

# Mesh Fixation with Metallic versus Delayed Absorbable Suture Material in Inguinal Hernia: A Clinical Comparative Assessment

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## Abstract

**Aim:** The aim of the present study was to compare outcomes of mesh fixation with metallic versus delayed absorbable suture material in inguinal hernia through laparoscopic surgery.

**Material & Methods:** This was prospective study conducted in the Department of General Surgery, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India during the period of one year. Total 200 male patients who underwent laparoscopic surgery were included in the study.

**Results:** In group 1, the patients' mean age of 53.7 years and in group 2 mean age of 50.5 years in group 2. In group 1, 25 patients having right and 26 patients have left, 26 patients have unilateral hernias and 23 patients have bilateral hernias while in group 2 there were 38 patients having right, 20 patients have left, 25 patients have unilateral hernias and 17 patients have bilateral inguinal hernias. There was no statistical significant difference was found between two groups except for the appearance of the post-operative pain after 1 month ( $p < 0.05$ ). The appearance of post-operative paresthesia in both surgical groups, there was more number of patients had developed paresthesia group 1 as compared to group 2 but it was not statistical significant. There was more number of patients had developed complications group 1 as compared to group 2 barring ecchymosis which was more common in group 2. There was no statistical significant difference was found between two groups.

**Conclusion:** In Laparoscopic surgery, a straightforward, safe, and efficient alternative to tension-free open mesh fixation with delayed absorbable suture material. With There are fewer odds of chronic groin discomfort and paresthesia following air knot fixation compared to the conventional way of fixation.

**Keywords:** Open inguinal hernia, Mesh fixation, Air knot, Non-absorbable suture, Delayed absorbable suture

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## Introduction

An inguinal hernia is the disease in which intraabdominal structures or parts of the intestine protrude through the triple triangle of the groin. This results in visible mass and pain, especially when the patients cough, stand for a period of time, bend over or lift heavy objects. Although it is not seriously dangerous, it does not improve on its own,

and might lead to life-threatening complications such as intestinal obstruction or strangulation. Abdominal wall hernia is a common clinical manifestation in general surgery, with a prevalence of 4% for people over 45 years of age and 1.7% for all ages. [1] Seventy-five percent of abdominal wall hernias are inguinal hernias. The lifetime

risk of inguinal hernia repair is 27% in men and 3 in women. [2] While most inguinal hernias have a slow natural course and result in mild to moderate discomfort. Mesh-based repair is the standard treatment for adult symptomatic inguinal hernias according to the International Guidelines for Groin Hernia Management [2], and it can be performed via an open or laparoscopic approach. Lichtenstein's technique is widely used for open hernia repair (OHR), whereas total extra peritoneal repair (TEP) and transabdominal preperitoneal repair (TAPP) are standard techniques for laparoscopic hernia repair (LHR). [3,4] Suture and tacker mesh fixations are techniques used for OHR and LHR respectively. The aim of fixation is long-term stability, but unfavourable effects of sutures or tacks have been reported, including chronic groin pain [5,6], vascular injury [7] and internal organ injury [8] (such as perforation, bending or lifting). Non-penetrating or atraumatic fixation techniques have been proposed as alternatives (such as glue and self-gripping mesh (SGM)) to prevent these outcomes. Chronic inguinal pain and discomfort are common complaints following an open inguinal hernia because of nerve compression

The most crucial aspect of surgery is mesh fixation, which is traditionally done with metallic sutures but has recently been tried with delayed absorbable materials, such as staples and glue, with positive postoperative results in terms of minimal postoperative pain and paraesthesia and low risk of reoperation. The aim of the present study was to compare outcomes of mesh fixation with metallic versus delayed absorbable suture material in inguinal hernia through laparoscopic surgery.

## Materials and Methods

This was prospective study conducted in the Department of General Surgery, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India during the period of one year. Total 200 male patients who underwent laparoscopic surgery were included in the study.

