

## A Comparative Study of Cyanoacrylate Glue versus Sutured Mesh Fixation for Lichtenstein Inguinal Hernia Repair

Dr.P. Vanitha, M.S., D.G.O.

Department Of General Surgery, Govt. Rajaji Hospital, Madurai  
Corresponding Author: Dr. A. Suganya. M.S.

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### Abstract

**Background:** In recent years, general surgeons who perform inguinal hernia repair have paid attention to successful reduction in the recurrence rate. The Lichtenstein technique is widely used because it is easy to learn and is associated with a low rate of complication and recurrences. Today, the new objective in primary hernia surgery should be to reduce complications such as chronic pain. Chronic pain after hernia repair can be disabling, with considerable impact on quality of life and there is evidence to suggest increased use of health services by patients who have chronic pain

**Methods:** This study is a prospective study of glue mesh fixation for primary unilateral inguinal hernia's during the period December 2017 – November 2018, Government Rajaji Hospital, Madurai Medical college. Number of cases studied is 60 were recruited for the study based on the eligibility criteria and informed written consent. Relevant data regarding history, clinical examination and investigations were collected and properly recorded. The patients would then be divided into (Group A) cyanoacrylate glue fixation of the mesh & (Group B) suture mesh fixation. short-term outcomes like length of operation time, pain, postoperative analgesia requirement within 24hrs, hematoma, seroma, long term outcomes like chronic pain, sensation of extraneous body, recurrence & time to return to work/normal activities were monitored in frequent intervals for 1<sup>st</sup> month, 3<sup>rd</sup> month, 6<sup>th</sup> month & 1 year These parameters were analyzed using chi square test & P value.

**Results:** This study compares the post-operative morbidity of mesh fixation with cyanoacrylate glue in Lichtenstein Hernioplasty over sutures. Cyanoacrylate glue for mesh fixation in the Lichtenstein repair of inguinal hernia shows advantages over sutures, including less duration of operating time(0.01) lower incidence of complications such as post-operative pain(0.017), post-operative analgesia requirement, seroma formation(0.03), foreign body sensation(0.01), chronic discomfort and duration of hospital stay(0.01).

**Conclusion:** Our study favours the use of cyanoacrylate glue for hernia mesh fixation in Lichtenstein Hernioplasty which is better tolerated than sutures and is not associated with an increased risk of hernia recurrence.

**Keywords:** Inguinal hernia; Hernia repair; Cyanoacrylate glue; Mesh fixation

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### I. Introduction

In recent years, General surgeons performing inguinal hernia repair have paid attention to successful reduction of recurrence rates. The Lichtenstein technique is widely used because it is easy to learn and it is associated with a low rate of complications and recurrences. Meshoma, seroma and complications related to the migration of the plug and mesh are a problem, but their incidence is low. Today, the new objective in primary hernia surgery should be to reduce disabling complications such as chronic groin pain.

Chronic pain after hernia repair can be disabling, with considerable impact on quality of life and there is evidence to suggest increased use of health services by patients who have chronic pain. Chronic pain or persistent neuralgia has been recognized as a complication after inguinal hernia repair but was reported in the 1980s as a rare and infrequent condition. Studies from the mid-1990s have reported a higher frequency of patients reporting pain after hernia repair more than 1 year after surgery. Estimates of chronic pain vary considerably from 0 to 53%. It can be mild to severe, even disabling and can adversely affect quality of life.

The 'pain complex syndrome' after hernia repair includes three different aspects: 1) numbness and burning sensation (hypoesthesia, hyperesthesia and paresthesia). Etiology of this problem includes non-neuropathic and neuropathic causes or a combination of both. Non-neuropathic causes include mechanical pressure of folded or wadded mesh, periosteal reaction and scar-tissue formation. Neuropathic pain can be caused by compression of one or more nerves by 'perineural fibrosis,' suture material, staples and tacks or by nerves injuries. So if it is possible to limit the use of suture and device fixation, chronic groin pain could be reduced. It also reduces the length of stay, shorter return to normal activity. The ideal adhesive material should

be Biocompatible, Cheap, easy to store and use. long-lateral-chain cyanoacrylates represent the best choice for mesh fixation in open mesh repair of inguinal hernia.

