

## Comparison between Suture Fixation V/S Cyanoacrylate Glue Fixations in Open Inguinal Hernia Repair

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### Original Research Article

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**Abstract:** The open mesh hernioplasty is currently remains the first choice of surgeon for groin hernia. To diminish the troubles and reduce the risk of postoperative discomfort different method of mesh fixation have been considered and mainly with tissue compatible glue. In our opinion, long lateral-chain cyanoacrylate represent best choice for mesh fixation in open mesh hernia repair. In this study firstly we publishing with primary endpoint of the study is Post-Operative Pain. Our study conducted between March 2016- February 2017 at RUHS – CMS and attached Jaipuria Hospital. Total 60 patients were included in our study. In which we randomized by sealed envelope. The envelopes were open intraoperatively. Primary outpoint were early and late post-operative pain. A total of 60 male patients was included in the trial. 30 patients were allotted to the sutured mesh fixation in group 1 and 30 patients to the suture less mesh fixation in group 2. At 1 month follow-up – 15 patients in group 1 reported pain in groin pain compared 9 in group 2. At 3 month follow up – Number of patient with pain decreased in both 15 to 6 in group 1 and 9 to 2 in group II. In our study demonstrate that mesh fixation with glue causes less post-operative pain in chronic pain than classical suture fixation technique, with similar if not better recurrence and morbidity.

**Keywords:** Suture, Fixation, Cyanoacrylate, Fixations, Inguinal, Hernia.

### INTRODUCTION

The open mesh hernioplasty is currently remains the first choice of surgeon for groin hernia [1]. The technique was first described in 1989 had been changed drastically after fixing the transverse fascia by mesh graft [2- 4].

Despite the demonstration of low complexity and low rate of complication several recent article demonstrated and higher rate of inguinal pain postoperatively with an average incidence of 12% to 53% [5-13].

There are many studies who seen the course of post-operative groin discomfort and chronic inguinal pain which was identified as inflammatory reaction to mesh, surgeon technique, surgeon experience, nerve entrapment in suture or scar tissue, inflammation of periosteum of the pubic tubercle traditionally taken into the first stitch [14-15]. To diminish the troubles and reduce the risk of postoperative discomfort different method of mesh fixation have been considered and mainly with tissue compatible glue.

In our opinion, long lateral-chain cyanoacrylate represent best choice for mesh fixation in

open mesh hernia repair. Glue has to meet the some criteria like biocompatibility and poor polymerization because not to prolong operative time and ideally inexpensive. Two different glue fulfill all these requirement available in market (1) n-butyl cyanoacrylate (2) human fibrin glue.

In our study we choose cyanoacrylate glue because it is less expensive than human fibrin glue. In this study firstly we publishing with primary endpoint of the study is Post-Operative Pain. Recurrent rate after 2 years with secondary outcome parameter will be published later on.

### MATERIALS AND METHODS

Our study conducted between March 2016- February 2017 at RUHS – CMS and attached Jaipuria Hospital after approval of ethical committee of Hospital, Jaipur. The inclusion criteria were male adult

with primary unilateral inguinal hernia, age over 21 years of age. Exclusion criteria were recurrent hernia, emergency procedure, and patient were not on good compliance, previous history of some psychological or other type of long term treatment for some systemic disease.

Total 60 patients were included in our study. In which we randomized by sealed envelope. The envelopes were open intraoperatively. Criteria evaluated – type of defect, operative time, hospitalization time, risk factor, complication pain, hyperesthesia and patient satisfaction. Primary outpoint were early and late post-operative pain, secondary outcome were used of pain killer after 12-20 hrs. morbidity and recurrent rate.

**Surgeon Technique**

All operation performed under spine block. The first few step of the operation was the same in both groups according to the original description by Lichtenstein i.e. inguinal canal opened hernial sac identified, separated, ligated, reduced. This was staged according to shape and size of the inguinal canal and put in place. In first group mesh was fixed at pubic tubercle and passed on the conjoined area and the inguinal ligament. The two posterior wings of the mesh were sutured together with two single prolene stitches.

In another group mesh was fixed with cyanoacrylate tissue adhesive on the pubic tubercle, inguinal ligament and the conjoint area. The posterior wings of the mesh were also fixed with tissue adhesive. Only one vial of glue was used for each patient. All patients had the same polypropylene kind of mesh irrespective of fixation method. The fascia was closed in both groups with vicryl running suture. Skin was closed with a subcuticular running suture.

To reduce bias, the post-operative regime is standardized for the study. All patients will receive the same intra and perioperative care except for mesh fixation method. All patients will receive paracetamol (three 1 gm doses per 24 hr.) either I.V. in early postoperative period or orally (Late post-operative period).

Post-operative pain was measured with in vision analogue scale by director interview or by phone call at 6 hr,12hr, 24hrs, 48 hr, 3day, 5 day, 10 day, 21 days, 1 month, 3 months, 6 months after surgery. Clinical study was checked by another surgeon at 15 days, 1 month and 3 month who were blinded to the treatment patient received. According to Alfeienet al chronic pain was considered most at the surgeon site still pressure at 3 month follow up [16]. Data were analyzed and summarized.

**RESULTS**

A total of 60 male patients were included in the trial.30 patients were allotted to the sutured mesh fixation in group 1 and 30 patients to the suture less mesh fixation in group 2.

Patient demographic and preoperative clinical details are listed in Table 1. Patient characteristics are also detail in Table 1. The both did not differ in type of hernia, age, experience of surgeon. The operative time was significantly shorter in group 2 with suture less mesh repair (68 vs. 42 minute).

