



Surgery

A STUDY TO COMPARE DIFFERENT METHODS OF WOUND CLOSURE-A PROSPECTIVE STUDY

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ABSTRACT "Super Glue" or Cyanoacrylate (CA) is an acrylic resin which rapidly polymerises in the presence of water. The principle component of commercial CAs (SuperGlue, Krazy Glue, Loctite) is either methy-2-cyanoacrylate or ethyl-2-cyanoacrylate, the original forms of CA developed in 1942 by Kodak Laboratories. (The discovery was made whilst investigating potential, high clarity, acrylics for the use in gun sights. Whilst not suitable for this application CA was quickly identified as a fast acting, low shear strength adhesive.)

AIMS AND OBJECTIVES: In the present study, we compare cyanoacrylate, adhesive closure of surgical incision with conventional methods

Material and methods: This prospective study was conducted in orthocare hospital Delhi from May 1 2014 to may 2017.

Inclusion criteria: All Patients admitted in surgical ward for elective surgery.

Exclusion criteria: All patients with multiple comorbidities were excluded from the study.

Conclusion: In conclusion, this controlled comparative study shows no difference in cosmetic aspect between adhesive and suture-treated skin incisions. Morphologically, the glue treatment is not related to any adverse effect.

KEYWORDS : Complications, Cyanoacrylate, Emergency

INTRODUCTION

Long times back in history (3000 B.C.) wounds were closed by Egyptians using thorns and needles. They also used adhesive linen strips, similar to modern day steri strips 2000 BC (Baily & love 25th ed.), medical literature contains references to the use of strings and snaws for ligating and suturing. South American used large black ants which bite the wound edges together.

Super Glue" or Cyanoacrylate (CA) is an acrylic resin which rapidly polymerises in the presence of water. The principle component of commercial CAs (SuperGlue, Krazy Glue, Loctite) is either methy-2-cyanoacrylate or ethyl-2-cyanoacrylate, the original forms of CA developed in 1942 by Kodak Laboratories. (The discovery was made whilst investigating potential, high clarity, acrylics for the use in gun sights. Whilst not suitable for this application CA was quickly identified as a fast acting, low shear strength adhesive.) During the Vietnam war it was used in field surgery with good effect, however, despite the promising results it was not approved by the United States Food and Drug Administration due to the unknown toxicity and two significant side effects during the polymerization process:

The curing process creates an exothermic reaction (heat) which can cause further tissue damage.

The process releases cyanoacetate and formaldehyde - both irritants to the eyes, nose, throat and lungs.

AIMS AND OBJECTIVES

In the present study, we used the cyanoacrylate, tissue adhesive closure of surgical incision to compare the results with conventional methods.

MATERIAL AND METHODS

This prospective study was conducted in orthocare hospital Delhi from May 1 2014 to may 2017.

INCLUSION CRITERIA

All Patients admitted in surgical ward for elective surgery.

EXCLUSION CRITERIA

All patients of emergency surgery were excluded from the study

OBSERVATION:

TABLE -1: distribution of cases according to operation performed.

Name of operation	No. Of cases in study group	%	No. Of cases in control	%
Herniotomy / Hernioplasty	11	27.5	10	25

Appendicetomy	6	15.0	8	20
Enucleation fibroadenoma breast	5	12.5	4	10
Total hip replacement	6	15	6	15
Total knee replacement	3	7	3	7
ORIF	6	15	6	15
Lipoma removal	5	12	5	12
Cholecystectomy	3	5	3	5
Scar revision	2	4	2	4
Traumatic wound	1	2	1	2

TABLE-2: Distribution of cases according to site of operation.

