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ORIGINAL STUDY

STUDY ON COMPARISON OF POST OPERATIVE PAIN IN MESH HERNIOPLASTY WITH GLUE VERSUS PROLENE SUTURE FOR MESH FIXATION

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Abstract

Hernia is an abnormal protrusion of whole or part of a viscus or tissue through normal or abnormal opening in the walls of its containing cavity (1). Inguinal hernia repair is one of the most common procedures in general surgical practices, and different types of repair have been described. In 1889, Bassini came up with the idea of "triple layer" tissue repair for inguinal hernias, which was associated with recurrence. In 1986, Lichtenstein described a tension-free inguinal hernia repair with mesh. Cyanoacrylate adhesives were first used for wound closure in 1959 and are now becoming a common treatment choice in many accident and emergency situations (20). Cyanoacrylates have the same tensile strength as absorbable sutures for closing wounds in the skin, and they can adhere to most tissue surfaces (21).

Introduction

Postoperative inguinal pain is arguably the most important and patient-centered outcome of inguinal hernia repair [1]. Pain is a dreaded long-term complication for patients and likely more so than recurrences and reoperations. However, it is still an area of research that is inadequately understood [2–4], and pain continues to present complicated diagnostic and therapeutic challenges [5–7].

The exact extent of the problem—i.e., the rate of chronic pain after inguinal hernia repair—is unclear. The rates conventionally reported in the literature vary considerably, and some sources report rates from 0% to 37% [8]. This large variation can likely be explained by

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several factors: studies use different definitions of chronic pain, different means of measurement, and different times of follow-up [4, 8, 9]. In addition, the leading studies in the field are older and possibly outdated, and these highly cited studies may not adequately reflect the ongoing advances in surgical practice in recent years, and a significant decrease in the occurrence of chronic pain may be expected. The recent advances in hernia surgery include an increased specialisation and development of certified hernia centres, more focus on training and recognition of specialist hernia surgeons [10, 11], advances in surgical device development including mesh technology, and a growing scientific focus on hernia research [12]. However, despite these developments, older and likely outdated chronic pain rates are still frequently repeated in the literature and are also communicated to patients preoperatively.

We have compared pain after inguinal hernia repair. In this review, we wanted to substantiate this claim through a critical appraisal of highly cited studies in the field and provide a discussion of its implications.

1. Kehlet, H. Chronic Pain after Groin Hernia Repair. *Br J Surg* (2008) 95:135–6.

2. Kehlet, H, Jensen, TS, and Woolf, CJ. Persistent Postsurgical Pain: Risk Factors and Prevention. *Lancet* (2006) 367:1618–25.

3. Campanelli, G Chronic Pain After Inguinal Hernia Repair is a Real Risk and a Major Issue. *Hernia* (2022) 26:1.

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6. Alfieri, S, Amid, PK, Campanelli, G, Izard, G, Kehlet, H, Wijsmuller, AR, et al. International Guidelines for Prevention and Management of post-operative Chronic Pain Following Inguinal Hernia Surgery. *Hernia* (2011) 15:239–49

7. Andresen, K, and Rosenberg, J. Management of Chronic Pain after Hernia Repair. *J Pain Res* (2018) 11:675–81.

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8. Kehlet, H, Bay-Nielsen, M, and Kingsnorth, A. Chronic Postherniorrhaphy Pain – a Call for Uniform Assessment. *Hernia* (2002) 6:178–81.

9. Molegraaf, M, Lange, J, and Wijsmuller, A. Uniformity of Chronic Pain Assessment after Inguinal Hernia Repair: a Critical Review of the Literature. *Eur Surg Res* (2017) 58:1–19.

10. Köckerling, F, Sheen, AJ, Berrevoet, F, Campanelli, G, Cuccurullo, D, Fortelny, R, et al. Accreditation and Certification Requirements for Hernia Centers and Surgeons: the ACCESS Project. *Hernia* (2019) 23:185–203.

