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A COMPARATIVE STUDY OF SUTURE MESH FIXATION VERSUS N-BUTYL CYANOACRYLATE GLUE MESH FIXATION IN LICHTENSTEIN TENSION-FREE INGUINAL HERNIOPLASTY.

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Abstract

Background: Inguinal hernias are frequently encountered. When not treated may lead to complications like obstruction and strangulation. ***AIM:*** To evaluate and compare the effectiveness of suture mesh fixation and N-butyl cyanoacrylate glue mesh fixation in open inguinal hernia repair by assessing postoperative pain during the early postoperative period (up to 48 hours), late postoperative period (48 hours to 1 month), and chronic groin pain (persisting beyond 3 months). ***METHODOLOGY:*** The present study was a single-center, prospective randomized, controlled two group study. It compares post-operative outcomes of mesh fixation with suture versus glue. It was conducted on patients admitted with the diagnosis of inguinal hernia. ***RESULT:*** The majority of patients in both groups were aged 40–59 years and had a swelling duration of less than 6 months. Glue mesh fixation was associated with significantly shorter mesh fixation time and lower postoperative and chronic groin pain, while postoperative complications, hospital stay, and recurrence rates were comparable between the two groups, with no recurrence observed during the 9-month follow-up. ***CONCLUSION:*** N-butyl cyanoacrylate glue mesh fixation is a safe and effective alternative to suture fixation, offering the advantages of reduced operative time and decreased postoperative and chronic groin pain without increasing complications or recurrence.

Keywords: Inguinal hernia, Lichtenstein tension-free hernioplasty, N-butyl cyanoacrylate glue mesh fixation.

INTRODUCTION

Inguinal hernias are frequently encountered. When not treated may lead to complications like obstruction and strangulation. Hernia and its treatment has fascinated surgeons of all latitudes throughout the years of recorded medical history.1 It is defined as a protrusion of a viscous or a part of a viscous into the inguinal canal either through a deep ring or through Hesselbach's triangle. Every surgical technique needs to be studied, its merits and demerits assessed; so that the patients in future may undergo only the best of the procedures. Thus research into newer techniques helps in improving the morbidity and mortality associated with the older standardized technique2,3.

As Surgeons we need to reinvent ourselves everyday so that the patient will gain maximum benefit from our efforts4. The surgical treatment of inguinal hernias has evolved through several stages to reach a modern and successful era. It has been said that the history of groin hernia is the history of surgery itself. Since the time Bassini described his technique the search for an Ideal Inguinal Hernia repair is still on5,6. An ideal hernia repair should be Tension free, Tissue based, with no potential damage to vital structures, no Long Term pain or complications and no recurrence. Inguinal hernia repair is one of the most common operations performed in general surgery. Chronic inguinal pain occurs in 16% to 60% patients postoperatively. Irrespective of its mild intensity, it substantially affects the quality of life of the patient.7 Even in the laparoscopic era, due to the long and complex learning curve of laparoscopic hernia repair, open Lichtenstein tension free hernioplasty is accepted as the gold standard in inguinal hernia repair in modern era.

Lichtenstein hernioplasty, is a widely accepted technique for open repair of inguinal hernia due to its safety, efficacy, and low recurrence rates. Despite the success of Lichtenstein hernioplasty in the management of inguinal hernia, the occurrence and handling of chronic groin pain has posed a significant challenge to surgeons5,8. The reported incidence of CGP varies from 0.7% to 62.9% in the medical literature. Thus, objective of this study was to systematic analysis the randomized,

controlled trials comparing suture mesh fixation (SMF) versus glue mesh fixation (GMF) in open inguinal hernia repair with regards to chronic groin pain, recurrence, mesh fixation time, post operative pain and postoperative complications.

AIM

To evaluate and compare the effectiveness of suture mesh fixation and N-butyl cyanoacrylate glue mesh fixation in open inguinal hernia repair by assessing postoperative pain during the early postoperative period (up to 48 hours), late postoperative period (48 hours to 1 month), and chronic groin pain (persisting beyond 3 months).

MATERIALS AND METHODS

The present study was a single-centre, prospective randomized, controlled two group study. It compares post-operative outcomes of mesh fixation with suture versus glue. It was conducted on patients admitted with the diagnosis of inguinal hernia. The present study was done at 1 july 2025 from 30 june 2026 for case study and follow up for 9 months till Jiet medical college and hospital jodhpur. All the cases of inguinal hernia attending the surgical OPD in SSG hospital and full fill inclusion criteria given below are enrolled in this study. Patients above 18 years of age operated by the open Lichtenstein method of hernia repair will be included in the study. Excluded patients were Age <18 years , All patients operated for herniao ther than Lichtenstein repair, Patients operated on emergency basis ,Recurrent hernia , Patient not giving consent and Patient not fit for anaesthesia.

