IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 21, Issue 2 Ser.4 (February. 2022), PP 05-10
www.iosrjournals.org

Comparative Study of Conventional Skin Suturing Vs Adhesive Glue

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ABSTRACT:
Aim and objective : *To study the efficacy, cosmesis between skin adhesive and suture material and also to compare time taken for closure post operative pain, scar dehiscence between two groups.*
Materials and Methods: *A Comparative study was done among 100 patients of both sexes of age group 18-60 years in elective procedure with incision less than 10cm (Hernia repair, Thyroid surgeries, Lipoma excision, Varicose veins surgery) done in Govt Rajaji Hospital Madurai between June 2021 and December 2021.*
Observation and Results : *The Mean time taken for skin closure in adhesive group is 2.72 minutes ±1.32 and that of suture group is 4.88 minutes ±1.533. It is observed that patient with skin glue have lesser postoperative pain in early hours than suture material. The outcome of wound using ASEPSIS SCORE for skin glue group is 0.88 and for suture group is 3.16. The wound cosmesis score for both skin glue and suture group with mean value of 3.1 and 5.74 respectively. The mean score for suture group is 8.3±0.8 and for skin glue group it is 2.8±0.75. The Mean score for postoperative scar for suture group is 8.3 and for skin glue group it is 2.86. The difference is of great significance, if p value <0.001.*
Conclusion: *The present study is done to compare the skin closure technique with Adhesive skin and skin suturing material. The concept of Adhesive skin glue is superior to skin suturing. Time taken for skin closure is shorter. Reduced postoperative pain. Therefore it is concluded that Octylcyanoacrylate can be used in surgical skin closure in clean elective surgeries.*
Key words: *Octylcyanoacrylate, Vancouver scale, Cosmesis.*

Date of Submission: 26-01-2022 Date of Acceptance: 07-02-2022

I. Introduction

A basic need for skin closure is tissue approximation. A good tissue reunion and cosmetically acceptable scar is an ideal surgeon's practice. Wound closure techniques have evolved from early developments in suturing material to advanced resources that include skin staplers, skin glue and adhesive tapes. Based on efficacy of advanced suturing techniques patient may be benefited with better cosmesis, lesser postoperative pain and less wound infection, lesser hospital stay. Hence it is wise to study and compare adhesive glue with suture material for the better outcome. with glue the results are better in comparison with suture material. Tissue adhesives offer barrier to microorganism to the site of healing time taken for skin closure is 3 minutes with adhesive glue but with suture material it takes about 7-10 minutes. best cosmesis is achieved with glue when compared with sutures. there is no risk of needle stick injury to the surgeon The cost-effectiveness of both glue and suture was found that although the cost of glue is high, total effective cost including transportation charge for follow up, loss of wages, local dressing and antibacterial medicaments was high with suture material. The overall cost effective was almost equal with adhesive glue and suture material.

II. Aim And Objectives

To study the efficacy, cosmesis between skin adhesive and suture material and also to compare time taken for closure post operative pain, scar, dehiscence between two groups.

III. Materials And Methods

Comparative study done among 100 patients of both sexes of age group 18-60 years in elective procedure with inclusion less than 10cm (Hernia repair, Thyroid surgeries, Lipoma excision, Varicose veins surgery done in Govt Rajaji Hospital Madurai between June 2021 and December 2021.
A Comparative study done in 100 patient in two groups, 6 months.

Inclusion Criteria

1. Age 18 – 60 yrs
2. Patients consented to the study according to designated proforma
3. Both sexes
4. Elective procedures with incision less than 10 cm (Hernia repair, Lipoma excision, Thyroid surgeries for SNG and MNG, Fibroadenoma excision, Varicose veins surgery

Exclusion Criteria

1. Age <18 yrs and >60 yrs.
2. Wound site >10cm.
3. Major elective surgeries which doesn't come under inclusion criteria.
4. Emergency surgery
5. Traumatic wounds
6. Immunocompromised status
7. Any comorbid status
8. Patient having scar in the same site
9. Patients with skin disease over operating area.
10. Patient not consented to designated proforma

Source of Collection

Patients who fit the inclusion criteria will be observed and following data collected
a. Details of participants including disease characteristics.
b. Details of type of intervention.
c. Details of outcomes reported.
Patients who get operated will be divided into two groups as group1 and group 2. Patients in group 1 will skin closure with suture material and group 2 with adhesive skin glue. Five parameters will be studied.
1. Time taken for skin closure with suture material and skin glue.
2. Postoperative wound infection using ASEPSIS SCORE for suture material and skin glue.
3. Postoperative scar assessed using Vancouver scar scale.
4. Postoperative pain studied with visual analogue scale for both suture material and skin group.
5. Wound cosmesis assessed with modified Hollander scale for both groups.