## II. Aim And Objectives

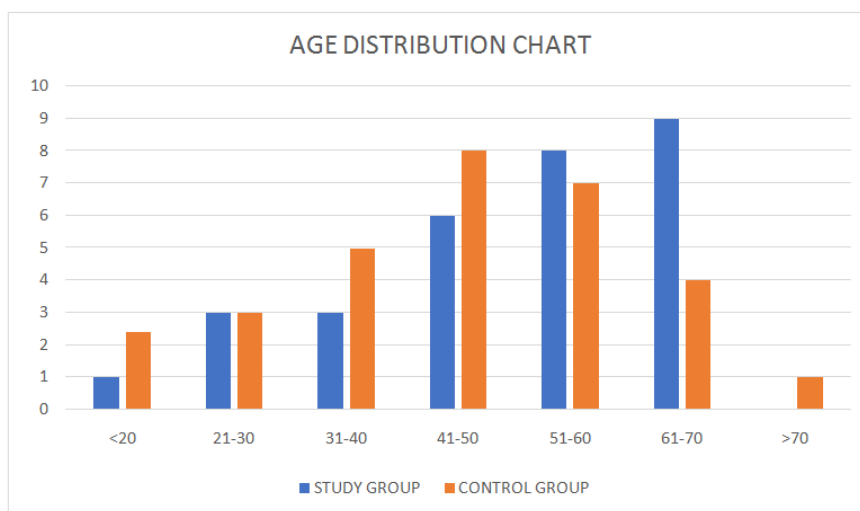
**AIM:** The aim of this study is compare the efficacy of cyanoacrylate glue with that of sutures in mesh fixation for Lichtenstein Inguinal Hernia repair

**OBJECTIVES** :-The objective is to investigate short-term outcomes like length of operation time and pain, post-operative analgesia requirement within 24 hours, hematoma, seroma, and long term outcomes like chronic pain, sensation of an extraneous body, recurrence, time taken to return to work/normal activity following inguinal hernioplasty performed by the Lichtenstein technique with mesh fixation by cyanoacrylate glue comparing with sutures

## III. Observations And Results

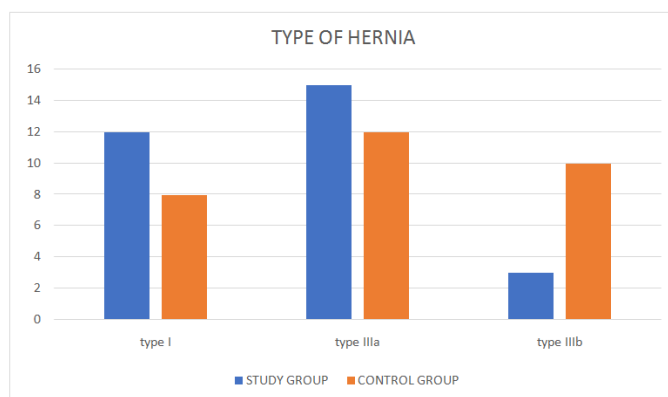
**Age distribution:** In study group most of the subjects belong to 60-70 age, and in control group most of them belong to 40-50 years of age.

STUDY GROUP			CONTROL		
Age group	number	Percentage	Age group	number	Percentage
<20	1	3.3	<20	2	6.6
21-30	3	10	21-30	3	10
31-40	3	10	31-40	5	16.7
41-50	6	20	41-50	8	26.7
51-60	8	26.7	51-60	7	23.3
61-70	9	30	61-70	4	13.4
>70	0	0	>70	1	3.3
Total	30	100	Total	30	100



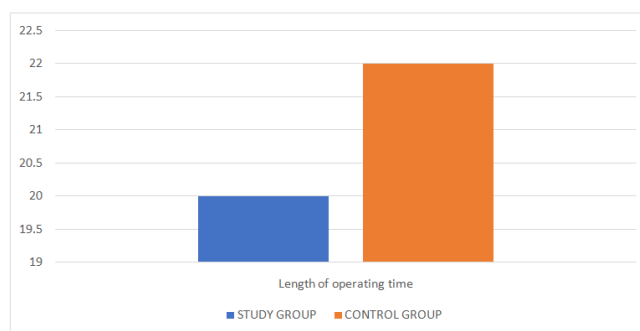
**Type of hernia :** In both study group and control group ,most of the subjects were of Nyhus type III A. In study group 12/30 belong to Nyhus type I; 15/30 belong to NyhusIIIa; 3/30 belong to NyhusIIIb. In control group, 8/30 belong to Nyhus I; 12/30 belong to Nyhus IIIa; 10/30 belong to NyhusIIIb

