

Observing Likely Outcomes of Different Closure Techniques in Lichtenstein Hernioplasty at Tertiary Care Institute: A Comparative Study

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Abstract

Introduction: A total of 80% of groin Hernias goes unnoticed in rural India due to social stigma landing into complications and finally into an emergency. With more than 25% of males having this common but complicated disease. Hence in present study we have focused on closure techniques after meshplasty to observe its various aspects.

Methodology: The present study was carried out in the Department of Surgery, at tertiary care institute. Ethical committee approval was taken. In present hospital-based study a sum of 63 individuals were considered, of which 13 patients were drop-outs hence final count was 50. These patients were grouped upon way of hernial closure in which group A was having closure with glue *N*-butyl-2 cyanoacrylate and group B underwent procedure with traditional suturing. For present study 39 males and 11 females were considered.

Observations: After successful pre-anesthetic medical check up Lichtenstein hernioplasty was performed in patients with hernial closure which were grouped as group A was having closure with glue *N*-butyl-2 cyanoacrylate and group B underwent procedure with traditional suturing. In results considering mean duration of surgery, outcome after surgery, pain relief and its duration, analgesics requirement and sensation of foreign body glue techniques used patients were found have more relief as compared to traditionally sutured patients.

Conclusion: Lichtenstein repair for inguinal hernia using glue mesh fixation as compared with conventional method definitely has added advantages and edge above it in terms of outcome and recovery. A benefit of glue mesh fixation is that it is quicker and less uncomfortable. Before the glue approach becomes the accepted standard of care for inguinal hernia repair and longer follow-up times are needed to validate the process. Hence the present study could a stepping stone towards making outcomes of hernial repairs more stress-free and beneficial for patients.

Keywords: Inguinal Hernia, Lichtenstein Repair, Glue Mesh Fixation.

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Introduction

A total of 80% of groin Hernias goes unnoticed in rural India due to social stigma landing into complications and finally into an emergency. With more than 25% of

males having this common but complicated disease.[1]

This Hernia is nothing but 'Protrusion of whole or a part of a viscous through the wall

that contains it' [2]. Numerous diverse types of abdominal wall hernias have been identified. Inguinal Hernias are one of the most communal Hernia found in our society. Inguinal hernia affects both men and women but is much more common in men who were majority operated in past. Repair of an inguinal hernia is one of the most common operations among adults in the western world today. The lifetime risk of undergoing such a repair is 27% for men and 3% for women[3].

Plenty of references could be seen while reviewing the literature for Hernia when ancient scientists wrote about repair and closure of Hernia but the results were usually poor as surgical aptitude was scrappy or even non-existent. Hence majority if the patients didn't received a proper treatment along with the required follow up. During the second half of the 19th century, new era of treating the Hernia was evolved with use of anaesthesia and antiseptic techniques; termed as modern inguinal hernia surgery which actually started in the 1880s, with the anatomical repair presented by Eduardo Bassini in Padua, Italy[4]. Further surgeons have added to these techniques like Shouldice, Marcy, Nyhus buttress, Stoppa, Lichtenstein and so on.[5]

Till time long-term analysis of results of hernia repair focused on post operative pain and recurrence rates. Pain is well-thought-out to be the most important outcome measure of inguinal hernia repair since it is a common and enduring problem for the patient. As the pain is measured to be due to nerve entrapment, the methods used in mesh fixation.[6]

Hence in present study we have focused on closure techniques after meshplasty to see its effect on operation time, the time to return to work, post-operative pain and healthier recovery in patients by using traditional suturing and glue technique using *N*-butyl-2 cyanoacrylate glue.

Methodology

The present study was carried out in the Department of Surgery, at tertiary care institute. Ethical committee approval for the study was obtained from the Institutional Ethical Committee. Present study is a observational hospital based prospective study.