11. Shulkin, JM, Mellia, JA, Patel, V, Naga, HI, Morris, MP, Christopher, A, et al. Characterizing Hernia Centers in the United States: what Defines a Hernia center? *Hernia* (2022) 26:251–7.

12. Rosenberg, J. Growing Focus on Hernia Surgery. *Laparosc Surg* (2020) 4:35.

OPERATIVE TECHNIQUE

Skin was prepared with a 10% betadine solution. An incision was made, and the subcutaneous layer was opened. The external oblique aponeurosis (EOA) was exposed and opened in the line of incision. Space was created by dissecting beneath the medial and lateral flaps of the EOA and then down the inguinal ligament, clearing its shelving edge to the pubic tubercle. Direct hernia sacs were inverted with polypropylene 2-0 sutures. In indirect hernias, the sac was dissected from the spermatic cord, divided, transfixed with 2-0 silk, and the distal part was excised. A sheet of prolene mesh measuring 3" by 6" was cut to shape and laid over the posterior wall of the inguinal canal so that it covered the pubic tubercle by at least 2 cm medially, extended superiorly to lay over the conjoint tendon, and extended to a point at least 6 cm beyond the deep inguinal ring and was fixed.

GROUP A- 1 ml of cyanoacrylate glue was applied to fix the prolene mesh. Glue was applied all over the mesh, with major attention given to the pubic

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tubercle, conjoined tendon, internal oblique aponeurosis, inguinal ligament, and crossed tails of the mesh.

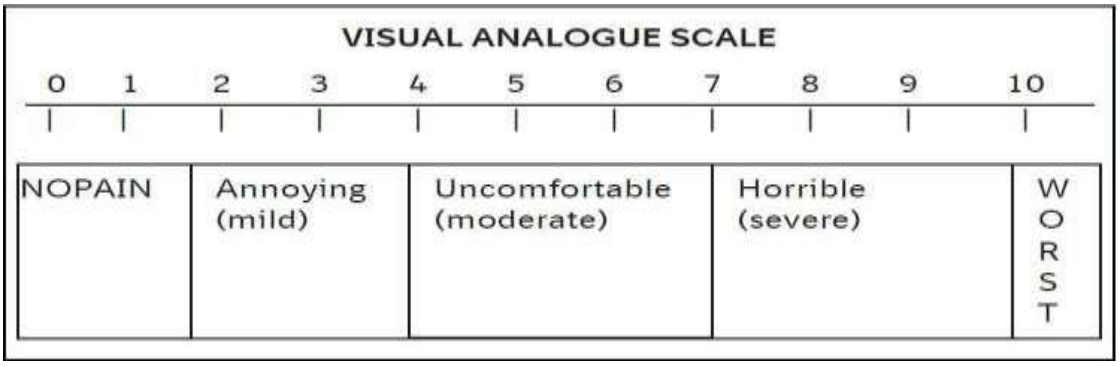
GROUP B- The mesh was fixed to the pubic tubercle, inguinal ligament, conjoint tendon, and internal oblique aponeurosis and at the crossed tail of the mesh using 3-0 prolene sutures.

The spermatic cord was passed through a slit in the mesh. EOA was sutured with Vicryl No. 2. Skin closure was done using interrupted nylon 2-0 sutures, which were removed after 7 days.

The mesh fixation time was noted using international norms of calculation.

Postoperative analysis was made in terms of postoperative pain, wound infections, seroma formation, haemorrhage formation, scrotal edema, hospital stay, cost effectiveness, foreign body sensation, recurrence, mesh displacement, and numbness.

For pain, a visual analogue scale was used.



Patients in both groups were post-operatively administered with anti-biotics for total duration of five days. Diclofenac sodium (50 mg twice a day) as an analgesic was prescribed for total duration of five days. All patients were kept in general surgery ward post-operatively for minimum period of 24 hours and was discharged after clinical assessment.

Follow-up

The patients were followed for 3 months for any late complication like chronic pain and recurrence.

