



COMPARISON OF OUTCOME BETWEEN SKIN CLOSURES WITH ADHESIVE GLUE 2-OCTYLCYANOACRYLATE AND SUTURE MATERIAL IN CLEAN ELECTIVE SURGERIES

General Surgery

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ABSTRACT

Introduction: Surgical wound closure aims to move close the skin flaps for good cosmetic outcome and to favour rapid healing with low risk of complications. Present study aimed to Compare skin closures with adhesive glue 2-octylcyanoacrylate and suture material in clean elective surgeries. **Material & Method:** This comparative observational study was conducted among the patients undergoing clean elective surgical procedure in the department of General Surgery AVMC medical college and hospital. Skin closure was done with suturing or with 2-octylcyanoacrylate adhesive glue under same antibiotic coverage for same duration. Ethics committee clearance was obtained, and informed consent was taken from the study participant. Patient not agreeing for 2-octylcyanoacrylate skin closure, mucocutaneous junctional wound or not willing to be part of study were excluded from the study. Both group of patients were compared using pain, Asepsis score and Modified Hollander Cosmesis scale. The collected data were analysed using SPSS v21 operating on windows 10, with p-value of <0.05 considered statistically significant. **Result:** In present study total of 120 patients included with 60 in each group. The mean age of patients was 39.41 ± 12.63 yrs. Among them 53 were female and 67 were male patients. On assessment of the pain score was significantly less ($p=0.03$) using 2-octylcyanoacrylate adhesive glue (0.18 ± 0.39) than suture (0.37 ± 0.55). Asepsis score was significantly less ($p=0.01$) using 2-octylcyanoacrylate adhesive glue (11.28 ± 4.23) than suture (16.28 ± 4.23). Modified Hollander cosmesis scale was significantly higher ($p=0.01$) using 2-octylcyanoacrylate adhesive glue (4.33 ± 0.68) than suture (4.07 ± 0.76). At various interval the Adhesive glue group showed superior result compared to the skin suture group which was statistically significant. ($p<0.05$) **Conclusion:** Adhesive glue group found to have better tolerance towards the pain in post-operative period compared to the suture. Also, there was better Asepsis score in adhesive glue group and also better Modified Hollander Cosmesis scale score and overall Cosmetic outcome among the patients of adhesive glue compared to skin suture.

KEYWORDS

Wound, Adhesive Glue, Suture, Cosmesis Scale, Asepsis Score, Visual analogue scale

INTRODUCTION

Surgical wound closure aims to close the skin flaps for good cosmetic outcome and to favour rapid healing with low risk of complications. Infection of surgical wound is a complication with an incidence of 1% to 3% and it is affected by age, site, smoking, host immune status, underlying illness, obesity, level of wound contamination.¹ Further significant risk factors are related to type and complexity of the surgical procedure, duration of operation, type of surgical approach. Another complication of surgical procedures is wound dehiscence that may increase the inpatient stay, resulting in additional costs, and it has a 9.6% attributable mortality.^{2,3}

Further surgical wound complications are the formation of hypertrophic or keloid scarring. The cosmetic appearance of the scar after healing affects the satisfaction of patients. A meticulous surgical technique is needed to avoid local swelling, dehiscence of the wound, and a poor cosmetic result.

A new technology is surgical adhesives, Cyanoacrylate that could provide patients with the option of suture less skin closure is fast catching up. Surgeons are faced with different kinds of wounds daily that have to be closed. With a plethora of skin closure materials currently available, choosing a solution that combines excellent and rapid cosmetic results with practicality and cost-effectiveness can be difficult, if not tricky.^{4,5}

We believe that a systematic review of comparative study is required to compare sutures with respect to Glue in terms of wound infections, length of hospital stay, rates of readmission, adverse events, pain, patient satisfaction with cosmetic results, in order to provide surgeons, the optimal method for skin closure in different surgical specialties.

MATERIAL AND METHODS

The present comparative observational study was conducted by the patient coming to department of general surgery, AVMCH undergoing clean elective surgery, those who are willing to participate in the study

by giving informed and written consent patients were grouped based on type of closure. This is a comparative study in which patients were studied in two groups. Skin Suturing Group: Patients with suture material skin closure in clean elective surgery and Adhesive Glue Group: Patients with 2-Octyl Cyanoacrylate skin closure in clean elective surgery. Cases undergoing clean elective surgical procedure and skin closure with suturing or with 2-octylcyanoacrylate, adhesive glue under same antibiotic coverage for same duration were included. Surgeries where stomas were necessary, Patients not agreeing for 2-octylcyanoacrylate skin closure and mucocutaneous junctional wound were excluded.