Name of operation	Study group		Control group	
	No.	%	No.	%
Face	11	35.5	12	30.0
Abdomen	7	22	10	25.0
Knee	13	23	10	25.0
Thigh	5	15	4	10.0
Extremities	1	1	1	2.5
Neck	3	7.5	3	7.5
TOTAL	40		40.0	

TABLE-3 Distribution of cases according to average duration of hospital stay

OPERATION	Study group		Control group	
	No.	Duration (days)	No.	Duration (days)
Total hip replacement	10	2	10 Same day discharge	3
Appendicetomy	5	3	7	5
Enucleation fibroadenoma breast	5	Same day discharge	4	2
Traumatic laceration	12	Same day discharge	7	Same day discharge
Open cholecystectomy	1	3	2	8
Total knee replacement	1	Same day discharge	5	Same day discharge
Fracture hip	2	Same day discharge	1	Same day discharge

Dermoid cyst	1	Same day discharge	1	Same day discharge
Mean	2.72	4.72		
SD	1.03	2.50		
T	-4.76			
P	<0.001HS			

TABLE-4 Distribution of cases according to incidence of post operative inflammation.

Characteristics	Study group (n=40)		Control grou(n=40)	
	No.	%	No.	%
No. Of patients developing erythema	7	17.5	9	22.5
t	0.31			
P	>0.05HS			

TABLE-5 Incidence of severity of infection

Grades of infection and percentage	Study group (n=40)		Control group (n=40)	
	No.	%	No.	%
Overall no. of patients having infection	8	20.0	9	22.5
Serous discharge	8	20.0	6	15.0
Seropurulent discharge	3	7.5	7	17.5
T	0.22			
P	>0.05 ^{HS}			

DISCUSSION:

In the present study, cyanoacrylate, a tissue adhesive was used in skin closure of various operations with an aim to find out: time consumed ,incidence of infection, Duration of Hospital Stay, Cosmetic result Study included a wide spectrum of cases. Cases were selected from the patients in emergency as well as indoor surgical wards of orthocare hospital Delhi.

in a study conducted by Bernard L, et al. Arch Dermatol. 2001. he concluded that The cosmetic outcome of cutaneous excisional surgery wounds closed with standard suturing was found to be superior to that of wounds closed with octyl cyanoacrylate Other study conducted by Greene D, et al came to the conclusion that Octyl-2-cyanoacrylate glue is an excellent alternative to suture closure, producing equivalent quality of closure at all time points and no difference in appearance. This adhesive was sufficient to withstand the forces of closure in upper eyelid blepharoplasty without dehiscence in the absence of sutures.

A study conducted by Barnett et al (1998) to compare histoacryl blue tissue adhesive glue with suturing in the repair of simple paediatric lacerations. Children 4 years old or older with non-ragged lacerations <5 cm in length, <12 hr old and not involving eyelid or mucous membrane were selected. A total of 163 patients were randomly allocated to either glue (83 cases) or sutures (80 controls) to repair their laceration. Primary outcome measures were cosmetic outcome at 3 and 12 months with secondary outcomes- length of time to perform procedure, and pain assessment of Procedure by doctor, nurse, parent and child. Tissue adhesive glue is faster and probably less painful than suturing. Tissue adhesive glue has the same cosmetic result as suturing when used for the repair of simple lacerations in children.

In one of the studies by Chibbaro S, et al. they concluded by saying that the new NCA tissue adhesive is a safe, effective and reliable skin closure for neurosurgical procedures in the supratentorial region; it also achieves optimal cosmetic results, is less time consuming to use and has greater patient satisfaction. However, further studies with a larger number of patients are necessary to corroborate these results.

Brunius and Ahren(1967) in their study on albino rats showed that tensile strength of incisions with non suture techniques was higher than that of sutured dehiscence. In this study, total 3 patients required secondary suturing and all patients were having appendectomy wound.

In a study conducted by Dalvi et al (1986) 3.57% cases of wound

closure by cyanoacrylate developed wound dehiscence and required secondary suturing Whereas only 12% cases required secondary suturing.

In majority of cases the glue was removed by patient himself on 7th day. This can easily be done by washing the part with soap solution or with savlon. No sterile instrument and assistance was required. The removal was entirely painless and pleasant for most of the patients especially children.

SUMMARY AND CONCLUSIONS

Wound closure by cyanoacrylate was quicker, pain free, had better cosmetic appeal and the hospital stay of the patients was reduced. No significant difference was found in infection rate and wound complication.

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