Surgical Adhesives are becoming more important in clinical settings because they reduce the risk of needle-stick injuries to surgeons, shorten surgery times,

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reduce patient blood loss, reduce surgical complications and infections, and don't need removal after surgery (15). An adhesive exhibits characteristics that allow for in situ polymerization, making it adhere tissue-to- tissue or tissue-to-non-tissue surfaces (16). The tissue adhesives used specifically in hernia repair have been fibrins (of biological origin) and cyanoacrylates (of synthetic origin) (17).

There has been a renewed interest in tissue adhesives because of the benefits of using them and the fact that their uses have grown in the field of surgery. For example, tissue adhesives are used to fix prosthetic materials in hernia surgery (18). Their use has been reported to result in better comfort and less postoperative pain after hernioplasty using tissue adhesives to fix the mesh (19).

OBSERVATIONS AND RESULTS

The study was conducted at the general surgery department of G.G.S. medical college and hospital, Faridkot, Punjab. The comparative study was done between two groups on the use of cyanoacrylate glue and prolene suture for mesh fixation in mesh inguinal hernioplasty. The study included 60 patients who were divided into two groups of 30 patients each using a non- random convenient sampling technique. Correlation of postoperative pain was studied. **Group A (n = 30) i.e.** Patients who underwent mesh hernioplasty with cyanoacrylate glue. **Group B (n = 30) i.e.** Patients who underwent mesh hernioplasty with prolene sutures

The results of the study are as follows:

Table 1: Distribution of patients according to age group

Age (Years)	Group A (Cyanoacrylate glue) (n=30)		Group B (Prolene Suture) (n=30)		Total		Chi-square value	p-value
	No.	%age	No.	%age	No.	%age		
21-30	4	13.3%	4	13.3%	8	13.3%		
31-40	7	23.3%	4	13.3%	11	18.3%		
41-50	8	26.7%	12	40.0%	20	33.3%		

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51-60	11	36.7%	10	33.3%	21	35.0%	1.66	0.645
Total	30	100.0%	30	100.0%	60			
Mean age ± SD	45.30±12.42		46.07±10.93					

Table 1 shows the distribution of patients according to age group. In the present study, the majority of the patients, i.e., 21 (35.0%), belonged to the age group 51–60 years. The mean age of the study group A was 45.30 ± 12.42 years, and the mean age of the study group B was 46.07 ± 10.93 years. Both groups were comparable to each other in terms of age distribution. In the present study, there were 60 (100%) male participants and no female participants, indicating a male predominance.

Table 2: Distribution of patients according to operative time of mesh fixation

Operation Time of mesh fixation (Minutes)	**Group A (Cyanoacrylate glue) (n=30**		**Group B (Prolene Suture) (n=30)**		**t**	**p-value**
	Mean	**SD**	**Mean**	**SD**		
	2.23	1.28	7.20	1.03	-16.570	0.001

It was found that the mean operative time of mesh fixation in Group A was 2.23 ±1.28 minutes, which was less than the mean operative time of mesh fixation in Group B, i.e., 7.20 ±1.03 minutes. With a p-value of.001, this difference was statistically significant.

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Table 3: Distribution of patients according to pain assessment at 6 hours post operatively

VAS At 6 Hour	Group A (Cyanoacrylate glue) (n=30		Group B (Prolene Suture) (n=30)		Total		Chi-square value	p-value
	No.	%age	No.	%age	No.	%age		
0	0	0.0%	0	0.0%	0	0.0%	21.818	0.001
1-4	30	100.0%	14	46.7%	44	73.3%		
5-7	0	0.0%	16	53.3%	16	26.7%		
8-10	0	0.0%	0	0.0%	0	0.0%		
Mean ± SD	3.33±0.55		4.63±0.67		Z	p-value		
					-8.244	0.001		

Table 3 shows the distribution of patients according to pain assessment at 6 hours postoperatively. A visual analogue scale was used to assess post-operative pain in all patients in the current study. At 6 hours postoperatively, the mean VAS for group A patients was 3.33 ±0.55 while for group B it was 4.63±0.67 respectively. This result was statistically significant with a p value of 0.001. The majority of patients in both groups had a VAS score between 1 and 4. In Group A, 30 patients (100%) had VAS scores between 1 and 4. In group B, 14 (46.7%) patients had a score between 1 and 4, and 16 (53.3%) patients had a score between 5 and 7, respectively. This difference between two groups was also significant with a p value of 0.001.