In each case both the group's preoperatively, detailed history was taken and routine investigation like haemoglobin, total count, differential count, ESR, RBS were done to rule out any acute or chronic infection or malignancy. Preoperative shaving of the parts was done at the same time on previous evening and same antibiotic protocol was followed, Injection Cefazolin 1gm single dose given intravenously at the time of anaesthesia and in minor surgeries, which were done under local anaesthesia antibiotics were administered immediately before surgery. In both group after procedure is finished, the wound was dried. The time of start of skin closure was noted down and the time of finishing skin closure is also noted. The time taken for skin closure was noted. In both the groups, the post-operative pain was assessed at 0 hours, 12 hours, 24 hours, 48 hours, 72 hours, and 7th day using Visual Analogue Scale of 0 to 100. 0 being no pain and 100 is worst pain possible as rated by patient themselves. The outcome of wound was assessed at 3rd, 5th, 7th post-operative days using ASEPSIS score. Wound is scored from 0 to 10, according to the proportion of wound involved and presence of serous collection, erythematous changes, purulent exudates, and separation of deep tissues. The wound was assessed for Cosmesis on 7th post-operative day using Modified Hollander Cosmesis Scale which has 6 clinical variables as step-off borders, edge inversion, contour irregularities, excess inflammation, wound margin separation, and good overall appearance. A total cosmetic score was derived by adding the scores of variables. A score of 1 is given to each variable if not

present in the wound, so a score of 6 was considered as optimal while 5 or less as sub-optimal. Any complications/infections if present are also observed in both the groups. On the follow-up at 1st month and 3rd month, the Wound Cosmesis was assessed by independent blinded observer and wound scoring is done using Visual Analog Scale of 0 to 100.

Statistical Analysis

All the data were entered in excel sheet and analysed using SPSS v21 operating on windows 10. The data were summarised as frequency, percentage, mean and standard deviation. The mean difference between the continuous variables was analysed using unpaired t-test and categorical using chi-square test. A p-value of <0.05 was considered statistically significant.

RESULTS

In present study total of 120 patients fulfilling inclusion criteria were included with consent. The mean age of patients was found to be 39.41yrs as shown in Table 1. Among them 53 were female patients and 67 were male patients. The mean Asepsis score was significantly lower on post operative day 3 in adhesive glue group compared to the suture group ($p<0.05$). The cosmesis score was found to be significantly better in adhesive glue group compared to the skin suture group ($p<0.05$). The Cosmesis was monitored using Modified Hollander cosmesis scale, study found the scores were significantly better in adhesive glue group at post operative day 7, 1st month, 3rd month compared to skin suture group. ($p<0.05$). The total cosmetic score was also found to be significantly better adhesive glue group compared to skin suture groups. ($p<0.05$)

Table 1: Comparison of the mean VAS score between the groups using unpaired t-test

Pain VAS Score	Skin closure				p-value
	Adhesive Glue		Skin Suture		
	Mean	SD	Mean	SD	
Duration	2.15	.63	7.5	.63	0.01*
0hr	3.43	1.25	5.25	1.00	0.01*
12hr	2.77	.74	3.75	1.39	0.01*
24hr	1.95	.59	2.85	.99	0.01*
36hr	.52	.68	2.10	.99	0.01*
48hr	.32	.47	1.38	.90	0.01*
7day	.27	.45	1.58	.62	0.01*
1month	.30	.46	.65	.71	0.01*
3month	.18	.39	.37	.55	0.03*

Table 1 shows assessment of the mean pain score, overall, the mean pain score was significantly lower among the patient in adhesive glue group compared to the skin suture group at various follow-up period. ($p<0.05$). The mean pain score at 12hr, 24hr, 36hr, 48hr, 7days, 1month and 3rd month it was significantly lower in adhesive glue group compared to skin suture group. ($p<0.05$)

Table 2: Comparison of the Asepsis score between the groups using unpaired t-test

ASEPSIS Score	Skin closure				p-value
	Adhesive Glue		Skin Suture		
	Mean	SD	Mean	SD	
POD3	17.53	5.85	17.73	5.85	0.895
POD5	11.28	4.23	16.28	4.23	0.01*
POD7	5.28	3.50	7.28	3.50	0.056

Table 2 shows assessment of the Asepsis score between the groups, the mean score was significantly better in adhesive glue group compared to suture group. The mean Asepsis score was significantly lower on post operative day 3 in adhesive glue group compared to the suture group. ($p<0.05$)

Table 3: Comparison of the Modified Hollander Cosmesis Scale between the groups using unpaired t-test

Modified Hollander Cosmesis Scale	Skin closure				p-value
	Adhesive Glue		Skin Suture		
	Mean	SD	Mean	SD	
POD7	4.25	.68	2.25	.68	0.01*
1month	4.30	.67	2.25	1.00	0.01*
3rd month	4.27	.69	3.33	.80	0.01*
Total Cosmetic score	4.33	.68	4.07	.76	0.01*

Table 3 shows the cosmesis score, which was found to be significantly better in adhesive glue group compared to the skin suture group. ($p<0.05$). The Cosmesis was monitored using Modified Hollander cosmesis scale, study found the scores were significantly better in adhesive glue group at post operative day 7, 1st month, 3rd month compared to skin suture group. ($p<0.05$)

DISCUSSION AND CONCLUSION

In present study total of 120 patients fulfilling inclusion criteria were included with consent. The patients were randomly allotted to groups based on skin closure type. Groups were one with adhesive glue skin closure and other group with skin suture as method of skin closure. Each group consisted of 60 patients, with total of 120 patients in the study.