RESULTS

Table 1: Group wise comparison of Mean age

Age in Years	Group A (n=45)		Group B (n=45)		Total (n=90)	
	n	%	n	%	N	%
20-39	8	17.8%	12	26.7%	20	22.2%
40-59	22	48.9	19	42.2%	41	45.6%
≥60	15	33.3	14	31.1%	29	32.2%

The majority of patients in both groups belonged to the 40–59 years age group, accounting for 48.9% of Group A and 42.2% of Group B, followed by patients aged ≥60 years (33.3% and 31.1%, respectively). Patients aged 20–39 years constituted the smallest proportion, with 17.8% in Group A and 26.7% in Group B.

Table 2: Mean duration of swelling

Duration of Swelling	Group A (n=45)		Group B (n=45)		Total (n=90)	
	n	%	n	%	N	%
< 6 Months	32	71.1%	30	66.7%	62	68.9%
6-12 Months	8	17.8%	9	20.0%	17	18.9%
13-24 Months	2	4.4%	4	8.9%	6	6.7%
>24 Months	3	6.7%	2	4.4%	5	5.6%

The majority of patients in both groups had a duration of swelling of less than 6 months, accounting for 71.1% in Group A and 66.7% in Group B. Smaller proportions of patients had swelling for 6–12 months, 13–24 months, and more than 24 months.

Table 3: Distribution according to time taken for fixation of Mesh

Time Taken forMesh Fixation	Group A (n=45)		Group B (n=45)		Total (n=90)	
	n	%	n	%	n	%
Less than 5 min.	6	13.3%	10	22.2%	16	17.8%
5-10 min.	21	46.7%	27	60.0%	48	53.3%
10-15 min.	6	13.3%	8	17.8%	14	15.6%
15-20 min.	12	26.7%	0	0.0%	12	13.3%

In group A, time taken for fixation of mesh was less than 5 minutes in 13.3% participants; 5-10 minutes in 46.7% participants; 10-15 minutes in 13.3% participants and 15-20 minutes in 26.7% participants. In group B, time taken for fixation of mesh was less than 5 min in 22.2% participants; 5-10 min in 60.0% participants; 10-15 min in 17.5% participants. No participant in group B took a longer time in the range of 15-20 min.

Table 4: Distribution according to Postop Complications till 15 days

Groups	**Group A (n=45)**		**Group B (n=45)**		**Total (n=90)**	
Postop Complications	***n***	***%***	***n***	***%***	***n***	***%***
No Complication	29	64.4%	34	75.6%	63	70.0%
Scrotal oedema	9	20.0%	7	15.6%	16	17.8%
Seroma	5	11.1%	4	8.9%	9	10.0%
Wound infection	2	4.4%	0	0.0%	2	2.2%

In Group A, 20.0% participants developed scrotal oedema; 11.1 % participants developed seroma and 4.4% participants developed wound infection.

In Group B, 15.6 % participants developed scrotal oedema;8.9 % participants developed seroma and no participant developed wound infection.

Table 5: Comparison of mean Postop Hospital Stay in two groups

Post-operative hospital stay	**Group A (n=45)**		**Group B (n=45)**		**Total (n=90)**	
	n	**%**	**n**	**%**	**N**	**%**
Upto 48 hours	4	8.9%	5	11.1%	9	10.0%
2-3 days	25	55.6%	31	68.9%	56	62.2%
4-5 days	2	4.4%	0	0.0%	2	2.2%
6-7 days	14	31.1%	9	20.0%	23	25.6%

The majority of patients in both groups had a post-operative hospital stay of 2–3 days, accounting for 55.6% in Group A and 68.9% in Group B. A smaller proportion required hospitalization for 6–7 days, while only a few patients stayed up to 48 hours or 4–5 days.

Table 6: Comparison of chronic groin pain at 3 months

	Group A n=39		**Group B n=41**		**Total n=80**	
	n	**%**	**n**	**%**	**n**	**%**
Chronic groin pain present	16	41.0%	5	12.2%	21	26.3%
Chronic groin pain absent	23	59.0%	36	87.8%	59	73.7%

Chronic groin pain was present in 41.0% of patients in Group A compared with 12.2% in Group B, while the majority of patients in both groups remained free of chronic groin pain (59.0% and 87.8%, respectively).

