



COMPARATIVE STUDY BETWEEN N-BUTYL-2-CYANOACRYLATE VERSUS SUTURED MESH FIXATION IN INGUINAL HERNIA

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ABSTRACT

Introduction: Lichtenstein tension free Hernioplasty is currently the first choice to repair primary groin hernias. However, complications associated with sutured mesh fixation following open groin hernia repair, such as chronic irritation and pain are commonly seen. To avoid these problems and reduce the risk of chronic pain, different methods of mesh fixation have been considered and mainly tissue compatible glues like N-butyl 2-cyanoacrylate glues. This study is designed to evaluate to demonstrate that the use of cyanoacrylate glue can reduce post-herniorrhaphy pain.

Material and methods: A total of 100 patients were studied. Patients are categorised into 50 for each group. Group A: Suture mesh fixation Group B: Glue mesh fixation

Results: Mean age was of 50.88 ± 9.67 years in standard prolene suture group & 44.9 ± 14.3 years in N-butyl cyanoacrylate group. Patients presented with swelling in the groin with or without pain or only with pain ranging from <6 months to >5 years.

Highest number of patients were in the age group of 40-49 years in N butyl cyanoacrylate group and in the age group of 50-59 years in standard prolene fixation of mesh group. Hospital stay in cases group was 4.82 days and in control group was 6.48 days. Pain after 1 month was seen only in 5 patients in N butyl cyanoacrylate mesh fixation group and whereas it was more in Standard Prolene Mesh fixation group i.e. 16 patients. Hence, the case group is superior to control group.

Conclusion: Use of N butyl cyanoacrylate glue for Lichtenstein hernia repair is more efficacious than regular prolene suture mesh fixation and also has the potential to reduce the post-operative pain and duration of hospital stay.

KEYWORDS : Glue, Hernia Mesh Fixation, Cyanoacrylate, Mesh Fixation With Glue.

INTRODUCTION

A hernia is an abnormal protrusion of whole or part of a viscus through normal or abnormal opening in the walls of its containing cavity¹. A hernia is the bulging of part of contents of the abdominal cavity through a weakness in the abdominal wall². Inguinal hernia repair is the most frequently performed operation in any general surgical unit³.

Hernioplasty is most commonly performed surgery for hernia. Mesh fixation is a major step in hernioplasty regularly; mesh is fixed with non-absorbable prolene sutures as there is longer operative time, more pain during post-operative period and foreign body sensation, sutures are replaced by n-butyl-2-cyanoacrylate glue for mesh fixation in Lichtenstein hernioplasty. Evidence of surgical repair of inguinal hernias can be traced back to civilizations of ancient Egypt and Greece⁴.

In 1989, repair for inguinal hernia was first described by Lichtenstein.⁵ However chronic pain after inguinal hernia repair remains a frequent complication with reported incidence of up to 63 percent⁶. Complications associated with sutured mesh fixation following open groin hernia repair, such as chronic irritation and pain are probably due to tension or nerve compression by sutures hence these complications have prompted surgeons to use a traumatic method of fixation by cyanoacrylate glue.⁷

AIM OF THE STUDY:

To study the efficacy of N-butyl 2 cyanoacrylate glue in mesh fixation in patients who underwent open Inguinal hernia repair.

OBJECTIVES

To compare the short-term outcomes

1. Post operative Inguinal pain
2. Time to return to daily activities

MATERIALS AND METHODS

Patients are categorised into 50 for each group

GROUP A: Suture Mesh Fixation

GROUP B: Glue Mesh Fixation

The first part of the operation was the same in the two groups, according to the original description by Lichtenstein. In Group A the mesh was fixed with two sutures at inguinal ligament and conjoint tendon. The two posterior wings of the mesh were sutured together with two single prolene stitches.

In Group B the mesh was fixed with n-butyl-2-cyanoacrylate tissue adhesive on the pubic tubercle, the inguinal ligament and the conjoined tendon. The two posterior wings of the mesh were fixed with glue. All patients had the same polypropylene kind of mesh, irrespective of the fixation method. All operations were performed with spinal block.

The outcome measures for this study are :-

To compare the short term outcome like Post operative pain and and time to return to daily activities.

INCLUSION CRITERIA

Patients admitted in the Dept. of General Surgery, NRI General Hospital Chinakakani.

