

Comparison of various methods of skin closure in inguinal hernia repair

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Abstract

Introduction: The optimal method of skin closure still remains ambiguous. Surgical sutures are conventionally used in skin closure of surgical wounds. The alternative wound closure devices available include skin staplers, adhesive tapes and skin glue. Various studies have been conducted all over the world using sutures, adhesive tapes, skin staplers and skin glue in closure of different wounds. Since Sutures have been the gold standard for skin closure, studies have been done to show that newer methods are equally useful if not better. **Aims and Objectives:** To Comparison Various Methods of Skin Closure in Inguinal Hernia Repair with respect to Cosmesis. **Methodology:** This study is a prospective study conducted at Aarupadai Veedu medical college and hospital, Pondicherry, during the period October 2013 to August 2015 after obtaining approval from the Institutional Ethics Committee. We prospectively randomized 120 patients between the age of 20 years and 70 years. The cosmesis was assessed at the end of the 1st month using the VAS; this scale is 100 mm long with “worst scar” written at 0 mm and “best scar” written at 100 mm. A wound registry data sheet was created using Microsoft excel and the data entered was statistically analysed using the SPSS software. **Result:** At the end of first month after surgery using a VAS. We also found that there was no difference in cosmesis at the end of one month between sutures, skin glue and Adhesive tapes but there was significantly worse cosmesis in those who were assigned to the stapler group (P-value<0.000074). **Conclusion:** Worse cosmesis in the stapler group was found as compared to others Treatment Group.


Keywords: Hernia Repair, Skin Glue, Staplers, Adhesive tapes, Sutures.

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INTRODUCTION

The optimal method of skin closure still remains ambiguous. Surgical sutures are conventionally used in skin closure of surgical wounds. The alternative wound closure devices available include skin staplers, adhesive tapes and skin glue. Various studies have been conducted all over the world using sutures, adhesive tapes, skin staplers and skin glue in closure of different wounds. Since Sutures have been the gold standard for skin

closure, studies have been done to show that newer methods are equally useful if not better. The decision as to which closure material to use is highly dependent on the anatomical location, length of the wound and the age of the patient. The ideal wound closure device should be easy to use, enable rapid wound closure, painless and provide excellent cosmesis and be cost effective.¹ The ultimate goals of wound closure are avoiding infection and achieving a functional and cosmetically appealing scar. To date, most clinical studies have focused on wound infection rates despite the fact that wound infection rates are low.^{2,8} Patients are more concerned with the ultimate cosmetic appearance of their wounds. With the development of a reliable and valid cosmetic scale, emphasis is shifting toward measuring cosmetic appearance as the primary outcome measure of wound repair.^{3,5,8} Surgical sutures are principally used for skin closure in wounds after injury or surgery. The inventor of sutures was Al-Zahrawi who was a surgeon of the 10th century.⁹ Sutures and suturing techniques have

evolved since. Sutures themselves act like foreign bodies and can cause tissue inflammation. Poor surgical technique while inserting the sutures and successive tissue local swelling after skin closure, localized tissue ischemia can create wound dehiscence and a poor cosmetic result. Surgical staples are medical devices that could be used to place metallic sutures in skin incisions. The staples were invented by Humer Hultl, a Hungarian surgeon in 1908.¹⁰ Contemporary staple devices were pioneered in the U.S.S.R.¹¹ Despite the fact that various studies have revealed great applicability of staples both in surgical wounds and traumatic lacerations, it remains uncertain if staples give a superior cosmetic result or reduce pain. The concept of using surface adhesive tape to close surgical wounds is not new and antedates the development of a satisfactory suturing technique. Linen strips were used in Egypt in 1600 B.C. ⁹Ambroise Pare and John Hunter both described techniques of suture-less skin closure, Golden *et al*¹⁴ described the use of a sterile adhesive tape which caused no chemical irritation, could be removed painlessly, permitted free evaporation of fluids, and was easy to handle while wearing surgical gloves. Steri-strips are available in varying sizes and shapes and are being used judiciously for closure of different wounds. The first cyanoacrylate was developed in 1949, it resulted in a strong inflammatory action with regard to tissue. In 1970 n-butyl-cyanoacrylate was developed, which had negligible toxicity and a good tissue seal. The improved 2- oetylcyanoacrylate tissue adhesive is an improved alternative to traditional devices for skin closure, they have repeatedly been found to be equal in effectiveness and safety for repair of lacerations and surgical incisions.^{13,14} The purpose of our study was to compare sutures, stainless steel staples, adhesive tapes and skin glue for wound closure in inguinal hernia repairs. Our objective was to determine the cosmesis between these devices.

