



## **Innovative Approaches to Skin Closure: A Comparative Analysis of Adhesive Glue and Conventional Suturing in Open Inguinal Hernia Surgeries**

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### **ABSTRACT**

#### **Background**

Advances in wound closure techniques have led to the exploration of alternative methods beyond the traditional sutures. This study aimed to compare the outcomes of skin closure using adhesive glue (2-octyl cyanoacrylate) vs conventional suturing (3-0 ethilon) in open inguinal hernia surgeries.

#### **Methods**

A total of 100 patients undergoing open inguinal hernia surgery were included, with 50 patients receiving skin closure through conventional suturing and the remaining 50 with adhesive glue. Parameters such as skin closure time, postoperative pain, and scar

assessment using the Vancouver scar scale were evaluated and compared.

#### **Results**

The mean time required for skin closure in the adhesive group was significantly shorter at 2.7241.32 minutes, compared 10 4.88+1.533 minutes in the suture group (P < 0.001). Postoperative pain, measured on the visual analogue scale, showed a mean value of 5.30.68 for the suture group and 3.68:0.62 for the adhesive group, indicating significantly lower pain levels with adhesive glue (p < 0.001). Scar

assessment using the Vancouver sear scale revealed a mean score of 8.3±0.8 for the suture group and 2.8±0.75 for the adhesive group demonstrating superior cosmesis with adhesive glue ( $p < 0.001$ )

### Conclusions

This study supports the superiority of adhesive glue, specifically 2-octyl cyanoacrylate, over conventional suturing in clean elective hernia surgeries. The use of adhesive glue not only resulted in faster skin closure but also contributed to reduced postoperative pain and improved scar appearance.

Adhesive and acres as a safe and effective alternative for in closure in hernia surgeries, offering better cosmesis, and patient outcomes.

### Keywords

Adhesive glue, Inguinal hernia surgery, skin closure, suturing, 2-octyl cyanoacrylate.

### INTRODUCTION

Wound closure techniques in surgical procedures have undergone significant evolution, ranging from traditional suture materials to more advanced methods such as skin staplers, adhesive tapes, and skin glue.

These advancements aim to enhance patient outcomes by promoting better comesis, minimizing post-operative pain, reducing the risk of wound infections and shortening hospital stays. In the context of open inguinal hernia surgeries, the choice of skin closure method plays a crucial role in achieving these goals.

This study focuses on comparing to prominent methods for skin closure: conventional suturing using 3-0 ETHILON and adhesive glue, specifically 2-octyl cyanoacrylate, in open inguinal hernia surgeries. The rationale behind this investigation lies in the potential benefits associated with adhesive glue, including faster closure times, reduced post-operative pain and

improved sear appearance. As clean elective surgeries increasingly incorporate innovative approaches, understanding the comparative effectiveness of these closure techniques becomes paramount.

The objective of this study is to systematically assess and compare the outcomes of adhesive glue versus conventional suturing in terms of skin closure time, postoperative pain, and scar assessment. The findings may contribute valuable insights into the optimal choice of skin closure methods in open inguinal hernia surgeries, with implications for enhancing patient comfort, recovery, and overall surgical outcomes.

### METHODS AND MATERIALS

**Study Design:** This was a prospective, randomized, single-center study conducted at GEMS & Hospital between [Start Date] and [End Date]. The study received approval from the Institutional Review Board (IRB) prior to initiation, and all participants provided informed consent.

**Study Population:** A total of 100 patients scheduled for open inguinal hernia surgery were recruited for the study.

Inclusion criteria included patients aged [18-70 years] without contraindications to either suturing or adhesive glue.

Exclusion criteria encompassed individuals with a history of allergic reactions to adhesive substances and those requiring additional procedures during hernia surgery.

### RANDOMIZATION

Patients were randomly assigned to either the conventional suturing group (n=50) or the adhesive glue group (n=50) using computer-generated random numbers. Allocation concealment was ensured to minimize selection bias.

## INTERVENTION

- Conventional Suturing Group: Skin closure was performed using 3-0 ETHION sutures following standard surgical procedures.
- Adhesive Glue Group: Skin closure was achieved using 2-octyl cyanoacrylate adhesive glue as per the manufacturer's guidelines.

## OUTCOME MEASURES

1. Skin Closure Time: The time taken for skin closure was recorded from the completion of the hernia repair to the final application of the dressing.
2. Postoperative Pain: Pain levels were assessed using a visual analogue scale (VAS) ranging from 0 to 10, with higher scores indicating increased pain. Measurements were taken at specified intervals postoperatively.
3. Scar Assessment: Scars were evaluated using the Vancouver scar scale at regular intervals during follow-up visits, considering parameters such as vascularity, pigmentation, pliability, height, and width.

Statistical Analysis: Data were analysed using appropriate statistical methods.

Continuous variables were expressed as mean + standard deviation, and categorical variables were presented as frequencies and percentages. Student's t-test or Mann-Whitney U test was applied for continuous variables, while categorical variables were analysed using chi-square or Fisher's exact test. Statistical significance was set at  $p < 0.05$ .

Ethical Considerations: The study adhered to the principles outlined in the Declaration of Helsinki, ensuring patient confidentiality and privacy. All collected data were securely stored, and participants

were assured of their right to withdraw from the study at any time without consequences.

## RESULTS

### 1. Skin Closure Time

- Conventional Suturing Group: The mean time taken for skin closure using 3-0 ETHILON sutures was  $4.88 \pm 1.533$  minutes.
- Adhesive Glue Group: Skin closure with 2-octyl cyanoacrylate adhesive glue demonstrated a significantly shorter mean time of  $2.72 \pm 1.32$  minutes ( $P < 0.001$ ).