### Inclusion Criteria

Patients with unilateral or bilateral hernia, elective surgery performed and primary hernia repair were included in the study.

### Exclusion Criteria

Patients with age <18 years, obstructed/strangulated inguinal hernias, emergency repair and recurrent hernia were excluded.

### Methodology

Patients were split into two groups of 100 each. Metallic suture material (tantallum 1-0) was used to fix the mesh in group 1 while mesh fixation was used in group 2 was completed with Vicryl 2-0, a delayed absorbable suture material. Age, hernia type, location, and site, postoperative problems, hospital stay, and recurrence rates were all examined for each patient. Follow-up information was gathered for groin discomfort, paresthesia, seroma, hematoma, infections, recurrence rate, etc. after 10 days, 1 month, 3 months, and 1 year.

### Statistical Analysis

The statistical analysis was performed using SPSS for windows version 22.0 software (Mac, and Linux). The findings were present in number and percentage analyzed by frequency, percent, and Chi-squared test. Chi-squared test was used to find the association among variables. The critical value of p indicating the probability of significant difference was taken as <0.05 for comparison.

### Results

**Table 1: Distribution based on age and side of hernia**

Variables		Group 1	Group 2
Age (Mean $\pm$ SD)		53.7 $\pm$ 16.4	50.5 $\pm$ 20
<b>Hernia side</b>			
Right		25	38
Left		26	20
Unilateral		26	25
Bilateral		23	17

In group 1, the patients' mean age of 53.7 years and in group 2 mean age of 50.5 years in group 2. In group 1, 25 patients having right and 26 patients have left, 26 patients have unilateral hernias and 23 patients have

bilateral hernias while in group 2 there were 38 patients having right, 20 patients have left, 25 patients have unilateral hernias and 17 patients have bilateral inguinal hernias.

**Table 2: Post-operative pain in both groups**

Time period	Post-operative pain		
	Group 1	Group 2	P value
After 10 days	30	25	0.10
After 1 month	16	10	0.01
After 3 months	10	5	0.18

There was appearance of post-operative pain in 30 patients, 16 patients, and 10 patients after 10 days, after 1 month and after 3 months, respectively in group 1 while for group 2, post-operative pain appeared in 25 patients, 10 patients, and 5

patients after 10 days, after 1 month and after 3 months, respectively. As such there was no statistically significant difference was found between two groups except for the appearance of the post-operative pain after 1 month ( $p < 0.05$ ).

**Table 3: Post-operative paraesthesia in both groups**

Time period	Post-operative paraesthesia		
	Group 1 N	Group 2 N	P- value
After 10 days	25	15	0.10
After 1 month	15	10	0.28
After 3 months	10	5	0.40

The appearance of post-operative paraesthesia in both surgical groups, there was more number of patients had developed paraesthesia group 1 as compared to group 2 but it was not statistical significant.

**Table 4: Post-operative complications**

Complications	Group 1 N	Group 2 N	P- value
Scrotal hematoma	15	14	0.72
Seroma	10	10	0.60
Echymosis	5	7	0.36
Wound infection	0	0	-
Recurrence	6	5	0.12
Average hospital stay	4 days	3 days	-

There was more number of patients had developed complications group 1 as compared to group 2 barring ecchymosis which was more common in group 2. But again there was no statistical significant difference was found between two groups. Recurrence was low but more in group 1 and was not significant. Average hospital stay was 3.5 days in both groups.