SUTURED WOUND

GLUE APPLIED WOUND

IV. Method Of Statistical Analysis

The following method of statistical analysis have been used in this study. The results were averaged (mean ±standard deviation) for continuous data and number and percentage for dichotomous data are presented in Table and Figure.
1. Univariate analysis of the dichotomous variables encoded was performed by means of the chi-Square test with Yates correction if required.

Chi-Square $\chi 2$ for (2*2 tables)

GROUP	Absent	Present	Total
Adhesive glue	A	b	a +b
Skin suturing	C	d	c +d
total	a +c	b +d	N

a, b, c, d are the observed numbers.
N is the Grand total $\chi 2$ with 1 DF = $N(ad-bc)^2 | (a+b)(c+d)(a+c)(b+d)$
DF =(r-1)*(c-1), where r =rows and c=columns

DF = Degree of freedom (Number of observation that are free to vary after certain restriction have been placed on the data)

2. Student "t' test.

The student 't' test was used to determine whether there was a statistical difference between male and female subjects in the parameters measured.

Student's t test is as follows:

$$t=\frac{\bar{x}_1-\bar{x}_2}{s\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}} \sim\sim\sim t_{n1+n2-2} \quad \text{Where } s^2=\frac{(n_1-1)s_1^{\,2}+(n_2-1)s_2^{\,2}}{(n_1+n_2-2)}$$

In all the above test P value less than 0.05 were taken to be statically significant. The data was analyzed using SPSS package.

MATERIAL	Frequency
Suture	50
Glue	50
Total	100

V. Observation And Results

TABLE -1 COMPARISON OF AGE

Age	Suture Group	%	Glue Group	%
< 30	13	26	13	26
31 - 40	13	26	10	20
41 - 50	16	32	13	26
> 50	8	16	14	28
Total	50	100	50	100
Mean	40.02		40.92	
SD	10.918		11.823	
t' value	-0.395			
P' value	0.693 Not Significant			

TABLE – 2

GENDER	Suture Group	%	Glue Group	%
Male	35	70	36	72
Female	15	30	14	28
Total	50	100	50	100
P' value	1.000 Not Significant			

TABLE - 3

DIAGNOSIS	Suture Group	%	Glue Group	%
B/L INGUINAL HERNIA	7	14	5	10
FIBROADENOMA LT BREAST	2	4	3	6
FIBROADENOMA RT BREAST	3	6	2	4
LIPOMA	2	4	2	4
LT INGUINAL HERNIA	7	14	7	14
LT LL VARICOSE VEINS	6	12	6	12
MNG THYROID	8	16	8	16
RT INGUINAL HERNIA	11	22	13	26
RT LL VARICOSE VEINS	4	8	4	8
Total	50	100	50	100
P' value	0.999 Not Significant			

TABLE – 4

PROCEDURE	Suture Group	%	Glue Group	%
B/L HERNIOPLASTY	7	14	5	10
EXCISION	7	14	7	14
LT HERNIOPLASTY	7	14	7	14
LT TRENDELENBERG PROCEDURE	6	12	6	12
RT HERNIOPLASTY	11	22	13	26
RT TRENDELENBERG PROCEDURE	4	8	4	8
TOTAL THYROIDECTOMY	8	16	8	16
Total	50	100	50	100
P' value	0.998 Not Significant			

TABLE - 5

Time for Closure	Suture Group	Glue Group
Mean	4.88	2.72
SD	1.534	1.325
t' value	7.534	
P' value	<0.001 Significant	

The Mean time taken for skin closure and it can be observed that the mean time taken for skin closure in adhesive group is 2.72 minutes±1.32 and that of suture group is 4.88 minutes±1.534.

TABLE - 6

POSTOPERATIVE PAIN (Time)	Suture Group		Glue Group		t' value	P' value
	Mean	SD	Mean	SD		
0 hrs	5.3	0.678	3.68	0.621	12.465	<0.001
12 hrs	5.46	0.885	3.74	0.527	11.802	<0.001
24 hrs	4.74	0.751	3.26	0.527	11.407	<0.001
48 hrs	4	0.606	2.76	0.476	11.374	<0.001
72 hrs	3.14	0.535	2.2	0.404	9.915	<0.001
7 days	2.24	0.476	1.32	0.513	9.295	<0.001

It is observed patient with skin glue have lesser postoperative pain in early hours than suture material.