In present hospital-based study a sum of 63 individuals were considered, of which nearly 13 patients were not available for complete study. Hence finally a total of 50 patients were considered. These patients were grouped upon way of hernial closure in which group A was having closure with glue *N*-butyl-2 cyanoacrylate and group B underwent procedure with traditional suturing. For present study 39 males and 11 females were considered.

Written and informed consent was obtained from each participant over a consent form. Initially detailed history was taken from each participant of the study as per standard operating procedures of the study. All individuals were screened, and inclusion criteria were young adults with no history of other systemic diseases, normal neurological examination and normal laboratory findings including blood sugar level, electrolytes and renal function was considered.

Then patients pre anesthetic medical procedure was performed and patients were entitled fit for surgery. In fit patients of Lichtenstein hernioplasty was performed using cyanoacrylate glue or non-absorbable sutures for mesh fixation. After recovery of patients by anaesthesia study parameters like pain index, pain while walking, need of analgesics, the duration of operation, wound complications, duration of early and late chronic pain were recorded on day 1, 7, 30, 90 and 180 as per the study protocol.

The data was collected in Microsoft office excel 2021. Statistical analysis was done by descriptive and inferential statistics to compare between groups, and paired T test was used for in-house comparison among cases to assess the different parameters by

using graph pad prism 8.0 and Epi info online 7. $P < 0.05$ was considered as statistically significant.

Observations & Results:

Present study was conducted in the Department of Surgery, at tertiary care institute of Vidarbha region Maharashtra state. After successful pre anesthetic medical check up Lichtenstein hernioplasty was performed in patients with hernial closure which were grouped as group A

was having closure with glue *N*-butyl-2 cyanoacrylate and group B underwent procedure with traditional suturing. For this closure procedure patients were randomly selected by lottery method and results were obtained.

In this table patient's demographic data is portrayed in terms of their age, height, weight and BMI amongst both the groups with no statistical significance ($p > 0.05$)

Table 1: Demographic distribution.

Parameters	Group A (N=25) mean \pm SD	Group B (N=25) mean \pm SD
Male	19	20
Female	6	5
Age (Years)	32.55 \pm 2.58	43.67 \pm 4.77
Height (cms)	164.10 \pm 7.13	165.30 \pm 8.00
Weight (kgs)	69.94 \pm 9.07	68.48 \pm 7.68
BMI (Kg/m ²)	26.04 \pm 3.87	25.06 \pm 2.30

Considering the time required for surgery as depicted in table given below

Table 2: Mean duration of surgery in minutes

	Group A	Group B
Duration of surgery (min)	54.3 \pm 9.6	82.5 \pm 14.9

The mean duration of surgery in Group A (Glue fixation of mesh) was 54.3 min with standard deviation of 9.6, while mean duration of surgery in group B (suture fixation of mesh) was 82.5 min with standard deviation of 14.9. This difference is statistically significant ($p < 0.05$).

Considering wound complications in patients during post-surgical period majority of the patients were having infections and hematoma in traditionally sutured patients as compared with glue techniques with significant results on day 7 with $p < 0.05$ as depicted in table 3.

Table 3: outcome of surgery in both the groups

Wound	Day 1		Day 7		Day 30		Day 90	
	Grp A	Grp B	Grp A	Grp B	Grp A	Grp B	Grp A	Grp B
Infection(i)	0	2	0	4	0	0	0	0
Hematoma(h)	0	0	0	2	0	1	0	0
Seroma(s)	1	0	0	0	0	0	0	0

Number of cases with complication There were 1 seroma on Day 1 in Group A, while Group B has 2 cases of wound infection.

While considering the pain score majority of patients were having obvious pain on day 1 which has started subsiding by day 7 with

significant differences amongst both the groups. The results on day 30 were also significant finding more relief in glue used patients as compared to traditionally sutured one whose results are depicted in table 4.

Table 4: Pain score in patients in post operative period.

Pain score	Group A	Group B
Day 1	3.48 ± 1.3	5.11 ± 1.96
Day 7	2.38 ± 1.01	4.01 ± 1.31
Day 30	0.93 ± 0.57	1.48 ± 0.70

While considering period required by patients for pain free walking following results were made as depicted in table 5

Table 5: Pain free walking period required by patients.