Table 4: Distribution of patients according to pain assessment at 12 hour post operatively

Vas At 12 Hour	Group A (Cyanoacrylate glue) (n=30		Group B (Prolene Suture) (n=30)		Total		Chi-square value	p-value
	No.	%age	No.	%age	No.	%age		
0	0	0.0%	0	0.0%	0	0.0%		

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1-4	30	100.0%	24	80.0%	54	90.0%	6.667	0.024
5-7	0	0.0%	6	20.0%	6	10.0%		
8-10	0	0.0%	0	0.0%	0	0.0%		
Mean ± SD	2.37±0.56		3.77±0.90		Z	p-value		
					-7.262	0.001		

Table 17 shows the distribution of patients according to pain assessment at 12 hours postoperatively. A visual analogue scale was used to assess post-operative pain in all patients in the current study. At 12 hours postoperatively, the mean VAS for group A patients was 2.37±0.56, while it was 3.77±0.90 for group B. This result was statistically significant with a p value of 0.001. The majority of patients in both groups had a VAS score between 1 and 4. In Group A, 30 patients (100%) had a VAS score between 1 and 4. In group B, 24 (90%) patients had a score between 1 and 4, and six (20%) patients had a score between 5 and 7, respectively. This difference between two groups was also significant with a p value of 0.001..

Table 5: Distribution of patients according to pain assessment at 24 hour post operatively

VAS at 24 Hour	Group A (Cyanoacrylate glue) (n=30		Group B (Prolene Suture) (n=30)		Total		Chi-square value	p-value
	No.	%age	No.	%age	No.	%age		
0	0	0.0%	0	0.0%	0	0.0%	0.000	1.000
1-4.0	30	100.0%	30	100.0%	60	100.0%		
5-7.0	0	0.0%	0	0.0%	0	0.0%		
8-10.0	0	0.0%	0	0.0%	0	0.0%		
Mean ± SD	1.77±0.43		2.70±0.84		Z	p-value		
					-5.434	0.001		

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Table 5 shows the distribution of patients according to pain assessment at 24 hours postoperatively. At 24 hours postoperatively, the mean VAS for group A patients was 1.77±0.43, while it was 2.70±0.84 for group B. This result was statistically significant with a p value of 0.001. In Group A, 30 patients had a VAS score between 1 and 4, while 30 patients (100%) in Group B had a score between 1 and 4. With a p value of 1.000, the difference between the two groups was not significant.

Table 6: Distribution of patients according to pain assessment at discharge post operatively

VAS At Discharge	Group A (Cyanoacrylate glue) (n=30		Group B (Prolene Suture) (n=30)		Total		Chi-square value	p-value
	No.	%age	No.	%age	No.	%age		
0	4	13.3%	1	3.3%	5	8.3%	1.964	0.161
1-4.0	26	86.7%	29	96.7%	55	91.7%		
5-7.0	0	0.0%	0	0.0%	0	0.0%		
8-10.0	0	0.0%	0	0.0%	0	0.0%		
Total	30	100.0%	30	100.0%	60	100.0%		
Mean ± SD	0.93±0.45		1.50±0.57		Z	p-value		
					-4.264	0.001		

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Table 6 shows the distribution of patients based on pain assessment postoperatively at discharge. At discharge postoperatively, the mean VAS for group A patients was 0.93±0.45, while that for group B was 1.50±0.57 respectively. This result was statistically significant with a p value of 0.001. Group A had 26 (86.7%) patients with a VAS score between 1 and 4, while Group B had 29 (91.7%) patients with a score between 1 and 4. With a p value of 0.161, this difference between the two groups was not statistically significant.