AIMS AND OBJECTIVES

To Comparison Various Methods of Skin Closure in Inguinal Hernia Repair with respect to Cosmesis.

MATERIAL AND METHOS

This study is a prospective study conducted at Aarupadai Veedu medical college and hospital, Pondicherry, during the period October 2013 to August 2015 after obtaining approval from the Institutional Ethics Committee. We prospectively randomized 120 patients between the age of 20 years and 70 years. The patients were divided into 4 groups; Suture group, Stapler Group, Adhesive tapes group and Skin Glue group respectively. The randomization was done using sealed envelopes, Patients with Inguinal hernia were included into Study while

patients with Strangulated hernias, Obstructed Hernias, Pediatric Age group were excluded from the study. Patients were allotted into various treatment groups i.e. Skin Glue, Staplers, Adhesive tapes, Sutures randomly. The cosmesis was assessed at the end of the 1st month using the VAS; this scale is 100 mm long with “worst scar” written at 0 mm and “best scar” written at 100 mm. A wound registry data sheet was created using Microsoft excel and the data entered was statistically analysed using the SPSS software.

RESULT

Table 1: Cosmesis-Mean, Average, SD<Variance, Annova

Groups	Count	Sum	Average	SD	Variance
Skin Glue	30	2241	74.7	8.20912	67.38966
Staplers	30	2019	67.3	7.372596	54.35517
Adhesive tapes	30	2271	75.7	5.408486	29.25172
Sutures	30	2271	75.7	9.917418	98.35517

ANOVA

Source of Variation	ss	Df	MS	F	P-value	F Crit
Between Groups	1484.1	3	494.7	7.935778	0.000074	2.682809
Within Groups	7231.2	116	62.337			
Total	8715.3	119				

Table 2: Cosmesis -1 month -Anova

t-test	Skin Glue	Staplers	Adhesive Tapes	Sutures
Skin Glue	t-test p-value			
Staplers	t-test p-value	3.6734		
Adhesive Tapes	t-test p-value	0.005	0.5572	5.0317
Suture	t-test p-value	0.5796	0.0000	
	t-test p-value	0.4254	3.7231	0.0000
	t-test p-value	0.6721	0.00004	1.0000

Our assessment of cosmesis was done at the end of first month after surgery using a VAS. We also found that there was no difference in cosmesis at the end of one month between sutures, skin glue and Adhesive tapes but there was significantly worse cosmesis in those who were assigned to the stapler group (P-value<0.000074)

DISCUSSION

We also found that there was no difference in cosmesis at the end of one month between sutures, skin glue and Adhesive tapes but there was significantly worse cosmesis in those who were assigned to the stapler group (P-value<0.000074). We found that the short term follow-up of cosmesis was similar in patients who were assigned to the suture, tissue adhesive and the skin glue groups; there was a fairly poorer scar in those patients who were assigned to the staplers group. We could not attribute this to any cause as we followed a standard protocol of using the skin stapler in wound closure. The only reason for scoring a poorer average on the VAS may be the presence of the rail road tracks around the incision site which were not there in the other modes of closure. Many studies have shown that there is no significant difference in cosmesis between these wound closure devices in a long term follow up.^{15,16,17,18} Zempksy *et al*¹⁹ noted that on a short-term follow-up, there was one wound complication in the Adhesive tapes group and 7 complications in the Dermabond group (P value 0.06). The results from our study are in agreement with the above study where there was no statistical difference between the two groups with regard to wound complications. Singer *et al*¹ noted that the cosmetic outcome was similar at the end of 3 months when glue was compared to sutures. Zempksy *et al*¹⁹ noted that There was no difference between Adhesive tapes and dermabond group in the mean visual analogue scale cosmesis scores: 37.2 mm (95% CI = 30.8-43.7) versus 43.8 mm (95% CI - 38.4-49.2) (P = 0.12) Mattick *et al*²⁰ compared the tissue adhesive 2-octylcyanoacrylate (Dermabond) with adhesive strips (Steri-Strips) in pediatric laceration repair; they found that the techniques were similar in efficacy, parental acceptability and cosmetic outcome²¹