	Group A	Group B
Pain free walking (days)	3.39 ± 1.21	5.38 ± 1.67

The Number of days after surgery patient could walk without pain in Group A (Glue fixation of mesh) was 3.39 days with standard deviation of 1.21, while The Number of days after surgery patient could walk without pain in Group B (suture fixation of mesh) was 5.38 days with standard deviation of 1.67. This difference

is statistically significant ($p < 0.001$) anticipating more relief in patients when glue was used for surgical closure.

When 1 month follow-up of the patients was recorded for pain free walk Group B patients were more relieved than group B patients as depicted in table 6

Table 6: Pain free walking by the end of 1 month.

Pain free walking	Group A	Group B
Yes	24	20
No	1	5
total	25	25

In Group A of total 25 patients 24 i.e., 96% could walk without pain at 1 month. While in group B of total 25 patients 20 i.e., 80% could walk without pain at 1 month. While considering need of analgesia maximum patient needed the dose till 10

post operative days within a peak in first week of post operative period with statistically significant difference at 7th post operative day in both the groups as depicted in table 7.

Table 7: Analgesics required in post operative period for patients.

Pain score		Group A	Group B
Day 1	Required	25	25
	Not-required	0	0
Day 7	Required	13	19
	Not-required	12	6
Day 30	Required	1	2
	Not-required	24	23
Day 90	Required	0	0
	Not-required	25	25

Considering the sensation of foreign body at surgical site following observations were made as depicted in Table 8:

Table 8: Sensation of foreign body in post-operative period.

Duration	Sensation of foreign body	Group A	Group B
7 days	Yes	24	23
	No	1	2
30 days	Yes	15	19
	No	10	6
90 days	Yes	9	12
	No	16	13
180 days	Yes	4	7
	No	21	18

In Group A 9 patient i.e., 16% had sensation of foreign body. While in Group B 15 patients i.e., 28% had sensation of foreign body at 6 months.

Discussion

Hernia is a disease of rural and urban societies of India. Especially inguinal hernioplasty is a sprouting surgical resolution to a very societal issue and bread-butter of a surgeon. Patients coming for surgeries mostly think about early, painless and comparatively cheaper recovery. It also focuses on its future goals in short- and long-term time domains so that patient could return to its day today life as soon as possible. [7]

Hence, we have designed present study to emphasize the outcomes, duration of surgery and the time of return to normal activity for patients who underwent a mesh procedure for open groin hernia repair with sutures or *N*-butyl-2 cyanoacrylate for mesh fixation. For this we had taken follow up of patients on day 1, day 7, 1 month, 3- and 6-months post operatively. 80% patients completed 6 month follow up out of total enrolled population.

Of the total 50 patients enrolled in the study all the patients in both groups were male. The mean duration of surgery in glue group was 54.3 min with SD 9.6 while in suture group the mean surgery time was 82.5 min with SD 14.9. The difference is significant ($p < 0.05$). The study done by H. Paajnen[8] showed that Surgery took 2-4 minutes less time in the glue group, but the difference was not statistically significant. While a Meta-analysis of glue versus sutured mesh fixation for the repair of Lichtenstein inguinal hernias revealed that glue mesh

fixation resulted in a shorter mean difference in operation time.[9]

The mean VAS pain score on post operative Day 1 in glue group was 3.48 with standard deviation of 1.3, while in suture group mean score was 5.11 days with standard deviation of 1.96

The pain scores at day 7, 3 month and 6 month for glue group when compared with the suture group was less. The difference was more at day 7 favoring glue method. Differences were significant. These results are similar to the results of Haroon M[10] and Sun P [11] both showed that early post operative pain with use of glue was less as compared with suture. The pain score at 1 year was also in favour of glue group. Thus, the reduction in early chronic pain through mesh fixation with cyanoacrylate glue appears more relevant than late chronic pain.