Table 7: Distribution of patients according to follow up at 1 month postoperative

Follow Up After 1 Month	Group A (Cyanoacrylate glue) (n=30		Group B (Prolene Suture) (n=30)		Total		Chi-square value	p-value
	No.	%age	No.	%age	No.	%age		
Pain (Vas 1-4)	0	0.0%	1	3.3%	1	3.3%		
Pain (Vas 5-7)	0	0.0%	0	0.0%	0	0.0%		
Pain (Vas 8-10)	0	0.0%	0	0.0%	0	0.0%		
Scrotal edema	0	0.0%	0	0.0%	0	0.0%		
Wound infection	0	0.0%	0	0.0%	0	0.0%		

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Foregin Body Sensatiion	0	0.0%	0	0.0%	0	0.0%	1.017	0.313
Mesh Infection	0	0.0%	0	0.0%	0	0.0%		
Mesh Displacement	0	0.0%	0	0.0%	0	0.0%		
Reoccurance	0	0.0%	0	0.0%	0	0.0%		
Numbness	0	0.0%	0	0.0%	0	0.0%		
Seroma	0	0.0%	0	0.0%	0	0.0%		
Hematoma	0	0.0%	0	0.0%	0	0.0%		
No Significant Findings	30	100.0%	29	96.7%	59	96.7%		

Table 24 shows the distribution of patients according to follow-up at 1 month postoperatively. At 1 month of follow-up, only one (3.3%) patient had a complaint of pain with a VAS score of 4 in group B. All the complications were managed conservatively in both groups

Table 8: Distribution of patients according to follow up at 2 month postoperative

Follow Up After 2 Month	Group A (Cyanoacrylate glue) (n=30		Group B (Prolene Suture) (n=30)		Total		Chi-square value	p-value
	No.	%age	No.	%age	No.	%age		
Pain (Vas 1-4)	0	0.0%	1	3.3%	1	1.67%		
Pain (Vas 5-7)	0	0.0%	0	0.0%	0	0.0%		
Pain (Vas 8-10)	0	0.0%	0	0.0%	0	0.0%		
Scrotal edema	0	0.0%	0	0.0%	0	0.0%		
Wound infection	0	0.0%	0	0.0%	0	0.0%		

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Foreign Body Sensatiion	2	6.7%	3	10.0%	5	8.33%	1.274	0.529
Mesh Infection	0	0.0%	0	0.0%	0	0.0%		
Mesh Displacement	0	0.0%	0	0.0%	0	0.0%		
Reoccurance	0	0.0%	0	0.0%	0	0.0%		
Numbness	0	0.0%	0	0.0%	0	0.0%		
Seroma	0	0.0%	0	0.0%	0	0.0%		
Hematoma	0	0.0%	0	0.0%	0	0.0%		
No Significant Findings	28	93.3%	26	86.7%	54	90.0%		

In group A, 2 (6.7%) patients had foreign body sensations. In group B, 3 (10%) patients had foreign body sensations, and one (3.3%) patient complained of pain with a VAS score of 4. However, patients in group B showed more complications, but the difference was not statistically significant. All the complications were managed conservatively in both groups

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Table 9: Distribution of patients according to follow up at 3 month postoperative

Follow Up After 3 Month	Group A (Cyanoacrylate glue) (n=30)		Group B (Prolene Suture) (n=30)		Total		Chi-square value	p-Value
	No.	%age	No.	%age	No.	%age		
Pain (Vas 1-4)	0	0.0%	1	3.3%	1	1.67%	1.274	0.529
Pain (Vas 5-7)	0	0.0%	0	0.0%	0	0.0%		
Pain (Vas 8-10)	0	0.0%	0	0.0%	0	0.0%		
Scrotal edema	0	0.0%	0	0.0%	0	0.0%		
Wound infection	0	0.0%	0	0.0%	0	0.0%		
Foreign Body Sensatiion	2	6.7%	3	10.0%	5	8.33%		
Mesh Infection	0	0.0%	0	0.0%	0	0.0%		
Mesh Displacement	0	0.0%	0	0.0%	0	0.0%		
Reoccurance	0	0.0%	0	0.0%	0	0.0%		
Numbness	0	0.0%	0	0.0%	0	0.0%		
Seroma	0	0.0%	0	0.0%	0	0.0%		
Hematoma	0	0.0%	0	0.0%	0	0.0%		
No Significant Findings	28	93.3%	26	86.7%	54	90.0%		

n group A, 2 (6.7%) patients had foreign body sensations. In group B, 3 (10%) patients had foreign body sensations, and 1 (3.3%) patient complained of pain with a VAS score of 4. However, patients in group B showed more complications, but the difference was not statistically significant. All the complications were managed conservatively in both groups.