The mean age of patients was found to be 39.41yrs. Among them 53 were female patients and 67 were male patients. Between the groups, there was comparable mean age with no statistically significant difference. Gender distribution between the groups were comparable. On assessment of duration of closure of the skin, the mean duration in adhesive glue group was significantly lower compared to the skin closure by suture.

Pawar AA et al., documented the mean age of patient as 37.90yr with comparability between the groups.⁶ In similar to present study, Gennari MD et al., documented that when compared to normal suture, patient satisfaction with the wound closed with OCA was considerably higher ($P<0.001$). Tissue adhesive application was much quicker than normal suture application ($P<0.001$).⁷ In study by Ananda BB, the mean age was found to be 41yrs with no significant difference in the mean age between the groups. Similar to present study they documented the male preponderance.⁸

On assessment of the mean pain score, overall, the mean pain score was significantly lower among the patient in adhesive glue group compared to the skin suture group at various follow-up period. ($p<0.05$) The mean pain score at 12hr, 24hr, 36hr, 48hr, 7days, 1month and 3rd month it was significantly lower in adhesive glue group compared to skin suture group. ($p<0.05$)

Pawar AA et al., on day 7, the mean VAS score for the skin adhesive group was 67.67, which was substantially higher than the scores for suture and stapler. On days 7, 14, and 28, the skin adhesive group had substantially higher mean MHCS and VAS scores than the suture and stapler groups. When compared to staples and sutures, octylcyanoacrylate can be employed for skin closure in clean elective operations with superior aesthetic outcomes.⁵

Ananda BB et al., showed comparatively less post-operative pain in the glue group followed by staples group then in the skin suturing group as measured at 12hrs, 24hrs, 48hrs, 3rd day and 7th day interval.⁸

Similarly on assessment of the Asepsis score between the groups, the mean score was significantly better in adhesive glue group compared to suture group. The mean Asepsis score was significantly lower on post operative day 3 in adhesive glue group compared to the suture group. ($p<0.05$)

The cosmesis score was found to be significantly better in adhesive glue group compared to the skin suture group. ($p<0.05$) The Cosmesis was monitored using Modified Hollander cosmesis scale, study found the scores were significantly better in adhesive glue group at post operative day 7, 1st month, 3rd month compared to skin suture group. ($p<0.05$) The total cosmetic score was also found to be significantly better adhesive glue group compared to skin suture groups. ($p<0.05$)

In study by Chen K et al., the number of patients with complications including erythema (1/40 vs. 16/40), tenderness (1/40 vs. 19/40), and drainage (1/40 vs. 9/40) was lower with OCT than with sutures, respectively (all $P<0.001$). The ports closed with OCT had higher overall HWES, i.e., better cosmetic score (5.92 ± 0.05 vs 5.50 ± 0.13) and lower margin separation (1/40 vs. 10/40) but had higher contour irregularity (6/40 vs. 1/40) (all $P<0.05$). However, skin contour irregularity was significantly better when OCT was applied using fine tissue forceps ($P=0.002$).⁹ In study by Brown JK et al., The skin adhesive group had considerably faster skin closure time. The mean wound cosmesis ratings on the visual analogue scale were comparable

between groups.¹⁰

In concordance Pawar AA et al., documented on day 7, the mean MHCS score for the skin adhesive group was 4.83, which was substantially higher than 3.90 for suture and 3.97 for stapler.⁶

The time it takes to apply OCA is one of the major advantages it has over conventional sutures. The shorter application time makes it ideal for emergency situations, as well as for pediatric patients. Pediatric patients are usually in severe distress, in a state of anxiety, and in pain when minor surgical procedures are needed. The quicker you can stop the bleeding and approximate the edges, the quicker you can get the child into a lower state of anxiety. OCA also does not require anesthesia and the child can often remain in their parent's lap while it is applied.¹¹

In similar study by Ananda BB et al., significantly indicated that the ASEPSIS score in the glue population was lower than in the other two groups, suggesting that the use of glue had lower infection rates when compared to staples and sutures.⁸

OCA is successful and dependable in skin closure for breast surgery, producing aesthetic outcomes comparable to conventional suture. OCA is quicker than traditional wound closure and has various advantages over suture healing for patients. According to cost study, OCA adhesive can drastically reduce health care costs.⁷ Skin glue produces the greatest outcomes in terms of post-operative discomfort, wound aseptis, cosmesis, and cost-effectiveness. Tissue glue is a safe, appealing, and successful alternative to other standard techniques of wound closure following elective surgery.⁸ Ananda BB et al., found that Skin glue gives the best results in terms of less post-operative pain, wound aseptis, better cosmesis and cost-effectiveness.⁸

The present comparative study between the adhesive glue and skin suture conclude that the glue group found to have better tolerance towards the pain in post-operative period compared to the suture. Also, there was better Asepsis score in adhesive glue group and better Modified Hollander Cosmesis scale score and overall Cosmetic outcome among the patients of adhesive glue compared to skin suture.

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