Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 6s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Mesh Fixation with Cyanoacrylate Glue vs. Conventional Sutures in Inguinal Hernias

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Cite this paper as: Dr. Arunkumar R, Dr. N. J. Abineshwar, Dr. C. Rajasekaran, Dr SK. Roshakhi Sultana, Dr. Yeleti. Subha Avinash, Dr. J. Sridhar, (2025) Mesh Fixation with Cyanoacrylate Glue vs. Conventional Sutures in Inguinal Hernias. *Journal of Neonatal Surgery*, 14 (6s), 1-10.

ABSTRACT

Background: Inguinal hernia repair is one of the most common surgical procedures. While conventional sutures are widely used for mesh fixation, they can lead to increased postoperative pain and complications. Cyanoacrylate glue has emerged as a potential alternative for non-traumatic fixation.

Objective: To compare the outcomes of mesh fixation using N-Hexyl cyanoacrylate glue versus conventional sutures in inguinal hernia repair.

Methods: A prospective randomized comparative study was conducted with 100 patients divided into two groups: Group A (Glue) and Group B (Sutures). Parameters such as operation time, postoperative pain (VAS score), seroma formation, surgical site infection (SSI), hospital stay, and recurrence rates were evaluated.

Results: The mean procedure time was significantly lower in the Glue group (65.86 ± 7.75 minutes) compared to the Sutures group (81.12 ± 9.50 minutes; $p < 0.0001$). Postoperative pain (VAS scores) was lower in the Glue group on days 3, 5, and 8. Seroma and SSI rates were reduced in the Glue group. Recurrence rates at 6 months were also lower for the Glue group (0%) compared to Sutures (6%; $p = 0.04$).

Conclusion: Cyanoacrylate glue is a safe and effective alternative for mesh fixation in inguinal hernia repair, offering reduced operation time, pain, and complications.

Keywords: *Inguinal hernia, Mesh fixation, Cyanoacrylate glue, Sutures, Postoperative outcomes, Hernia recurrence, Pain management.*

1. NTRODUCTION

Inguinal hernia repair is one of the most frequent surgeries in general surgery, often involving mesh fixation to prevent recurrence.[1] Conventional sutures, while effective, can lead to postoperative complications such as seroma, infection, and prolonged recovery. [2,4]Cyanoacrylate glue offers a minimally invasive fixation method, potentially reducing these issues. This study compares the efficacy and safety of mesh fixation using cyanoacrylate glue versus sutures.[3]

Conventional sutures, often non-absorbable, have been the standard for mesh fixation but are associated with tissue trauma and nerve irritation, contributing to persistent postoperative pain. Cyanoacrylate glue, a synthetic adhesive, has emerged as a promising alternative. It provides secure fixation while avoiding tissue penetration, potentially reducing chronic pain, operative time, and other complications.[4]

Recent studies have demonstrated that cyanoacrylate glue results in lower pain scores and fewer complications during the postoperative period compared to sutures. For example, a randomized trial found significantly lower pain levels and faster recovery among patients whose mesh was fixed with glue. Similarly, glue fixation has been shown to minimize surgical site infections (SSI) and seroma formation without compromising the structural integrity of the repair[6]

Given these advantages, this study aims to compare the efficacy and safety of mesh fixation using cyanoacrylate glue versus traditional sutures in inguinal hernia repair. By focusing on critical outcomes such as postoperative pain, recovery time, and complication rates, this research seeks to identify the optimal fixation method for improving patient outcomes.

2. MATERIALS AND METHODS

Study Design: Prospective randomized comparative study.

Population: 100 patients undergoing inguinal hernia repair at VMKVMCH between September 2022 and May 2024.

Inclusion Criteria: Patients aged >18 years with primary inguinal hernia.

Exclusion Criteria: Recurrent or complicated hernias, BMI >35, or significant comorbidities.

Groups:

- **Group A (Glue):** Mesh fixed using N-Hexyl cyanoacrylate glue.
- **Group B (Sutures):** Mesh fixed using 2-0 polypropylene sutures.

Parameters Evaluated: Operation time, VAS score, seroma formation, SSI, hospital stay, and recurrence (3 and 6 months).

Statistical Analysis: Data were analyzed using SPSS with significance set at $p < 0.05$.

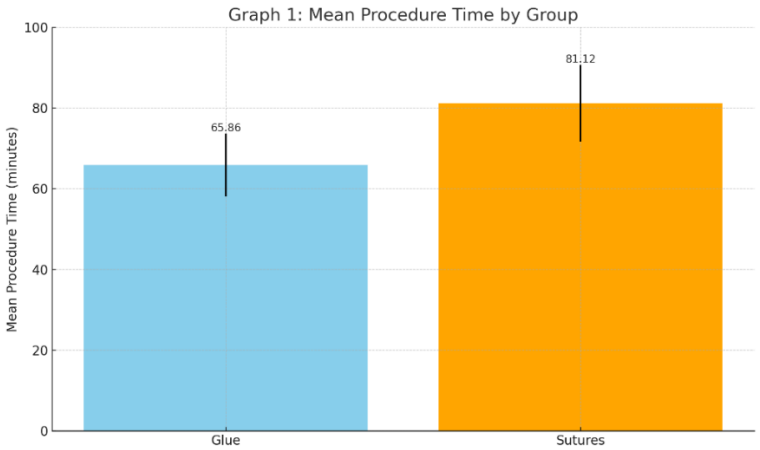
Results

1. Procedure Time

The Glue group demonstrated significantly shorter procedure times compared to the Sutures group.