Our study showed that the need of analgesic postoperatively was less in the glue group. Of total 25 patients in glue group 52% at day 7 and 0% at 3 month needed analgesic while in the suture group 76% patients at day 7 and 9% at 3 month needed analgesic.

The sensation of foreign body was enquired at 1 month and 6th month. In group A 60% patients at 1 month and 16% at 6 months reported foreign body sensation. In group B 76% at 1 month and 28% at 6 months reported this. Though the sensation of foreign body is mainly a function of mesh[12], we still observed difference in both groups. Glue fixation may affect

sensation of foreign body by being thin film on application and avoiding bulky non-absorbable suture knots similar findings were seen by Schwab R.[12]

Pain free walking was taken as a measure to resume to normal daily activity. Return to normal activity is important from the patient's perspective as the major chunk of patients belongs to the working age group. This parameter also favoured glue group as Glue group had pain free walking after mean 3.39 days SD 1.21 while at 1 month 96% patients would walk without pain. Suture group could walk without pain after mean 5.38 days SD 1.67 and at 1 month only 80% patients could walk without pain. S Phoa also observed similar results stating that glue could be used more efficiently than traditional sutures. [13]

H. Paajanen [8] showed that there glue group had 3.4% wound infection which was more than double of wound infection seen in the suture group (1.4%). But in our study we found that in glue group only one patient i.e. 4% had wound complication (seroma). Suture group had 4 i.e. 16 % patients with wound complications (wound infection) none of the patients were re-operated for evacuation of seroma or debridement nor needed mesh removal for persistent infection. The infections were controlled by daily dressing and oral antibiotics. The seroma was aspirated and dressed accordingly. Similar findings related to post operative surgical complications were seen by Techapongsatorn S [14]

As with all other studies reviewed [9, 10] the recurrence rate in the both group were comparable. None of the patients had recurrence in both groups.

The cost-benefit analysis of using adhesive is another crucial factor. The fact that medical adhesive is more expensive than suture may impede its widespread adoption. The research we reviewed and our own did not take this into account. Although the cost of glue might be offset by a quicker recovery from surgery, a quicker return to

normal activities, and less analgesic usage, more research is required to confirm this. Alabi A supports findings of present study [14, 15]

Hence findings of present study suggested that glue method of mesh fixation in inguinal hernia repair is chosen over suture method of fixation.

Present study Comparative Study of N-butyl-2-cynoacrylate versus Conventional Method of Mesh Fixation in Inguinal Hernia Repair was conducted in tertiary care institute of Vidarbha region of Maharashtra state, on completion of our study and after evaluation of results and observations following conclusions were drawn.

Although the duration of surgery is significantly reduced when glue is used for mesh fixation. Secondly along with lesser need of analgesics in glue technique. The difference in analgesic requirement and pain score at day 7, one month, and three months was quite substantial and favoured the glue approach at day 7, the difference was greater. Therefore, the patient experienced less acute postoperative pain and early chronic pain.

The use of glue in mesh fixation has resulted in early pain-free walking and decreased sensation of a foreign body, which can assist patients in quickly returning to their regular daily activities. Finally wound issues are another factor that could postpone returning to regular activity and, consequently, to employment. Comparing the suture approach to the use of adhesive to fix mesh, wound complications were found to be lower.

Conclusion

Thus, we conclude Lichtenstein repair for inguinal hernia using glue mesh fixation as compared with conventional method definitely has added advantages and edge above it in terms of outcome and recovery.

A benefit of glue mesh fixation is that it is quicker, less uncomfortable, and has a similar rate of hernia recurrence. Before the glue approach becomes the accepted standard of care for inguinal hernia repair, further multicentric and randomised studies with larger patient populations and longer follow-up times are needed to validate the process. Hence the present study could a stepping stone towards making outcomes of hernial repairs more stress-free and beneficial for patients specially belonging to Rural area.

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