## Discussion

Inguinal hernia may be defined as a protrusion of a part or whole of viscous into the inguinal canal either through the deep inguinal ring or through the Hesselbach's triangle. It is one of the most common complaints with which patients attend surgical outpatient department in our country. [9] A male older patient is more likely to have an inguinal hernia. 10% of patients have bilateral inguinal hernias, with 2/3 of patients having indirect and 1/3 having direct hernias. [10] One of the most popular surgical operations worldwide is the correction of this hernia. Nowadays, the majority of surgeons favor tension-free mesh repairs. [3] The Lichtenstein tension-free hernioplasty is currently the surgery of choice for most people everywhere. [11] The development of surgical techniques, such as laparoscopic hernia repair, has led to the introduction of new mesh fixation techniques. There are various suture types. Simple metallic sutures to screw-type fasteners that are absorbable are some of the materials utilized to repair hernias. [12]

In group 1, the patients' mean age of 53.7 years and in group 2 mean age of 50.5 years in group 2. In group 1, 25 patients having right and 26 patients have left, 26 patients have unilateral hernias and 23 patients have bilateral hernias while in group 2 there were 38 patients having right, 20 patients have left, 25 patients have unilateral hernias and 17 patients have bilateral inguinal hernias. There was appearance of post-operative pain in 30 patients, 16 patients, and 10 patients after 10 days, after 1 month and after 3 months, respectively in group 1 while for group 2, post-operative pain

appeared in 25 patients, 10 patients, and 5 patients after 10 days, after 1 month and after 3 months, respectively. As such there was no statistical significant difference was found between two groups except for the appearance of the post-operative pain after 1 month ( $p < 0.05$ ). According to several researches, the prevalence of pain might range from 0% to over 30%. [13] The entrapment of a nerve by mesh or sutures may be the source of the discomfort. This can be prevented by locating the groin nerves or by securing the mesh with fibrin or biologic glues rather of sutures. [14]

The appearance of post-operative paresthesia in both surgical groups, there was more number of patients had developed paresthesia group 1 as compared to group 2 but it was not statistical significant. The entrapment of a nerve by mesh or sutures may be the source of the discomfort. The groin can be located to prevent this. Instead of utilizing sutures to hold the mesh in place, biologic glues, fibrin, or nerves may be employed. [15,16] Regarding the progression of post-operative paresthesia, the current study found that group 1 experienced more progression of paresthesia than group 2 at various time points. Entrapment of a nerve by mesh or suture is once again the main cause of the onset of paresthesia. Post-operative groin pain and discomfort are uncommon with delayed absorbable sutures made with the air knot technique.

Rausa et al [17] was the only one assessing all three methods of mesh fixation (suture fixation, self-gripping mesh and glue fixation) using a network meta-analysis involving a total of 20 RCTs. The network meta-analysis results showed similar rates of chronic pain among the three methods of mesh fixation, with no significant increase of chronic pain after glue fixation or self-gripping mesh fixation. Glue fixation was ranked as the method with the highest probability of reducing the risk of chronic pain, followed by self-gripping and suture. There was more number of patients had

developed complications group 1 as compared to group 2 barring ecchymosis which was more common in group 2. But again there was no statistical significant difference was found between two groups. Recurrence was low but more in group 1 and was not significant. Average hospital stay was 3.5 days in both groups. Regarding the risk of recurrence, most reviews showed similar rates of recurrence between the assessed methods for mesh fixation. Fixation using delayed absorbable sutures is not recommended. Recurrence rates and surgical complications don't differ significantly. Mesh fixation is an essential stage in hernia surgery for successful results, but other factors may also contribute to recurrence, making it challenging to choose the optimum suture material from that perspective other solutions, such as glues, staples, and tackers, now successfully available for fixations.[18]

### Conclusion

There are various mesh-fixation techniques might be useful for prevention of hernia recurrence, including suture, glue, or SGM for OHR, and metallic tack, absorbable tack, glue, suture, SGM or non-fixation techniques for LHR. Glue in both OHR and LHR may be of benefit for less pain in the short- and medium-term postoperative periods and less chronic groin pain for OHR in the long term. In Laparoscopic surgery, a straightforward, safe, and efficient alternative to tension-free open mesh fixation with delayed absorbable suture material. With There are fewer odds of chronic groin discomfort and paresthesia following air knot fixation compared to the conventional way of fixation. This is because fewer nerves are compressed. The recurrence rates for the two approaches are statistically equivalent. As a result, delayed absorbable material may be an effective mesh fixation substitute.

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