Group	Mean Procedure Time (min)	Standard Deviation	p-value
Glue	65.86	±7.75	<0.0001*
Sutures	81.12	±9.50	

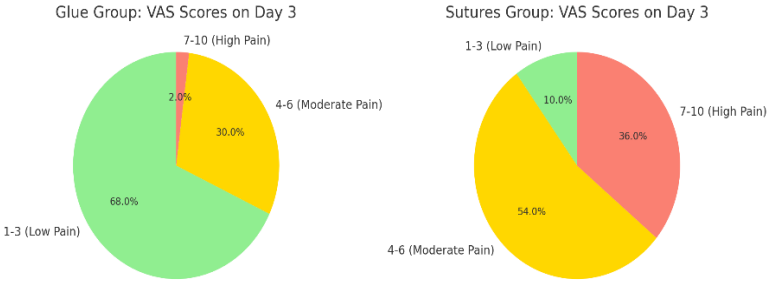
Graph 1: Mean Procedure Time



2. Postoperative Pain Visual Analog Scale (VAS Scores)

Follow-Up Day	VAS Score Range	Glue (%)	Sutures (%)	p-value
Day 3	1-3	68%	10%	0.0001*
	4-6	30%	54%	
	7-10	2%	36%	
Day 5	1-3	98%	42%	0.0001*
	4-6	2%	58%	
Day 8	1-3	100%	100%	-

Pie Chart 1: VAS Scores on Day 3

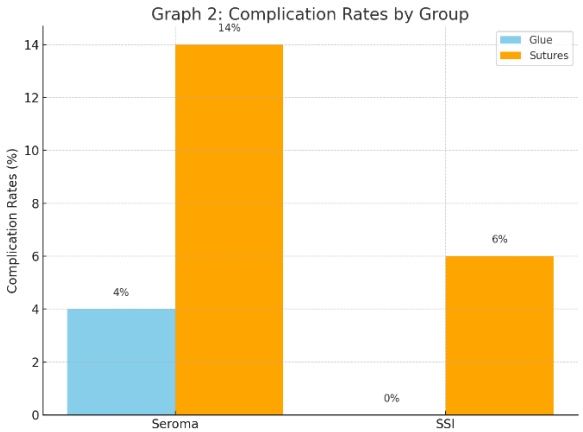


3. Complications

Seroma Formation and SSI:

Complication	Glue (%)	Sutures (%)	p-value
Seroma	4%	14%	0.02*
Surgical Site Infection(SSI)	0%	6%	0.08

Graph 2: Complication Rates



4. Hospital Stay and Recurrence

Parameter	Glue Group	Sutures Group	p-value
Hospital Stay (days)	2.76 ± 1.34	3.90 ± 1.86	<0.0001*
Recurrence (6 months)	0%	6%	0.04*

3. DISCUSSION

Procedure Time

The mean procedure time in our study was 65.86 ± 7.75 minutes for the GLUE group and 81.12 ± 9.50 minutes for the Sutures group, with a statistically significant p-value of 0.0001. This significant reduction in operative time with the use of glue is consistent with other studies. For instance, the study by Zaidan[1] and group reported a mean of operative time of 41.2 ± 5.1 mins for glue group & 47.6 ± 4.9 mins for suture groups, showing a statistically significant difference favoring the glue method. Similarly, a study by Yassin and group also found a reduced mean of operative time of 41.2 mins with glue versus 47.6 minutes with sutures. Another study by Haroon and group. reported the mean procedure time of 52.6 mins for glue group & 64.2 mins for suture groups, further supporting the efficiency of glue fixation. The consistency of these findings across different studies highlights the efficiency of glue in reducing operative time. This reduction is likely due to the simpler and quicker application process of glue compared to sutures, which require more precise and time consuming handling. Faster procedures can also reduce anesthesia time and associated risks, improving overall patient outcomes. In summary, our study's findings regarding procedure time are well-supported by existing literature, indicating that glue fixation is not only effective but also time-efficient, making it a valuable option in surgical practice.

On day 3 post-operation, our study found that the VAS scores for pain were significantly low in GLUE group when compared to Sutures groups. Specifically, 68% patients in the GLUE group had VAS scores of 1-3, compared to only 10% in the Sutures group. This significant difference is consistent with findings from other studies. For instance, Zaidan and group reported significantly lower VAS scores in the glue group at various postoperative intervals, including day 3. Similarly, Yassin and group noted a lower mean VAS score of 3.7 the glue group when compared to 4.3 in suture groups at the 24 hr mark . The incidence of seroma and surgical site infections (SSI) in our study also showed favorable outcomes for glue group, has lower rates compared to sutures group. Haroon and group. observed similar trends, reporting fewer complications in the glue group, particularly in terms of seroma and SSI. In conclusion, the lower VAS scores and reduced complication rates in the glue group observed in our study align well with existing research, demonstrating the advantages of glue fixation in improving patient comfort and reducing early postoperative issues.

4. CONCLUSION:

Overall, n-butyl cyanoacrylate glue proves to be a valuable tool in the surgical management of hernia of inguinal regions, providing significant benefits in terms of patient comfort, recovery time, and long-term success rates. Future research with larger sample sizes and extended follow-up periods could further validate these findings and help refine the use of glue in hernia surgery.

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