Type of hernia (Nyhus)	study group	control group
type I	12	8
type IIIa	15	12
type IIIb	3	10



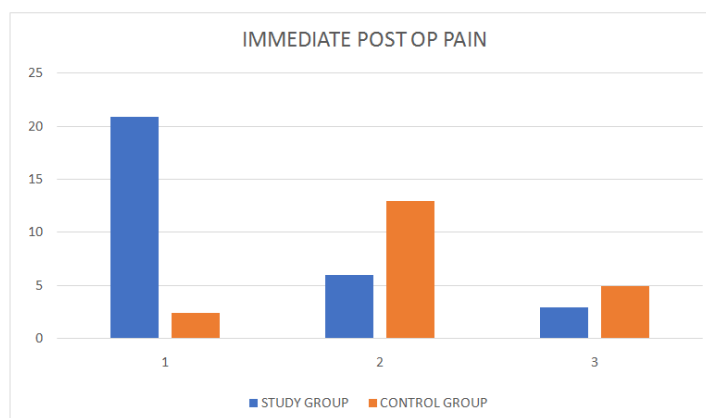
**COMPARISON LENGTH OF OPERATING TIME** : The mean length of operating time in study group was 20minutes, where as in control group, slightly more 22minutes. The difference is statistically significant with a p value of 0.01

	STUDY GROUP	CONTROL GROUP
MEAN DURATION	20	22



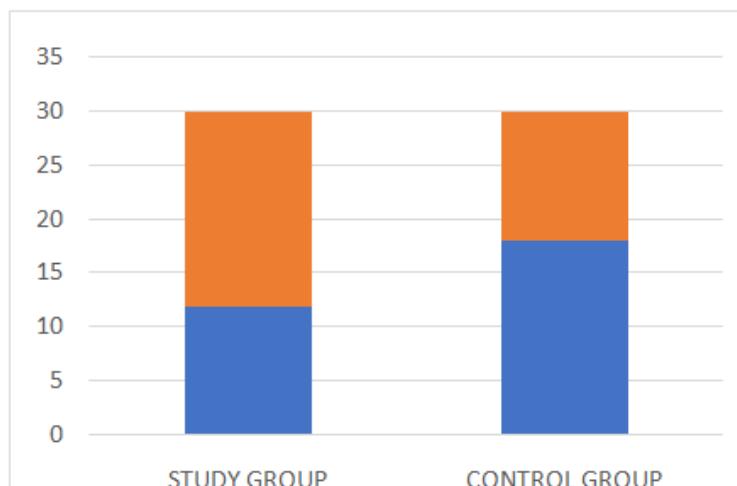
**COMPARISON OF IMMEDIATE POST-OPERATIVE PERIOD PAIN** : Immediate post operative pain is compared between two groups using VAP score with in 24hours of surgery. In both the groups were having pain with varying intensity. In Study group 3/30(10%) had a score of 3; 6/30(20%) had a score of 2; 21/30(70%) had a score of 1. In control group, 5/30(16.6%) had a score of 3; 13/30(43.3%) had a score of 2; 12/30(40%) had a score of 1.

VAP score	STUDY GROUP	CONTROL GROUP
1	21	12
2	6	13
3	3	5

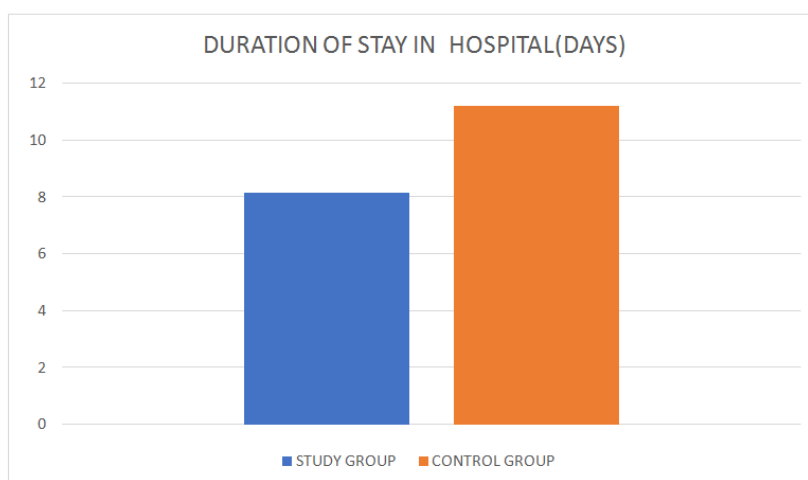


**Comparison of seroma formation** :The incidence of seroma in Study group was 40 % (12/30), which was lesser than Control group 60% (18/30). This difference was statistically significant with a p value of 0.03.