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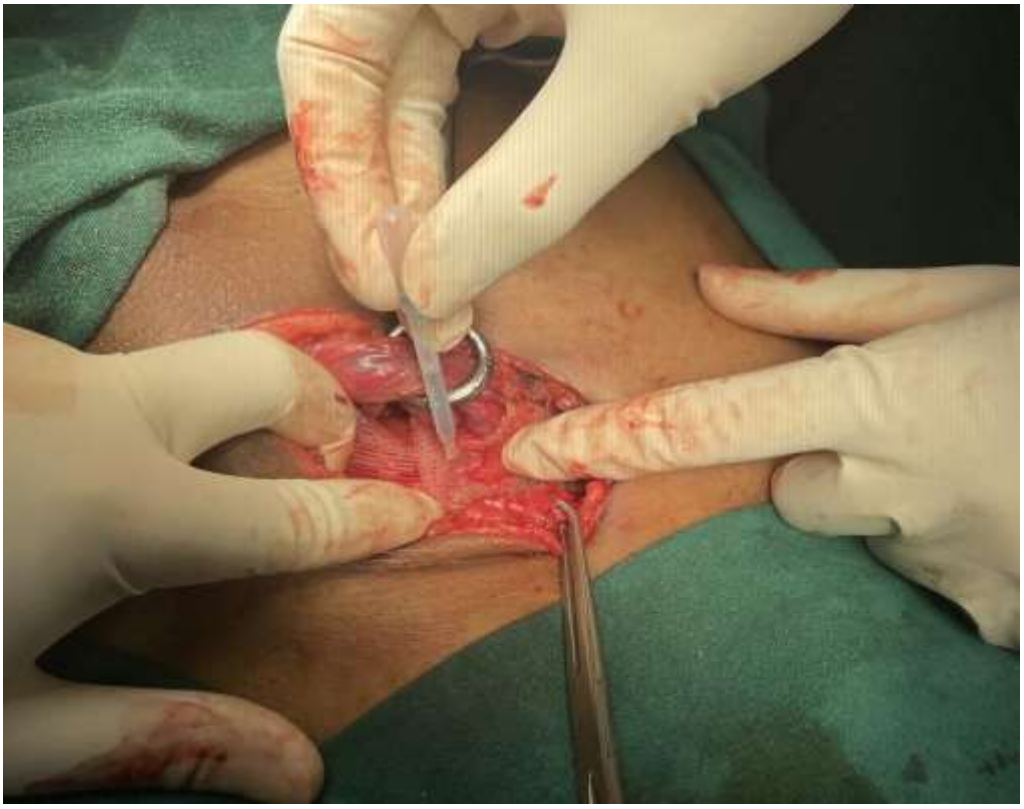