Table 7: Distribution according to loss to follow up

	Group A	**Group B**
At 2nd day	0	0
At 7th day	0	0
At 15th day	0	0
At 1 month	0	0
At 3 month	6	4
At 6 months	7	5
At 9 months	11	9

No patients were lost to follow-up up to the 1-month assessment in either group. Loss to follow-up was observed from the 3-month visit onwards, with 6, 7, and 11 patients in Group A and 4, 5, and 9 patients in Group B at the 3-, 6-, and 9-month follow-up visits, respectively.

Table 8: Recurrence at 9 months of follow up

	Group A (n=34)	Group B (n=36)
Recurrence	0	0

No recurrence of inguinal hernia was observed among the patients who completed follow-up in either Group A (n=34) or Group B (n=36). This indicates that both suture mesh fixation and N-butyl cyanoacrylate glue mesh fixation were associated with no recurrence during the study follow-up period.

DISCUSSION

In our study The majority of patients in both groups belonged to the 40–59 years age group, comprising 22 (48.9%) patients in Group A and 19 (42.2%) patients in Group B. Patients aged ≥60 years constituted 15 (33.3%) in Group A and 14 (31.1%) in Group B. The 20–39 years age group included 8 (17.8%) patients in Group A and 12 (26.7%) patients in Group B. Tebula et al9 found that mean age in group A(suture mesh fixation) was 42.4±12.0 years while in group B (glue mesh fixation) was 47.6±12.3 years with p = 0.370, which was not statistically significant.

In our study the majority of patients in both groups had a duration of swelling of less than 6 months, accounting for 32 (71.1%) patients in Group A and 30 (66.7%) patients in Group B. A duration of 6–12 months was observed in 8 (17.8%) patients in Group A and 9 (20.0%) patients in Group B. Swelling lasting 13–24 months was noted in 2 (4.4%) patients in Group A and 4 (8.9%) patients in Group B, while swelling for more than 24 months was present in 3 (6.7%) and 2 (4.4%) patients, respectively.

The majority of patients in both groups required 5–10 minutes for mesh fixation, accounting for 21 (46.7%) patients in Group A and 27 (60.0%) patients in Group B. Less than 5 minutes was required in 6 (13.3%) patients in Group A and 10 (22.2%) patients in Group B, while 10–15 minutes was required in 6 (13.3%) and 8 (17.8%) patients, respectively. A fixation time of 15–20 minutes was observed only in Group A, involving 12 (26.7%) patients, whereas no patient in Group B required this duration. Campanelli et al10 for operation time from skin incision to skin closure, following the use of suture mesh fixation (SMF) and glue mesh fixation (GMF) in open inguinal hernia repair and these all studies shown intra operative time in minutes for complete the whole operation.

In present study, the majority had no postoperative complications, accounting for 29 (64.4%) patients in Group A and 34 (75.6%) patients in Group B. Scrotal oedema was the most common complication, occurring in 9 (20.0%) patients in Group A and 7 (15.6%) patients in Group B. Seroma developed in 5 (11.1%) patients in Group A and 4 (8.9%) patients in Group B. Wound infection was observed only in Group A, affecting 2 (4.4%) patients, while no case was reported in Group B. Jenaw R.K., et al11 found incidence of seroma formation in group A(n=40) was 8 and in group B(n=40) was 2 which was statistically significant. (p=0.043) Tab. Cefadroxyl 500mg 12 hourly for 7 days given in Seroma patients with drainage of Seroma through the suture site and advice to follow up after 7 days. Seroma resolved in 7 days and no more antibiotics were required in these patients. Paajanenet al12 observed the incidence of scrotal edema in Group A (n=151) was 8 and in Group B (n=151) was 4 with P value of 0.70, which was statistically not significant.In the study of Jeroukhimov et al13, incidence of wound infection in group A(n=92) was 1 and in group B(n=92) was 2 with p value of 0.561, which was statistically not significant.

In present study patients in both groups were discharged within 2–3 days after surgery, accounting for 25 (55.6%) patients in Group A and 31 (68.9%) patients in Group B. Hospital stay of up to 48 hours was observed in 4 (8.9%) patients in Group A and 5 (11.1%) patients in Group B. A stay of 4–5 days was noted only in Group A, involving 2 (4.4%) patients, whereas no patient in Group B required this duration. Hospitalization for 6–7 days was required in 14 (31.1%) patients in Group A and 9 (20.0%) patients in Group B.

Chronic groin pain was present in 16 (41.0%) patients in Group A compared with 5 (12.2%) patients in Group B. The majority of patients were free from chronic groin pain, accounting for 23 (59.0%) patients in Group A and 36 (87.8%) patients in Group B. Overall, chronic groin pain was observed in 21 (26.3%) of the 80 patients who completed follow-up, while 59 (73.7%) patients had no chronic groin pain. Lionetti et al14 found the incidence of chronic pain in Group A(n=72) was 6 and in Group B(n=72) it was 0, with p value <0.001 which was statistically significant.

