

A Study of Comparisons of Normal Suturing and Adhesion of Skin Closure Tissues in Surgery of Inguinal Hernia

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Abstract

Background: Suture material has evolved into advanced wound closure procedures such as skin staplers, skin glue, and sticky tapes. Based on the success of enhanced suturing procedures, patients may experience improved cosmesis, less postoperative discomfort, less wound infection, and a shorter stay in the hospital. The researchers wanted to see how adhesive glue compared to suture material for skin closure in hernia procedures. Closing wounds in an aesthetically acceptable manner has always been difficult. Surgeons have attempted to create "invisible scars" since the dawn of time. This, on the other hand, has always eluded me. 'Scar' is a surgeon's signature. Technically, the skin closure procedure should be simple, acceptable, quick, and cost-effective. Sutures and staples are still the most commonly used procedures. The usage of GLUE, on the other hand, is becoming more common in clinical practise. With regard to time management, postoperative pain, ulcer problems, cosmesis, and cost-effectiveness, the authors compared all three procedures.

Aim: The study aims to comparison of conventional suturing and tissue adhesive (2-octyl cyanoacrylate) for skin closure in inguinal hernia surgeries

Material and Method: There were 70 people in this study who underwent inguinal hernia surgery. Skin closure was performed on 35 patients with traditional suturing (3-0 ETHILON) and tissue glue on the remaining 35 patients (2-octyl cyanoacrylate). Postoperative discomfort, duration of skin closure, and scarring tests were all detected, and the findings were compared. In the General Surgery Department, a 2-year randomized controlled trial comparing tissue glue and wound-closing sutures following selection procedures was performed on 70 healthy patients.

Results: The average skin closure time in the adhesive group was 1.521.444 minutes, while the average skin closure time in the suture group was 3.661.33 minutes. With a p value of 0.001, this difference is significant. The mean visual analogue value of the suture group was 4.5 ± 0.58 , while the average skin group value was 2.38 ± 0.72 . With a p value of <0.001 , this value was very significant. The tissue glue group had less postoperative pain than other groups. At regular intervals, the postoperative scar was tested using a Vancouver scale. The average score for the suture group was 7.4 ± 0.4 , while the average skin glue group was 1.9 ± 0.65 . At p value of <0.001 , these changes in effect were significant.

Conclusion: In clean elective procedures, adhesive glue outperforms traditional suturing. It is a safe and successful form of skin closure that results in decreased postoperative pain and improved scar cosmesis. Staples are easier to use and take less time to apply than glue and

stitches. In terms of post-operative discomfort, wound asepsis, cosmesis, and cost-effectiveness, skin glue delivers the best results.

Keywords: Adjusted holander scale, Octyl-2-cyanoacrylate, Staplers, Sutures, tissue glue, VAS, wound closure, Cyanoacrylates.

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Introduction

In prehistoric times, many natural sources, such as honey, were used as antibiotics. In modern society, these traditional methods of healing are still used. In the 1960s and 1970s, polymeric coatings were introduced in a variety of ways and were custom made. A new initiative is now underway that will summarize everything to support wound healing in the right way. An important condition for skin closure is tissue limitations. A healthy joint of tissue and an acceptable physical scar are two aspects of the surgeon's work. Complex methods of wound healing that have emerged from the initial discovery of suturing material include skin staplers, skin glue, and adhesive tapes. [1]

Patients may benefit from improved cosmesis, less postoperative discomfort, and less wound infection, as well as a shorter hospital stay, based on the efficacy of enhanced suturing methods. Therefore, for maximum results, it is important to investigate and compare the adhesive glue with the suture material. When the surgeon removes a clean wound, there is minimal tissue loss, no significant bacterial infection, and small scars, and the results with glue are better than suture material. In addition, compared with sutures, the use of glue saves time during surgery. [2,3]

The best way to cut and close a hole is to be simple, safe, fast, inexpensive, painless, disinfectant, and result in a healthy scar look. Cyanoacrylate tissue adhesives has many of these features. The cyanoacrylate adhesive, developed in 1949, is applied to the outer layer of the skin. Given liquid monomers of

cyanoacrylates. When they come in contact with tissue anions, they coalesce, forming a strong bond that holds the wound ends together. After 5-10 days, the cyanoacrylate attachments shrink and crack again and do not need to be removed. In 1958, cyanoacrylates were first marketed as a very strong, fast-drying adhesive. [4] Alkyl cyanoacrylates are the most extensively used tissue adhesives today. [5]

