

Skin Adhesive Versus Absorbable Suture in Closing Wound

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ABSTRACT

Objective: To compare the outcomes of wound closure in breast surgery incisions by conventional suture technique versus tissue adhesive.

Study Design: Randomized controlled trial study

Place and Duration of Study: This study was conducted at the Department of General Surgery, Breast Unit, Liaquat National Hospital, Karachi from 23rd May 2017 to 31st January 2018.

Materials and Methods: Total 100 patients were included and divided equally in Group-A (tissue adhesive Dermabond) and in Group-B (conventional suturing technique). The time required to close the wound was recorded. On 7th postoperative day wound was assessed on the basis of presence or absence of infection and wound dehiscence.

Results: In patient with tissue adhesives the mean closure time was 47.32±69.13 seconds while with suture closure it was 205.00±113.12 seconds. 4% patients observed to have wound infection in tissue glue versus 16% in suture closure. Wound dehiscence was found in 2% patients with wound closed by tissue glue and 14% in patient with suture closure.

Conclusion: The study concluded that tissue adhesive is a safe and effective method for closure of skin incision and there is a significant difference in wound closure time, wound dehiscence and wound infection when compared with conventional suturing.

Key Words: Wound Closure, Breast Surgery Incisions, Conventional Suture Technique, Tissue Adhesive.

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INTRODUCTION

Secure skin closure is an integral step in nearly every surgical procedure. If the method used to close the skin incision is not good enough to provide strength and support required by the tissue to approximate; the edges of the wound may separate providing a potential pathway for bacterial contamination which then lead to wound infection, poor cosmetic outcome and patient satisfaction.^{1,2}

There have been always a conventional method of wound closure by a suture but the use of tissue adhesive has been increased in recent years because it is safe, less time consuming, less traumatic and provide good cosmetic effect. Different types of tissue adhesives have been used ranging from adhesive strips to adhesive gels (biological and synthetic). Cyanoacrylate gels are a family of synthetic, strong, fast-acting adhesive which is widely being used and Octylcyanoacrylate

(Dermabond) is a first FDA approved adhesive used in surgical wounds^{3,4}. The various studies have been published on the use of tissue adhesives and most of them are on closing wounds in plastic surgery, head and neck surgery, traumatic lacerations, general surgical procedures including laparoscopic surgery.

Fewer studies have been done on the outcome of wound closure with standard suture technique versus tissue adhesives in breast surgery especially in this part of the world. This study aims to compare the efficacy (in terms of cosmetic outcome and wound dehiscence) and time required for skin closure with tissue adhesive and standard suturing technique on breast surgical incisions.

MATERIALS AND METHODS

This Randomized Control study was conducted at the Department of General Surgery, Liaquat National Hospital, Karachi, from 23rd May 2017 to 31st January 2018. Total of 100 patients included, divided equally in two groups.

Inclusion criteria:

- All female patients electively admitted for excision of breast lump (up to 5 cm).
- Age limit 18-65 years

Exclusion criteria:

- Patients with incision involving the axilla
- Traumatic wounds (confirmed by history)
- Surgical incisions placed on previous scars
- Inflammatory/ infected breast lumps

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- Patients on immunosuppressant or anticoagulants that may affect wound healing
- Patients with uncontrolled diabetes mellitus (HbA1c of more than 6.5mg/dl)
- Known allergy to octylcyanoacrylate
- Previous history of hypertrophic or keloid formation

Study was formally approved by the hospital research and ethics committee. Informed consent was taken from each patient. Verbal and written consent was acquired from all patients meeting the inclusion criteria. Basic clinical data like age and surgical procedure were recorded in the Performa provided in the study tool section by the principle investigator. The skin incision was closed by a well-trained resident (minimum year 3 of residency). The patients were divided in two groups randomly with the help of lottery method. Sealed envelope technique was used.

- Group A patients underwent skin closure by tissue adhesive Dermabond (Ethicon Inc.).
- Group B patients underwent Conventional subcuticular suturing technique with 3-0 Vicryl (Ethicon Inc.).

The time required to close the wound by two above mentioned method was recorded with the help of stop watch. The patient followed up in the OPD at 7th post-operative day. At 7th day wound was assessed on the basis of presence or absence of infection and wound dehiscence and findings were entered into the Performa.

RESULTS

Total 100 female patients with age between 18 years to 65 years meeting inclusion criteria were included to compare the outcomes of wound closure in breast surgery incisions by conventional suture technique versus tissue adhesive. In both study groups, Group A (tissue adhesive technique) and Group B (Conventional subcuticular suturing technique) 50 patients were included. Descriptive statistics were calculated using SPSS version 21. Qualitative variables were presented in terms of frequency and percentages.

Table No.1: Descriptive Statistics of Age (years) (n=100)

	Group A (n=50)	Group B (n=50)
Mean	35.72	38.28
SD	14.47	13.50
Median	33.00	36.00
Minimum	18	18
Maximum	65	65
Range	47	47

Quantitative variables were presented in term of mean and standard deviations. Stratification was done to see the effect of modifiers on outcome. Independent t-test was applied to compare means. Post stratification chi

square test was applied considering $p \leq 0.05$ as significant.