Patients with 20 years of age and above with evidence of Inguinal Hernia.

EXCLUSION CRITERIA

Patients who refuse to give consent.

Patients with recurrent or Giant hernias or femoral hernia or hernia with complications.

Patients with History of coagulation disorder.

Patients with connective tissue disorders and psychological or physical disorders that could affect the ability to feel and elaborate pain.

RESULTS

A total of 100 patients are included in this study out of which 50 are from suture group and 50 are from glue group. Out of these 100 patients, majority of them, that is 74 patients are in the age group between 40-69 years. Youngest patient is of 22 years old and oldest is of 77 years old. There is no significant difference in the age distribution in both groups.

TABLE NO: 1 COMPARISON OF PAIN BY VISUAL ANALOG SCALE AT POD-1

Categories of pain	Cases - Hernioplasty with glue fixation n (%)	Control - Lichtenstin'sh ernioplasty with sutures n (%)	Total n(%)	χ^2 value and p value
Very happy, no hurt	3 (6)	1 (2)	4 (4)	$\chi^2 = 36.15$ $p = 0.001^*$
Hurts just a little bit	36 (72)	8 (16)	44 (64)	
Hurts a little more	10 (20)	38 (76)	48 (32)	
Hurts even more	1 (2)	3 (6)	4 (4)	
Total	50 (100)	50 (100)	100 (100)	

* Result is significant with $p < 0.05$

Number in parenthesis indicates percentages

The case group has lesser number of patients suffering from moderate pain (20%) compared to control group (76%), and this association is found to be statistically significant.

TABLE NO: 2 COMPARISON OF PAIN BY VISUAL ANALOG SCALE AT POD-3

Categories of pain	Cases - Hernioplasty with glue fixation n (%)	Control - Lichtenstin'shernioplasty with sutures n (%)	Total n(%)	χ^2 value and p value
Very happy, no hurt	18 (36)	6 (12)	24 (24)	$\chi^2 = 22.71$ $p = 0.004^*$
Hurts just a little bit	26 (52)	16 (32)	42 (42)	
Hurts a little more	5 (10)	25 (50)	30 (30)	
Hurts even more	1 (2)	3 (6)	4 (4)	
Total	50 (100)	50 (100)	100 (100)	

* Result is significant with $p < 0.05$

Number in parenthesis indicates percentages

The case group has lesser number of patients suffering from moderate pain (10%) compared to control group (50%), and this association is found to be statistically significant.

TABLE NO: 3 COMPARISON OF PAIN BY VISUAL ANALOG SCALE AT POD-7

Categories of pain	Cases - Hernioplasty with glue fixation n (%)	Control - Lichtenstin'shernioplasty with sutures n (%)	Total n(%)	χ^2 value and p value
Very happy, no hurt	38 (76)	14 (28)	52 (52)	$\chi^2 = 41.38$ $p = 0.001^*$

Hurts just a little bit	11 (22)	33 (66)	44 (44)
Hurts a little more	1 (2)	3 (6)	4 (4)
Hurts even more	0 (0)	0 (0)	0 (0)
Total	50 (100)	50 (100)	100 (100)

* Result is significant with $p < 0.05$

Number in parenthesis indicates percentages

The case group has lesser number of patients suffering from moderate pain compared to control group and this association is found to be statistically significant.

This assessment is done on outpatient basis for some patients as some are discharged prior to 7 days.

TABLE NO: 4 COMPARISON OF PAIN AFTER 15 DAYS

Pain	Cases - Hernioplasty with glue fixation n (%)	Control - Lichtenstin'shernioplasty with sutures n (%)	Total n (%)	χ^2 value and p value
Present	5 [10]	13 [26]	18 [18]	$\chi^2 = 4.336$ $p = 0.037^*$
Absent	45 [90]	37 [74]	82 [82]	
Total	50 [100]	50 [100]	100 [100]	

* result is Significant with $p < 0.05$

Number in parenthesis indicates percentages

The number of patients with pain who underwent hernioplasty with glue fixation is less (10%) when compared to number of patients with pain who underwent Lichtenstin's hernioplasty with sutures (26%) 15 days after surgery. This association is found to be statistically significant.