TECHNIQUE	N	%
STUDY GROUP	12	40%
CONTROL GROUP	18	60%

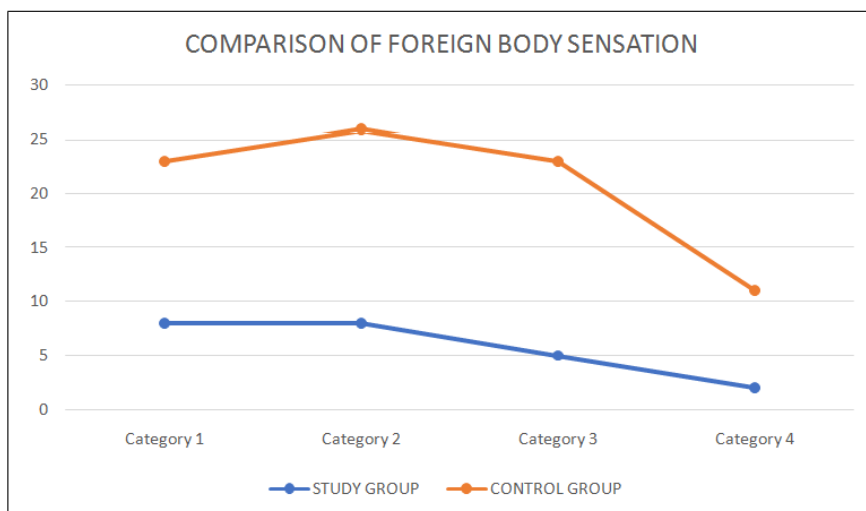


**COMPARISON DURATION OF HOSPITAL STAY** :- The mean duration of hospital stay in study group is 8.16 which is less compared to the control group 11.2. This difference was statistically significant with a p value of 0.02



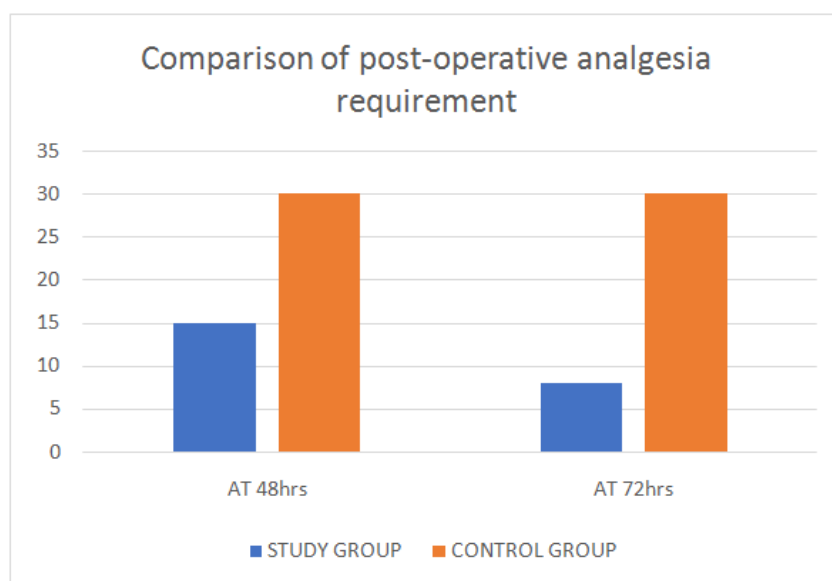
**Comparison of foreign body sensation** : The incidence of foreign body sensation in study group was 6.6 % (2/30), which was much lesser than control group 30%, (9/30). This difference was statistically significant with a p value of 0.01.