No patient in either group was lost to follow-up at the 2nd day, 7th day, 15th day, or 1-month assessment. Loss to follow-up began at the 3-month visit, involving 6 patients in Group A and 4 patients in Group B. At the 6-month follow-up, the number of patients lost increased to 7 in Group A and 5 in Group B. By the 9-month follow-up, 11 patients in Group A and 9 patients in Group B were lost to follow-up.

No case of recurrence was observed in either Group A (n=34) or Group B (n=36) during the follow-up period. Thus, the recurrence rate was 0% in both study groups. These findings indicate that both suture mesh fixation and N-butyl cyanoacrylate glue mesh fixation were equally effective in preventing hernia recurrence during the study period. The absence of recurrence suggests satisfactory surgical outcomes with both fixation techniques. Jenaw R.K., et al11 found the incidence of recurrence in Group A(n=40) was 3 and in Group B(n=40) it was 2, which was statistically significant.

CONCLUSION

The present study compared suture mesh fixation with N-butyl cyanoacrylate glue mesh fixation in Lichtenstein tension-free inguinal hernioplasty. Glue mesh fixation was associated with a significantly shorter mesh fixation time and lower postoperative pain scores during the early postoperative period. The incidence of chronic groin pain at 3 months was also significantly lower in the glue fixation group. Postoperative complications, including seroma, scrotal oedema, and wound infection, were comparable between the two groups and did not differ significantly. No recurrence was observed in either group during the 9-month follow-up period. Overall, N-butyl cyanoacrylate glue mesh fixation appears to be a safe and effective alternative to suture fixation, offering the advantages of reduced operative time and decreased postoperative and chronic groin pain without increasing complications or recurrence.

REFERENCES

1. N. Ladwa et al. / International Journal of Surgery 11 (2013) 128e135
2. Hidalgo M, Castillo MJ, Eymar JL, Hidalgo A. Lichtenstein inguinal hernioplasty:sutures versus glue. Hernia 2005;9:242e4.
3. Mui WL, Ng CS, Fung TM, et al. Prophylactic ilioinguinal neurectomy in open inguinal hernia repair: a double-blind randomized controlled trial. Ann Surg 2006;244:27e33.
4. Aasvang E, Kehlet H. Surgical management of chronic pain after inguinal hernia repair. Br J Surg 2005;92:795e801.
5. O'Dwyer PJ, Alani A, McConnachie A. Groin hernia repair: postherniorrhaphy pain. World J Surg 2005;29:1062e1065.
6. Giampierocampanelli, dieggopettinari: inguinal hernia recurrence: classification and approach ,j min access surgery .2006:2(3):147-150
7. Skandalakis J, Colborn G. Skandalakis' Surgical anatomy. Athens, Greece: PMP; 2004.
8. Fischer JE. Introduction to Hernia Section. 5th ed. In: Mastery of Surgery, Skandalakies JE, Skandalakies LJ, Celtrom GL, Androulakis J, McClusky DA III, Skandalakies PN, et al. Lippincott: Williams & Wilkins; 2007. pp. 1857-59
9. Tebula et al (2015) Cynoacylate glue v/s suture fixation of mesh in inguinal hernia open repair: A randomized controlled clinical trial. Gastroenterol Hepatol Open Access 2(5):00054.DOI:10.15406/ghoa.2015.02.00054
10. Campanelli G, Pascual MH, Hoeferlin A, Rosenberg J, Champault G, Kingsnorth A, et al. Randomized, controlled, blinded trial of Tisseel/Tissucol for mesh fixation in patients
11. undergoing Lichtenstein technique for primary inguinal hernia repair: results of the TIMELI trial. Ann Surg 2012 Apr;255(4):650e7.
12. Jenaw R.K., et al Comparative Study between Monofilament Absorbable vs Non-Absorbable Sutures for Mesh Fixation in Lichtenstein's Hernia Repair. "The Antiseptic" Vol. 114 No. 7 & P: 27 – 31
13. Paajanen H. Do absorbable mesh sutures cause less chronic pain than nonabsorbable sutures after Lichtenstein inguinal herniorraphy? Hernia 2002;6:26e28.
14. Jeroukhimov Igor, Wiser Itay,etal. Reduced pain after tension free inguinal hernia repair using absorbable sutures: A single blind randomized clinical trial, J Am Coll Surg2014 ;218:102-107.
15. Lionetti R, Neola B, Dilillo S, et al. Sutureless hernioplasty with light-weight mesh and fibrin glue versus Lichtenstein procedure: a comparison of outcomes focusing on chronic postoperative pain. Hernia 2012;16:127e131.