TABLE NO: 5 COMPARISON OF DURATION OF HOSPITAL STAY

HOSPITAL STAY	Cases - Hernioplasty with glue fixation n (%)	Control - Lichtenstin'shernioplasty with sutures n (%)	Total	χ^2 value and p value
1-3 DAYS	9 [18]	1 [2]	10 (10)	$\chi^2 = 36.46$ $p = 0.001^*$
4-6 DAYS	38 [76]	21 [42]	59 (59)	
7-9 DAYS	3 [6]	28 [56]	31 (31)	
TOTAL	50 [100]	50 [100]	100 (100)	

* Result is significant with $p < 0.05$

Number in parenthesis indicates percentages

TABLE NO: 6 COMPARISON OF MEAN DURATION OF HOSPITAL STAY

	Cases - Hernioplasty with glue fixation		Control - Lichtenstin'shernioplasty with sutures	
Hospital stay in days	Mean	Standard Deviation	Mean	Standard Deviation
	4.82	1.30	6.48	1.39

The mean duration of hospital stay required for the cases is 4.82 ± 1.3 days.

The mean duration of hospital stay required for the controls is 6.48 ± 1.39 days.

There is a significant difference between the time of hospital stay for the two groups.

There is a significant difference in the duration of hospital stay in between these two groups as most of the patients i.e. 47 patients in glue group were discharged before 7 days, while 28 patients in suture group stayed more than 7 days.

DISCUSSION

In our study of comparison between use of N-butyl cyanoacrylate glue versus prolene suture mesh fixation in Lichtenstein hernia repair, we found that out of total 100 patients, 50 in N butyl cyanoacrylate group & 50 in standard prolene suture mesh fixation group, mean age was of 50.88 ± 9.67 years in standard prolene suture group & 44.9 ± 14.3 years in N-butyl cyanoacrylate group.

Patients presented with swelling in the groin with or without pain or only with pain ranging from <6 months to >5 years.

Highest number of patients were in the age group of 40-49 years in N butyl cyanoacrylate group and in the age group of 50-59 years in standard prolene fixation of mesh group.

Hospital stay in cases group was 4.82 days and in control group was 6.48 days

TABLE NO:6 COMPARISON OF DURATION OF HOSPITAL STAY WITH OTHER STUDIES

Ming-gang Wang et al (Mean duration in days)		Kim-Fuchs et al (Mean duration in days)		Campanelli et al (Mean duration in days)		Present study* (Mean duration in days)	
Cases	Controls	Cases	Controls	Cases	Controls	Cases	Controls
3 days	3.5 days	3.35	3.39	< 1 day	< 1 day	4.82	6.48
;Not significant		Not significant		Not significant		Significant difference in hospital stay duration	

There is a significant difference in the duration of hospital stay between the two groups in the present study and when compared to other studies, there are no studies that show significant difference with the glue and suture fixation.

This study highlights the duration of hospital stay in both groups as the results depicts there is less duration of hospital stay in glue group when compared to the suture group.

Other studies like Ming-Gang Wang et al had a mean duration of 3 days in glue group and 3.5 days in suture group and there is no significant difference.

Another study by Kim-Fuchs et al had a mean duration of 3.35 days in glue group and 3.39 days in suture group.

Campanelli et al study had duration of less than 1 day in both glue and suture group as this study was based on laparoscopic hernia repair.

Pain after 1 month was seen only in 5 patients in N butyl cyanoacrylate mesh fixation group and whereas it was more in Standard Prolene Mesh fixation group i.e. 16 patients.

Foreign body sensation is significantly less in cases group.

So, to be said in final words N butyl cyanoacrylate glue Mesh fixation is far superior option to be used in standard Lichtenstein tension free repair for mesh fixation with only cost as hindrance factor.

CONCLUSION

Use of N butyl cyanoacrylate glue for Lichtenstein hernia repair is

more efficacious than regular prolene suture mesh fixation and also has the potential to reduce the post-operative pain and duration of hospital stay. The time taken for the patient to return to daily activities is significantly reduced in n butyl cyanoacrylate group due to reduced hospital stay and less post-operative pain. There is less pain postoperatively in n butyl cyanoacrylate group mesh fixation. Less number of cases of seroma, hematoma and infection in N butyl cyanoacrylate group of mesh fixation Foreign body sensation is less in glue fixation group.

Hence Lichtenstein tension free hernioplasty is always better option if mesh fixation done with N butyl cyanoacrylate when compared with Lichtenstein's tension free hernia repair with standard prolene suture fixation.

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