Follow up (months)	STUDY GROUP	STUDY GROUP	CONTROL GROUP	CONTROL GROUP
	n	%	n	%
1	8	26.6	15	50
3	8	26.6	18	60
6	5	16.3	18	60
12	2	6.6	9	23.3



**Comparison of post-operative analgesia requirement** : Within 24 hrs post- operative period, all the subjects in both groups required analgesia. However, at 48 hrs post-operative period 15/30 (50%) of subjects in study group required analgesia compared to (30/30,100%) of control group. This difference was statistically significant. Similarly, at 72 hrs post-operative period, 26 % ( 8/30) of study group required analgesia, compared to 100 %(30/30) in control group. This difference was statistically significant with a p values of 0.016

POST OPERATIVE PERIOD(hrs)	STUDY GROUP n	STUDY GROUP %	CONTROL GROUP N	CONTROL GROUP %
With in 24	30	100	30	100
48	15	50	30	100
72	8	26	30	100



#### IV. Discussion

This is a prospective comparative study, comparing 60 patients who had undergone Lichtenstein’s hernioplasty for inguinal hernia, of which 30 had undergone mesh fixation with n-butyl-2-cyanoacrylate glue and the remaining 30 with prolene sutures. In this study the mean length of operative time required in study group was 20minutes, which was slightly more than in control group 22minutes. The difference is statistically significant with a p value of 0.01. In this study the incidence of seroma in study group was 40 % (12/30), which was lesser than Control group 60% (18/30). This difference was statistically significant with a p value of 0.03, similarly to the study conducted by M. Canziani, et al. for fixation of mesh using glue in 40 patients there was no seroma formation in any patient. In this study, the incidence of haematoma formation in study group was

16.6%(5/30) where as in control group 76.6%(23/30). This difference is statistically significant with a p value of <0.01 similar to study conducted by Negro P, et al. i.e study on use of glue versus sutures for mesh fixation in open tension-free Lichtenstein repair of inguinal hernia Patients who received glue were also less likely to experience hematoma than those in the suture group (P = 0.001). in this study, The incidence of seroma in Study group was 40 % (12/30), which was lesser than Control group 60% (18/30). This difference was statistically significant with a p value of 0.03. Similar to the study conducted by M. Canziani, et al. for fixation of mesh using glue in 40 patients there was hematoma formation only in 3 patients (3/40) and no seroma formation in any patients.

In this study, the incidence of foreign body sensation in study group was 6.6% (2/30), which was much lesser than control group 30%, (9/30). This difference was statistically significant with a p value of 0.0001, similar to study conducted by Mario Testini, et al. on a single-surgeon randomized trial comparing sutures, glue for mesh fixation during primary inguinal hernia repair sensation of extraneous body was reported in 5 (8.47%) patients who received sutures. There were no reported cases in the glue group. The mean duration of hospital stay in study group is 8.16 which is less compared to the control group 11.2. This difference was statistically significant with a p value of 0.01. where as in the study conducted by Mario Testini, et al. There was no significant difference between the groups in terms of mean duration of hospital stay.

In this study, the requirement of analgesia in the 24 hrs post-operative period, all the subjects in both groups required analgesia. However, at 48 hrs. Post-operative period 15/30(50%) of subjects in study group required analgesia compared to (30/30,100%) of control group required analgesia. This difference was statistically significant with <0.001. Similarly, at 72 hrs Post-operative period, 26% (8/30) of study group required analgesia compared to 100 %(30/30) in control group. This difference was also statistically significant with a p value of <0.0001 at both 48 and 72 hrs, similar to the study conducted by M.Canziani, et al 40 patients underwent mesh fixation with 2 ml of glue in which postoperative pain occurred in two patients, while chronic pain occurred in one patient; the remaining 37 patients were pain-free. In this study none of the groups had recurrence similar to the study conducted by Colvin HS, et al. In which Glue fixation was not associated with an increased risk of hernia recurrence and also in the study done by Mario Testini, et al. where there is no recurrence in any of the groups.

## V. Conclusion

The ultimate aim in hernioplasty procedures is to decrease the post-operative complications and morbidity of the patient without any increased risk of hernia recurrence. This study compares the post-operative morbidity of mesh fixation with cyanoacrylate glue in lichtenstein Hernioplasty over sutures. Cyanoacrylate glue for mesh fixation in the Lichtenstein repair of inguinal hernia shows advantages over sutures, including less duration of operating time(0.01) lower incidence of complications such as post-operative pain(0.017), post-operative analgesia requirement, seroma formation(0.03), foreign body sensation(0.01), chronic discomfort and duration of hospital stay(0.01). Hence our study favours the use of cyanoacrylate glue for hernia mesh fixation in Lichtenstein Hernioplasty which is better tolerated than sutures and is not associated with an increased risk of hernia recurrence.

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