Tissue adhesives act as a barrier to microorganisms entering the healing site, resulting in a reduction in wound infection. When compared to stitches, glue provides the best cosmesis. [6,7] Patients in the skin suture group required postoperative dressing, however wound closure with glue was relatively inexpensive. When employing adhesive instead of suture, there is no risk of needle stick harm to the surgeon. Multiple puncture sites are a cause of infection in sutured wounds, which is avoided in sticky glue, minimising wound infection. [8] The use of sticky glue for skin closure eliminates dead space, and thorough hemostasis should be achieved for best results. Although the cost of glue is considerable, the overall effective cost of suture material is also high, taking into account transportation costs for follow-up, lost earnings, local dressing, and antibacterial medications.

The overall cost-effectiveness of sticky glue and suture material was nearly identical. In wound closure, adhesive glue is extremely important. In this study, tissue glue is

compared to traditional suturing in hernia procedures.

Material and Methods

The research was conducted out in the General Surgery Department. All of the participants in the study gave their informed consent in both English and the vernacular language.

Selection of Patients

This prospective comparative study, consisting of 70 patients divided into two groups, was conducted in collaboration with the General Surgery Center, Datta Meghe Medical College, and Shalinitai Meghe Hospital Nagpur. Patients with unilateral inguinal hernias aged 15 to 65 with open inguinal hernia are included. Cases with specialized clean surgery and skin closure with normal skin suturing or staples or adhesive skin coated with the same antibiotics. Patients between the ages of 15 and 65, those who have had pre-existing hernia, patients with diabetes and immune-compromise, and those with skin disease in the workplace are all eligible. Removal procedures included multiple injuries, peripheral vascular disease, insulin-dependent mellitus diabetes, known bleeding diathesis, personal or family history of keloid formation or scarring, and known sensitivity to cyanoacrylate chemicals or -formaldehyde. Patients with unilateral inguinal hernia who were admitted to Shalinitai Meghe Hospital Nagpur and who met the conditions of admission will be monitored, and data on patient characteristics, surgical procedures, and results will be collected. Patients signed an informed consent form.

The group was split into two using randomization software. Patients undergoing inguinal hernia surgery will be divided into two groups: group 1 and group 2. Patients in group 1 had skin clogged with adhesive

tissue. (2-octyl cyanoacrylate) is a type of cyanoacrylate. Patients in group 2 have their skin sealed with 3-0 ethylon which can be absorbed from time to time.

The study included 70 patients who had open inguinal hernioplasty, open appendectomy, lipoma excision, and open cholecystectomy and were generally healthy. Following these treatments, which include subcutaneous measurements to close the dead area and set wound boundaries, patients were randomly assigned to one of three groups. The holes in group A are sealed with propen and glue (octyl-2-cyanoacrylate). Propen was used to apply a thin layer of octyl-2-cyanoacrylate over the entire wound, stretching 5-10mm across the edge of the wound.

Parameters

- Duration of skin closure with suture material and skin glue,
- The postoperative scar was tested using a Vancouver scale,
- Postoperative pain was studied on a visual analogue scale,
- The cosmesis of wounds is assessed by Hollander's adjusted scale.

Tables and statistics show intermediate results (mean standard deviations) in continuous data as well as the number and percentage of dichotomous data. The chi-Square experiment with Yates modification was used to perform a consistent analysis of the dichotomous variables observed.

Statistical analyses

The students't test was done to see if there was a statistical difference in the parameters measured between male and female subjects. Statically significant was defined as a P value of less than 0.05. The spas package was used to analyze the data.

Result:

Table 1: Open appendicectomy, lipoma excision, open cholecystectomy, and hernioplasty were the four procedures conducted.