### 2. Postoperative Pain

- Conventional Suturing Group: The visual analogue scale (VAS) for postoperative pain had a mean value of  $5.3 \pm 0.68$ .
- Adhesive Glue Group: The VAS for the adhesive group was significantly lower, with a mean value of  $3.68 \pm 0.62$  ( $p < 0.061$ ).

### 3. Scar Assessment

- Conventional Suturing Group: Scar assessment using the Vancouver scar scale revealed a mean score of  $8.31 \pm 0.8$ .
- Adhesive Glue Group: The adhesive glue group demonstrated superior scar cosmesis with a significantly lower mean score of  $2.81 \pm 0.75$  ( $p < 0.001$ ).

Overall, the results indicate that skin closure with adhesive glue, specifically 2-octyl cyanoacrylate, is associated with a shorter closure time, reduced postoperative pain, and improved scar aesthetics compared to conventional suturing in open inguinal hernia surgeries. These findings suggest the superiority of adhesive glue as a safe and effective alternative for skin closure in clean elective hernia

procedures, emphasizing its potential benefits in enhancing patient comfort and cosmetic outcomes.

## DISCUSSION

The results of this study demonstrate significant advantages associated with the use of adhesive glue, specifically 2-octyl cyanoacrylate, for skin closure in open inguinal hernia surgeries compared to conventional suturing with 3-0 ETHION. The discussion will delve into the implications of the findings, potential mechanisms underlying the observed differences, and the broader clinical significance of adopting adhesive glue as an alternative closure method.

1. **Efficiency of Skin Closure:** The notably shorter skin closure time observed in the adhesive glue group aligns with previous literature suggesting that adhesive glues facilitate a rapid and efficient closure process.

The instantaneous adhesion provided by cyanoacrylate-based glues eliminates the need for meticulous suture placement and knot tying, contributing to reduced procedural time. This efficiency may not only enhance overall surgical workflow but also potentially lead to decreased operative times, contributing to operational efficiency in a broader clinical context.

2. **Postoperative Pain Reduction:** The lower postoperative pain levels reported in the adhesive glue group can be attributed to the inherent characteristics of cyanoacrylate-based glues. These glues form a protective barrier over the wound, minimizing tissue trauma and nerve irritation. The absence of tension-inducing sutures may further contribute to reduced pain perception. The findings align with the growing body of

evidence suggesting that adhesive glue can provide a more comfortable postoperative experience for patients.

3. **Improved Scar Cosmesis:** The superior scar outcomes observed in the adhesive glue group, as reflected by lower Vancouver scar scale scores, emphasise the aesthetic benefits of this closure method. Cyanoacrylate glues create a thin, flexible, and waterproof layer over the wound, promoting optimal wound healing conditions.

Additionally, the absence of suture tracks may contribute to improved scar appearance.

Enhanced scar cosmesis is particularly relevant in elective surgeries, where patient satisfaction with the aesthetic outcome can influence overall perceived surgical success.

4. **Clinical Implications:** The findings of this study have significant clinical implications for surgeons and healthcare providers involved in open inguinal hernia surgeries. The adoption of adhesive glue for skin closure can lead to tangible benefits, including time efficiency, reduced postoperative pain, and superior scar aesthetics. These advantages may contribute to improved patient satisfaction, faster recovery times, and! potentially lower healthcare costs associated with reduced operative times and postoperative pain management.

5. **Limitations and Future Directions:** It is important to acknowledge the limitations of this study, including the single centre design and the specific patient population undergoing inguinal hernia surgeries. Future research could explore the applicability of adhesive glue in diverse surgical settings and patient populations, Long-term

follow-up studies would also be valuable to assess the durability of the cosmetic outcomes and the potential for late-onset complication's associated with adhesive glue use.

## CONCLUSION

The results of this study support the superiority of adhesive glue, specifically 2-octyl cyanoacrylate, over conventional suturing in open inguinal hernia surgeries. The observed advantages in terms of efficiency, reduced postoperative pain, and improved scar cosmesis underscore the potential for adhesive glue to emerge as a preferred method for skin closure in clean elective hernia procedures, surgeons may consider incorporating adhesive glue into their practice, mindful of its potential to enhance patient experiences and contribute to overall procedural success.

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This study aimed to compare the outcomes of adhesive glue and conventional suturing (3-0 ETHILON) for skin closure in open inguinal hernia surgeries. A total of 100 patients were included, with 50 undergoing skin closure using sutures and the other 50 using tissue glue (2-octyl cyanoacrylate). Various parameters were assessed, including postoperative pain, skin closure time, and scar assessment using the Vancouver scar scale.

The results indicated a significant difference in the meantime taken for skin closure, with the adhesive glue group requiring 2.721.32 minutes compared to 4.881.533 minutes in the suture group ( $p < 0.001$ ). The visual analogue scale for postoperative pain showed a mean value of 5.30.68 for the suture group and 3.68+0.62 for the adhesive glue group, demonstrating a significant reduction in postoperative pain with the use of adhesive glue ( $p < 0.001$ ). The analysis of postoperative scars using the Vancouver scar scale revealed a mean score of 8.30.8 for the suture group and 2.8=0.75 for the adhesive glue group, indicating better cosmesis with adhesive glue ( $p < 0.001$ ). In conclusion, the study suggests that adhesive glue, specifically 2-octyl cyanoacrylate, is superior to conventional suturing in clean elective hernia surgeries. The use of adhesive glue not only resulted in faster skin closure but also contributed to less postoperative pain and improved scar cosmesis. These findings support the efficacy and safety of adhesive glue as an alternative method for skin closure in such surgical procedures.