Figure 2: Showing Mesh Fixation done with cyanoacrylate Glue in Group A Patient

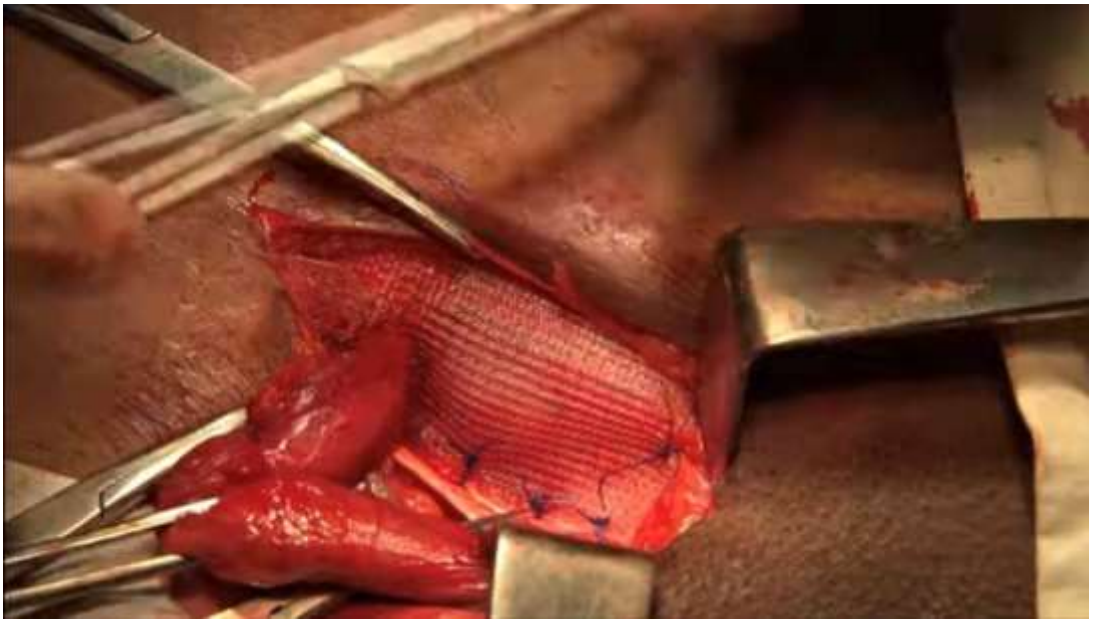

Figure 3: Showing mesh Fixation with Prolene suture in Group B Patient

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Figure 4: Showing cyanoacrylate glue used in the present study in Group A patients

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DISCUSSION

In this review, we wanted to demonstrate the uncertainty that remains about the rate of chronic pain after inguinal hernia repair alongwith the comparison of pain in glue versus prolene mesh. This uncertainty is partly due to the heterogeneity in the definition and measurement of chronic pain as well as the recent advancements in modern surgery that may have resulted in a decreasing chronic pain rate, which is not yet fully reflected in the literature.

Newer sources with more contemporary and higher quality evidence do already exist, and some of these have reported chronic pain rates as low as 3% for laparoscopic repair [38, 39].

Chronic pain is most commonly defined as pain persisting either three or 6 months postoperatively [9], but a 1-year threshold has also been proposed [8]. The international treatment guidelines have not yet agreed on this [5, 6]. A 3-month threshold is in line with the original IASP definition of chronic pain [36] and the recommendations by the HerniaSurge Group [5], but some argue that 6 months are necessary after mesh-based hernia repairs to allow for the mesh-related inflammatory response to decrease [4]. The included studies using a 3-month threshold reported chronic pain rates ranging from 16%–54%, and the studies using af 6-month threshold reported rates ranging from 10%–23%. In hernia surgery, a 6-month threshold may be a more accurate reflection of the pathophysiological transition from acute to chronic pain, even though the exact mechanism behind this transition is not entirely clear [4–6, 27]. The aetiology of chronic pain after inguinal hernia repair is likely to be multifactorial, but it is mostly thought to be of neuropathic origin, which justifies the extensive attention given to intraoperative nerve management [5].

In the included studies, there was a large variation in the length of follow-up (total range of 3–84 months). However, it is important to note that postoperative pain declines substantially over time [38]

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One of the most common problems with herniorrhaphy is inguinodynia, which is pain that persists beyond three months after surgery for an inguinal hernia. Inguinodynia is caused by many factors, and studies have shown that it is related to how the surgery was done and to intrinsic factors in the patient that imply a greater predisposition to this phenomenon (32). Sutureless fixation of mesh in open inguinal hernia repair is being used to prevent inguinodynia after hernia surgery (33). Farouk et al. (1996) wrote the first papers about using a synthetic tissue adhesive in hernia surgery (34). So we conducted this study to compare the outcomes between mesh fixation with cyanoacrylate glue and mesh fixation with prolene suture.