The mean age of patients in group A and group B was 35.72 ± 14.47 years and 38.28 ± 13.50 years respectively. The descriptive statistics of age are presented in Table-1.

In our study, mean closure time was 47.32 ± 69.13 seconds in group A (tissue glue) and 205.00 ± 113.12 seconds in group B (suture closure). In group A (tissue glue) 4% patients was observed wound infection and 16% patients observed wound infection in group B (suture closure). Wound dehiscence was found in 2% patients of group A and among 14% patients of group B.

Independent t-test was applied to compare means between two study groups. The results showed that there was significant mean difference in closure duration among two study group ($p=0.000$) as presented in Table 2.

Table No. 2: Comparison of Mean Closure Duration with Study Group (n=100)

	Study Group		P-Value
	Group A	Group B	
Mean	47.32	205.00	0.000*
SD	69.13	113.12	

Independent t-test was applied.
P-value ≤ 0.05 considered as Significant.
*Significant at 0.05 levels.

Table No. 3: Frequency and Association of Wound Infection with Study Group (n=100)

Wound Infection	Study Group		Total	P-Value
	Group A	Group B		
Yes	2(4)	8(16)	10(10)	0.046*
No	48(96)	42(84)	90(90)	
TOTAL	50	50	100	

Chi Square Test was applied.
P-value ≤ 0.05 considered as Significant.
*Significant at 0.05 levels.

Table No. 4: Frequency and Association of Wound Dehiscence with Study Group (n=100)

Wound dehiscence	Study Group		Total	P-Value
	Group A	Group B		
Yes	1(12.5)	7(87.5)	8	0.027*
No	49(53.3)	43(46.7)	92	
Total	50	50	100	

Chi Square Test was applied.
P-value ≤ 0.05 considered as Significant.
*Significant at 0.05 levels.

Standard preoperative sterile measures taken, no prophylactic antibiotic used for breast lumpectomy in both groups. Comparison of wound infection and wound dehiscence among the two study groups was done. The results also showed that there was significant association of wound infection ($p=0.046$) and wound

dehiscence ($p=0.027$) among two study groups as shown in table 3 & 4, respectively.

DISCUSSION

Surgery for breast diseases (benign or malignant) is very common, and scar related to this surgery needs to be cosmetically acceptable with minimal risk of infection. Suture material has been used as a conventional method for closure of breast wounds since decades and even now regarded as standard method of wound closure. Tissue adhesive material has long been used in wound closure in western part of world, and offers the advantages of faster wound closure, good cosmetic outcome and lesser postoperative wound care. Little has been found in the literature regarding the use of tissue glue for breast incisions. Our study highlights its use in breast wound and signifies the outcomes of tissue adhesive which are comparable to international studies. Apart from using tissue adhesive for skin closure, various studies have been conducted showing the versatile use of height and scar color was comparable between the study groups. For obvious reasons there were no hatch marks in the tissue adhesive group.

Sebesta et al, used tissue adhesives for closure of laparoscopic trocar wounds and observed that 2 out of 30 patients i.e. 6.6 % developed subcuticular seroma with wound dehiscence⁵.

Study also compared the time for closure of wound among both groups, mean closure time with tissue adhesive was 3.7mins and with suture 14mins (p value of <0.00001)⁵, that is comparable to our results. Singer AJ and colleagues repaired traumatic lacerations using tissue adhesive, on follow up they found that, only 1 wound was infected and only 2 wounds (out of 63 patients), required re closure due to dehiscence⁶. Similar to this study⁶, in our study only 2 patients (out of 50 patients) were found to have wound infection with skin adhesive.

Sebesta and colleagues showed that there was no difference was in complication rates between tissue adhesive and suture group⁵. Similar findings were seen in another study, 8% of subjects in the suturing group developed wound infection compared to just 4 percent in the tissue adhesive group. The findings of our study correlate with the finding of Maartense et al. that tissue adhesive was associated with fewer wound infections than the sutures⁷. Souza et al, found that routine use of topical adhesive for wound closure decreased the infection rates when used as an add-on measure to conventional sutures, with a significant reduction in infection rates for cardiovascular surgery patients⁸.

Studies comparing conventional suturing with tissue adhesive for wound closure in other surgeries has had

varied results. In 1997, a randomized control trial comparing cyanoacrylate tissue adhesive and sutures in the management of lacerations found no difference in the cosmetic outcome and there was no difference in the percentage of early or late optimal wound evaluation scores. Tissue adhesive was found to be a less painful method of closure. This study showed that tissue adhesive was fast and painless method of closure, as in the case in our study⁹.

CONCLUSION

The study results showed that the use of tissue adhesive has an advantage when compared to conventional suturing. In conclusion, our study results showed that tissue adhesive is a safe and effective method for closure of skin incisions. There is a significant difference in wound closure time, wound dehiscence and wound infection when compared with conventional suturing.

We recommend the safe use of tissue adhesive in breast lumpectomies and possibly in other clean wounds for skin closure.

Author's Contribution:

Concept & Design of Study:	Saiqa Majeed Rufina Soomro
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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