtenstein repair is the most accepted operation for the inguinal hernia repair.<sup>8,9</sup> A number of modifications were made in the Lichtenstein repair to improve the quality of life of the patients amongst them is securing the mesh to the posterior wall of the inguinal canal using stainless steel staples.<sup>10</sup> Egar and his colleague were the first to secure mesh using staples.<sup>11</sup> The main advantage of using the staples is to decrease the operative time and there was a statistically significant difference between the operative time of the two groups. This means that staples can be applied more quickly and easily than the prolene sutures. By reducing the operative time we reduced the tissue handling and therefore the risk of wound infection which was supported by literature.<sup>12-14</sup> There was no intra-operative complications in our study as also reported by Gould.<sup>15</sup>

There was no recurrence in either group as reported by others in literature.<sup>14</sup> The frequency of pain was slightly lower in staple group. These results are also observed in the study of Shaikh et al.<sup>16</sup> Less postoperative pain helped in early recovery and

return to work as observed in other studies.<sup>17-18</sup> This result was supported by Shaikh and his colleagues<sup>16</sup> This decrease in the postoperative pain helped in early recovery and return to work.<sup>17,18</sup>

**CONCLUSION:**

To recapitulate securing mesh with staple not only makes operation quicker for the surgeon but also improves the quality of life of the patients by reducing the postoperative pain and complications.

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Author's Contributions:

Shireen A.A Ramzanali: Design of the work, the acquisition, analysis, interpretation of data, drafting/ revision of manuscript.  
 Sadiqa Haider: Data collection.  
 Syed Sagheer Hussain Shah: Final approval of the manuscript and supervision of data collection.

Conflict of Interest:

The authors declare that they have no conflict of interest.

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