In the present study, the majority of the patients belonged to the age group 51–60 years, which included 21 (35%) patients. The mean age of the patients in Group A, who underwent mesh fixation by cyanoacrylate glue was 45±12.42 years, and the mean age of the patients in Group B who underwent mesh fixation by prolene suture was 46±10.93 years. Both groups were comparable to each other. In the study by Tebala et al. (2015), the mean age of patients in the suture fixation group was 42.4±12.0 years, and the mean age of patients in the glue fixation group was 47.6±12.3 years (24). In a study by Fouda et al. (2020), the mean age of patients in the group with glue fixation was 48.2±12.1 years, and the mean age of

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patients in the suture group was 49±11.6 years (29).

In this study, both groups had only male patients. There were 60 male patients and no female patients. In a study by Fouda et al. (2020), the glue

group included 19 (95% male) and 1 (5% female) patients, while the suture group included 20 (100% male) patients (29). Kalwaniya DS et al. (2020) did a study in which the male to female ratio was 29:1 in both the suture and glue groups (100).

The majority of patients in this study had left-sided inguinal hernias. Group A had 14 (46.7%) patients with a left-sided inguinal hernia and 13 (43.3%) patients with a right-sided hernia. In Group B, both right and left side hernias were present in 14 (46.7%) patients each. Arafa AS et al. (2019) did a study in which left-sided hernias were presented in both groups, with 63 (78.8%) patients in the glue group and 52 (65%) patients in the suture group. (28).

In the present study, indirect inguinal hernia was a common presentation. In group A, 21 (70%) patients had an indirect inguinal hernia, and 7 (23.3%) patients had a direct inguinal hernia. In group B, 17 (56.7%) patients had an indirect inguinal hernia, and 11 (36.7%) patients had a direct inguinal hernia. Bilateral hernias were present in both groups, with one patient (3.3%) in group A and two (6.7%) in group B. A study by Jaiswal et al. (2018) had 11 (35.5%) patients with direct-type hernias and 20 (64.5%) patients with indirect-type hernias (93). Fouda et al. (2020) did a study in which indirect hernia cases were presented in both groups, with 49 (81.67%) patients in the glue group and 47 (78.33%) patients in the suture group (30).

In the current study, the most common type of hernia sac content (in 70% of cases) was omentum. It was present in 24 (80%) patients in group A and in 18 (60%) patients in group B. Bowel as the content of the hernia sac was present in 2 (6.7%) cases in group A and 7 (11.1%) cases in group B.

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In our study, we found that the mean operative time to fix mesh in Group A was 2.23±1.28 minutes, while the mean operative time in Group B was 7.20±1.03 minutes. The difference between the mean operative time to fix mesh in both groups was found to be significant with a p value of 0.001. It was noted in our study that mesh fixation was easy and quick with cyanoacrylate glue. In a study by de Goede et al. (2013), the duration of operation was found to be shorter in mesh fixation with glue (84). A study by Moreno-Egea A et al. (2014) found that the use of glue significantly reduced the mean surgicaltime with a p value of 0.001 (23). In a meta-analysis done by Sun et al. (2017), it was found that mesh fixation with glue was superior to suture regarding duration of the operation (25). In a study by Jeyakumar et al. (2018), an average difference of 10.8 minutes was seen between the two methods of mesh fixation, with a comparatively longer time to complete the procedure when sutures were used. With p = 0.009, this difference was found to be statistically significant (26). Iyanahally et al. (2018) did a study in which the mean operating time required for the glue fixation was 36.52±3.1 minutes and the suture fixation was 48.32±5.9 minutes. There was a statistically significant difference between the two procedures for the mean operating time required, with a p value of 0.001 (27).

CONCLUSION

Techniques for inguinal mesh hernioplasty employing prolene mesh fixation with cyanoacrylate glue and prolene suture no. 3 produce results that are equivalent. However the usage of Cyanoacrylate adhesive in the mesh fixation showed promising results in terms of operating time,post-operative pain, and hospital stay.

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