The mean hospital stay was 6.93 and 6.53 days in both groups (Table 2) which was not significantly differ. There was no major intraoperative complication but there were some more chances of hematoma formation with superficial surgical site infection in group I. No major complication, no reoperation and no mesh inspection occurred in either group (Table 2).

At 1 month follow-up – 15 patient in group 1 reported pain in groin pain compared 9 in group 2 (Table 3). At 3 month follow up – Number of patient with pain decreased in both 15 to 6 in group 1 and 9 to 2 in group 2 (Table 4).

After 9 month we found that in group 1, 3 patients and 1 patient in group 2 to suffer from persistent pain and discomfort in groin region. All patients with persistent pain quantified the pain being mild with no loss of quality of life and no interference with daily activity (Table 5).

**Table-1: Patient characteristics**

|                                   | Group 1 (Suture)<br>(N=30) | Group 2 (Sutureless)<br>(N=30) |
|-----------------------------------|----------------------------|--------------------------------|
| Age                               | 44.6                       | 45.7                           |
| Type of hernia (NYHES)            |                            |                                |
| 1                                 | 0                          | 1                              |
| 2                                 | 0                          | 2                              |
| 3a                                | 9                          | 8                              |
| 3b                                | 18                         | 16                             |
| 4                                 | 3                          | 3                              |
| Surgeon                           |                            |                                |
| Sr. experienced surgeon           | 24                         | 27                             |
| Associated Surgeon                | 6                          | 3                              |
| Mean of the operative time (min.) | 62 (45-90)                 | 48 (32-90)                     |

**Table-2: Postoperative results**

|                    | Group 1 (Suture)<br>(N=30) | Group 2 (Sutureless)<br>(N=30) |
|--------------------|----------------------------|--------------------------------|
| Major complication | 0                          | 0                              |
| Hematoma           | 5                          | 3                              |
| Recurrence         | 0                          | 0                              |
| Hospital stay      | 6.93 (2-10)                | 6.53 (2-10)                    |

**Table-3: Follow up at 1 month**

|                      | Group 1 (Suture)<br>(N=30) | Group 2 (Sutureless)<br>(N=30) |
|----------------------|----------------------------|--------------------------------|
| Drop out             | 5                          | 4                              |
| Follow up at 1 month | 25                         | 26                             |
| Pain                 | 15                         | 9                              |
| Recurrence           | 0                          | 0                              |

**Table-4: Follow up at 3 month**

|                      | Group 1 (Suture)<br>(N=30) | Group 2 (Sutureless)<br>(N=30) |
|----------------------|----------------------------|--------------------------------|
| Drop out             | 12                         | 8                              |
| Follow up at 3 month | 18                         | 22                             |
| Pain                 | 6                          | 2                              |
| Recurrence           | 0                          | 0                              |

**Table-5: Follow up at 9 month**

|                      | Group 1 (Suture)<br>(N=30) | Group 2 (Sutureless)<br>(N=30) |
|----------------------|----------------------------|--------------------------------|
| Drop out             | 22                         | 20                             |
| Follow up at 9 month | 8                          | 10                             |
| Pain                 | 3                          | 1                              |
| Recurrence           | 0                          | 0                              |

## DISCUSSIONS

Mesh hernioplasty for inguinal hernia is one of the most frequent operation worldwide.<sup>5</sup> Our study comparison mesh fixation with suture to sutureless mesh fixation with glue in lichtenstein hernia repair it provides that fixation with glue is not inferior to standard suture technique in long term outcome. Sutures mostly know absorbable have been demonstrated to increase post-operative pain by entrapment or injury or chronic foreign body reaction [14, 15]. In our study another method fixation by tissue adhesive has hold the most promising results in terms of clinical efficiency and reduction in post-operative pain [17].

The primary end point of the trial was the presence of chronic pain in groin defined as persistent after three or more month. In our study the 2 curve of pain had similar trend but different level of pain score. The peak of pain in both group 24 hours after surgery where the effect of intraoperative anesthesia completely diminished and patient has restored his normal life. At this stage there was no difference between glue and suture and mostly the pain due to surgeon itself.

Also the number of patients who were still on pain killers after 24 hrs is comparable between two

groups. In most significant difference between the two groups are between 2 days and 1 month after surgery. May be due to low grade, local inflammation and reducing risk of nerve entrapment when glue was used.

Some recent met analysis and systemic reviewed confirmed a reduction in chronic groin pain and faster return to normal activities with the use of glue [17]. This indicates that chronic pain is more likely due to local inflammation and micro environmental changes but should be due to more anatomical region such as nerve entrapment however this has not been confirmed in met analysis studies [18].

Secondary end points of our study were post-operative complication and recurrence rate. In our case, both of them seen to be high in group 1 of patient whose mesh fixed with suture. This result matched to study of 2010 Testing et al reported an overall morbidity rate of as high as 39 in suture v/s 11 in cyanoacrylate patients [19].

In our study we planned a standardized technique trying to limit the bias but we could not exclude that occasionally the surgeon performance for some unexpected intraoperative finding. Clearly, this

study has some other limitations. The most evident is low no of cases, the original research planned was to conduct a study of 250 patients however there was stopped due to evident better clinical results in the group of patients whose mesh fixed with glue. This was based on general impression of the surgeon involved in the study.

A severe limitation of our study was the loss of patients in follow up reason being that in our Government Hospital set up patient was not strict to come particular OPD days.

### CONCLUSION

In our study demonstrate that mesh fixation with glue causes less post-operative pain in chronic pain than classical suture fixation technique, with similar if not better recurrence and morbidity.

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