Variable	Glue	Sutures	Total
Age (Mean + SD)	31.10± 15.81	28.18±12.30	31.10±14.31
Female	20	10	30
Male	21	19	40
Surgical procedure			
Hernioplasty	15	15	30
Open appendicectomy	8	8	16
Lipoma excision	5	5	10
Open cholecystectomy	4	4	8
Incision Length (cms) (Mean + SD)	5.43±1.23	5.75±1.34	4.41±1.33
Time taken for wound closure (Mean + SD)	99.85±14.19	249.77±22.72	115.64±44.03
Complications			
Serous Exudate	3	5	8
Erythema	2	10	12
Purulent exudates	2	5	7
Wound gaping	1	2	3
Length of hospital stay	4.57±0.87	5.60±4.24	4.40±4.18

Table 2: Comparison of postoperative scar among study group using vancouver scar scale.

Vancouver Scar Scale	Suture	N	Mean ±SD
	Suture	35	9.38 ±0.75
	Glue	35	3.66±0.85

Table 3: Comparison of wound cosmesis score using modified hollander scale.

Modified hollander scale	Suture	N	Mean ±SD
	Suture	35	4.84 ±0.79
	Glue	35	2.15± 0.83

At various periods, the wound's outcome was measured using a modified Hollander scale. This scale provides for the evaluation of four parameters, as well as the satisfaction of both the patient and the observer.

Discussion

For a satisfactory cosmetic and functional result, wound closure technique must approximate the skin incision. All wound closure techniques have the same goal: to approximate the wound borders without interfering with the natural healing process. Because of the expense and availability of suture material, skin closure techniques have

traditionally been performed with it, but the current trend is toward a speedier, more comfortable, and more cosmetically pleasing procedure. Furthermore, when compared to sutures, the use of glues results in a shorter operating time. As a result, tissue adhesives can be used instead of sutures, staples, and adhesive strips. [9] Suture material is still used to close wounds, despite the fact that it is linked to postoperative pain and the need to return for suture removal, which can cause concern or suffering.

Wound biomaterials are divided into three categories: trace elements, basics, and tissue adhesives. Suturing has become a widely used wound closure treatment method due to the

high reliability of the sewing material. Suturing, on the other hand, requires expertise and knowledge, as well as time and the need to remove the stitches. Some processes have long been under investigation. Because of this concern, surgeons are increasingly using tissue grafts to heal wounds instead of stitches. [10,11] Several studies have been conducted to compare the efficacy of tissue adhesives versus conventional sutures in the closure of facial wounds. [12-16]

Bacterial infestations are particularly dangerous because the suture material is attached to the perforated areas of the wound, which can lead to surgical infection (SSI). In addition, SSI is considered low when glue is used instead of staplers. [17] Some people mistakenly believe that applying glue is the same as using stitches. Because suture material is often associated with needle damage, there is a high risk of transmission of HIV and other infections.

Greater strength is maintained despite all the shortcomings in suture material technology. Returning to the stapler device, faster application is associated with a decreased rate of tissue reaction and infection. These stapling devices, on the other hand, do not provide a precise closure, and removing staples is a pain.

Skin sticky glue was developed as a result of a never-ending search for a chemical that could overcome the limitations of a variety of closure processes (octyl-2-cyanoacrylate). Tissue adhesive was discovered in 1949, but not until 1959 that it was utilized in surgery. Previous generations used short carbon atoms, which resulted in fast disintegration and dangerous chemicals. Topical adhesive glues, such as cyanoacrylate, adhere to the outer surface of the skin. It contains a long chain plasticizer, resulting in a strong and flexible bond. Octyl-2-cyanoacrylate is a cyanoacrylate derivative having a longer carbon chain than its shorter equivalents, making it stronger and more flexible. [18,19]

This was revised in 2010 with the addition of six more studies, bringing the total number of RCTs to fourteen (1152 patients). [20] Sutures have been found to be significantly higher than tissue attachments in preventing rot in clinical trials. Sutures are also proven to be much faster to use than previous studies. There was no significant difference between sewing and tissue attachment, patient and operator satisfaction, or cost. [21] One study compared the adhesive tissue with different ways of sealing wounds, and found that other closures were more enjoyable for patients and nurses than attachments. [22] Tissue glue resulted in a faster wound closure time, less postoperative discomfort, and improved wound cosmesis in this study. [23]

Conclusion:

According to this study, the use of 2-octyl cyanoacrylate creates a visibly better scar when compared to conventional suturing. Tissue adhesive and suturing, on the other hand, have similar early difficulties. 2-octyl cyanoacrylate is a safe and effective way to close skin incisions that has no short-term negative effects and a better cosmetic appearance than other solutions.

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