TABLE - 7

ASEPSIS SCORE	Suture Group	Glue Group
Mean	3.16	0.88
SD	0.766	0.689
t' value	15.65	
P' value	<0.001 Significant	

The outcome of wound using ASEPSIS SCORE for skin glue group is 0.88 and for suture group is 3.16.

TABLE - 8

MODIFIED HOLLANDER SCALE	Suture Group	Glue Group
Mean	5.74	3.1
SD	0.694	0.931
t' value	16.07	
P' value	<0.001 Significant	

The wound cosmesis score for both skin glue and suture group with mean value of 3.1 and 5.74 respectively. The p value is of significant being <0.001.

TABLE - 9

VANCOUVER SCAR SCALE	Suture Group	Glue Group
Mean	8.36	2.86
SD	0.851	0.756
t' value	34.152	
P' value	<0.001 Significant	

The mean score for suture group is 8.3±0.8 and for skin glue group it is 2.8±0.75.This difference of score is of great significance with p value <0.001. mean score for postoperative scar for suture group is 8.3 and for skin glue group it is 2.86.

VI. Discussion

Approximation of skin incision in wound closure technique is essential for a good cosmetic and functional result. suture material is associated with puncture site near the wound edge, there is high chance of microbial invasion which in turn leads on to surgical site infection.

Needle stick injury is highly associated with suture material and hence there is high chance of transmission of HIV and other diseases. Despite all shortcomings of suture material technique, it still retains the maximum tensile strength.

An ever ending research for a material to overcome the shortcomings of various closure technique led to discovery of skin adhesive glue (octylcyanoacrylate).

Tissue adhesive were discovered in 1949 but clinically it came into surgeons practice in 1959. In earlier generation short carbon atoms were used which results in faster degradation and producing toxic

products. cyanoacrylate are topical adhesive glues that forms bond over outer surface of skin. It contains long chain plascticizer and forms strong flexible bond.

Time Taken For Skin Closure

In one of the published studies of octylcyanoacrylate of quin.J.et al, use of adhesive glue was found to be significantly faster (220 seconds versus 744 seconds; $p<0.001$).

The mean time taken for adhesive glue is 4.88 minutes ±1.53 and for skin suturing group the mean time taken is 2.72 minutes ±1.32. This difference in minimum time taken of skin closure for adhesive group if great significant with p value <0.001.

Postoperative Pain

The postoperative pain for both skin glue and skin suturing is compared at 0hrs, 12hrs, 48hrs, 72hrs and 7th postoperative day. Postoperative pain is assessed using visual analogue scale. In the present study it is seen that postoperative is less with skin glue group than with suturing techniques. This difference is of great significance with p value <0.001.

Wound Asepsis Score

Postoperative wound infection is assessed using ASEPSIS SCORE for first 5 days of postoperative period. The parameters noted during the study is seroma, erythema, purulent discharge, separation of wound and each parameters score 1-5 for first 5 days of postoperative period. Seroma and erthema are more commonly seen with skin suturing group than adhesive glue group .This difference is of great significance with p value <0.001. Postoperative scar following skin closure with adhesive glue and skin suturing is studied using Vancouver scar scale.

Postoperative Scar

Vancouver scar scale is burn scar scale which studies five parameters such as pigmentation, pliability, scar height, colour and vascularity. Score ranges from 0-13. In the present study it is observed that hyperpigmentation with increased scar height and band like texture is associated with skin suturing group. Adhesive glue group is associated with less pigmentation, normal skin colour and pliable skin. The difference is of great significance with p value <0.001.

Wound Cosmesis Score

The outcome of wound is assessed with Modified Hollander scale at various intervals. This scale allows assessment of four parameters with patient and observer satisfaction score.

In the present study early results is in favour of Adhesive glue and later follow upshows significant difference. Adhesive glue had got good cosmetic than with skin suturing.

VII. Conclusion

The present study is done to compare the skin closure technique with Adhesive skin and skin suturing material. The concept of Adhesive skin glue is superior to skin suturing due to following properties: Faster, comfortable and cosmetically better. Time taken for skin closure is shorter which in turn reduces operating time. It provides flexible, water resistant and sealed skin closure. It forms water tight barrier and allows the patient to take shower at any time. Stitches need not be removed. No need to apply bandages. Reduced postoperative pain. It disappears naturally as incision heals and leaves no mark. It is non- irritant and can be safely applied. Therefore it is concluded that Octylcyanoacrylate can be used in surgical skin closure in clean elective surgeries.

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Prof. Dr. SANTHI NIRMALA, M.S, et. al. "Comparative Study of Conventional Skin Suturing Vs Adhesive Glue." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 21(02), 2022, pp. 05-10.