CONCLUSION

In conclusion, all 4 WCD are equally effective. The pros and cons of all WCD are relatively similar, the options of skin closure should be discussed with the patients and we must not hesitate to use any of the WCD discussed above. Larger sample size may be needed in deriving a firm conclusion on the best suited WCD for closure of inguinal hernia repair. Further scope of study to include cost benefit ratio and patient satisfaction can be considered.

REFERENCES

1. AJ, Hollander JE, Quinn JV Evaluation and management of traumatic lacerations. N Engl J Med 1997;337:1142-1148
2. Singer kl, Hollander JE, Cassara G, Thode HC Jr, Henry MC, Valentine S. Level of training, wound care practices, and infection rates. Am J Emerg Med. 1995; 13:265-8.
3. Rutherford WH, Spence R. Infection in wounds sutured in the accident and emergency department. Ann Emerg Med. 1980; 9:350-2.
4. Haughey RE, Lammers RL, Wagner DK. Use of antibiotics in the initial management of soft tissue hand wounds. Ann Emerg Med. 1981;
5. Dire DJ, Coppola M, Dwyer DA, Lorette JJ, Karr JL. Prospective evaluation of topical antibiotics for preventing infections in uncomplicated soft-tissue wounds repaired in the ED. Acad Emerg Med. 1995;
6. Roberts AHN, Teddy PJ. A prospective trial of prophylactic antibiotics in hand lacerations. Br J Surg. 1977; 64:394-6.
7. Lindsey D, Nava C, Marti M. Effectiveness of penicillin irrigation in control of infection in sutured lacerations. J Trauma. 1982; 22:186-8.
8. Wood PB. Wound infection in undressed sutured wounds of the hand. Br J Surg. 1971; 58:543-5.
9. Grossman JAI, Adams JP, Kunec J. Value of prophylactic antibiotics in simple hand lacerations. JAMA. 1981; 245:693-7.
10. Hajar R. Al Zahrawi: father of surgery. Heart Views 2007; 7: 154-6.
11. Hultl H. Kongress der Ungarischen Gesellschaft fuer Chirurgie, Budapest, May 1908. Pester Med Chir Presse 1909; 45: 108-10, 121-2.
12. Palmer, J. F., Works of John Hunter. London, Longman, 1837.
13. Hollander JE, Singer AJ. Laceration management. Ann Emerg Med 1999; 34:356-67.
14. Singer AJ, Quinn JV, Clark RE, Hollander JE. Closure of lacerations and incisions with octylcyanoacrylate: a multicenter randomized trial. Surgery 2002; 131:270-6.
15. Majno G: The healing hand. Man and wound in the ancient world. Cambridge, MA: Harvard University Press, 1975
16. Zempksy WT, Grem C, Nichols J, Parrotti D: Prospective comparison of cosmetic outcomes of facial lacerations closed with Steri-strips or Dermabond. Acad Emerg Med 8 438- 2001.
17. Mattick A (2002) Use of tissue adhesives in the management of paediatric lacerations. Emergency Medicine Journal. 19, 5,382-385
18. Ammirati CT. Advances in wound closure materials. Adv Dermatol. 2002; 18:313-338.

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