

# A comparative study of use of adhesive glue versus skin staplers for closure of skin incisions

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## Abstract

**Introduction:** The goals of wound closure are directed towards 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. 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. **Aims and Objectives:** To Study of Use of Adhesive Glue versus Skin Staplers for Closure of Skin Incisions. **Methodology:** This study is a prospective study conducted at Tertiary Care Hospital during the period January 2013 to January 2014 after obtaining approval from the Institutional Ethics Committee. We prospectively randomized 66 patients between the age of 20 years and 70 years. The 66 patients by taking their written, explained consent during one year period were randomly divided into Adhesive Glue (Group A) and Skin Staplers (Group B). Data was analyzed by Chi –square test. **Result:** Majority of the Patients in Group A were having excellent Result at the end of one month i.e. (36.36%) as compared to Group B i.e. 9.09%) and Poor results were more prevalent in Group B i.e. 39.39% than Group A i.e. 9.09%) this observed difference is Statistically Highly significant ( $\chi^2=15.22$ ,  $df=4$ ,  $P<0.0043$ ). Overall the complications were more common in Group B as Compared to Group A i.e. 90.90% and 78.78% respectively. The Complications like Erythema, Uneven scars were more common in Group B i.e. 21.21% and 69.69% and 0%, 46.15% respectively while Wound Gaping was more prevalent in Group A i.e. 6.06% and 0% respectively this observed difference was statistically significant ( $\chi^2=7.651$ ,  $df=2$ ,  $P<0.0218$ ). **Conclusion:** Adhesive Glue was superior as compared to Skin Staplers; with respect to excellent Cosmetic Result and less complications except wound gaping was more prevalent in it.

**Keywords:** Adhesive Glue, Skin Staplers, Closure of Skin Incisions.

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## INTRODUCTION

The goals of wound closure are directed towards 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. 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.<sup>1,2,3</sup> 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.<sup>4</sup> 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 10<sup>th</sup> century.<sup>5</sup> 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 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.<sup>6</sup> Contemporary staple devices were pioneered in the U.S.S.R.<sup>7</sup> 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.<sup>5</sup> Ambroise Pare and John Hunter both described techniques of suture-less skin closure, Golden *et al*<sup>14</sup> 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-octylcyanoacrylate 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.<sup>8,9</sup>

## MATERIAL AND METHODS

This study is a prospective study conducted at Tertiary Care Hospital during the period January 2013 to January 2014 after obtaining approval from the Institutional Ethics Committee. We prospectively randomized 66 patients between the age of 20 years and 70 years. All the patients who planned for the General Surgeries were included except those who do not give consent, which are having Diabetes, Immuno-compromised disease, Malignancies were excluded from the study. The 66 patients by taking their written, explained consent during one year period were randomly divided into Adhesive Glue (Group A) and Skin Staplers (Group B). Patients were assessed for Scar Hypertrophy which was categorized as follows: Excellent: linear flat scar of width less than 2 mm. Good: flat, linear scar of width less than 3 mm. Fair: minimally raised scar of width less than 5 mm. Poor: more than 5mm width and hypertrophied scar<sup>10</sup>. Data was analyzed by Chi-square test.

## RESULT

**Table 1:** Distribution of the Patients as Per the Cosmetic Result at the End of One Month

Cosmetic Results	Group A No (%)	Group B No (%)
Excellent (Width <2 Mm)	12 (36.36%)	3 (9.09%)
Good (Width <3 Mm)	11 (33.33%)	5 (15.15%)
Fair (Width <5 Mm)	7 (21.21%)	12 (36.36%)
Poor (Width >5 Mm)	3 (9.09%)	13 (39.39%)
<b>Total</b>	<b>33 (100%)</b>	<b>33 (100%)</b>

$\chi^2=15.22$ , df= 4, P<0.0043

Majority of the Patients in Group A were having excellent Result at the end of one month i.e. (36.36%) as compared to Group B i.e. 9.09%) and Poor results were more prevalent in Group B i.e. 39.39% than Group A i.e. 9.09%) this observed difference is Statistically Highly significant ( $\chi^2=15.22$ , df= 4, P<0.0043)

**Table 2:** Distribution of the Patients as Per the Complications Occurred

	Group A No (%)	Group B No (%)
Erythema	0(0%)	7 (21.21%)
Uneven	12(46.15%)	23 (69.69%)
Wound Gaping	2 (6.06%)	0 (0%)
<b>Total</b>	<b>26 (78.78%)</b>	<b>30 (90.90%)</b>

$\chi^2 = 7.651$ , df= 2, P< 0.0218

Overall the complications were more common in Group B as Compared to Group A i.e. 90.90% and 78.78% respectively. The Complications like Erythema, Uneven scar were more common in Group B i.e. 21.21%) and 69.69% and 0%, 46.15% respectively while Wound Gaping was more prevalent in Group A i.e. 6.06% and 0% respectively this observed difference was statistically significant ( $\chi^2 =7.651$ , df=2, P<0.0218).

## DISCUSSION

In 1991, Matthews and Briant advocated a randomized, controlled trial comparing the use of tissue glue with standard methods of skin closure following thyroid surgery to confirm their findings of a reduced hospital stay where glue was used. To date, this retrospective case control study remains the only comparison of tissue glue with a standard method of skin closure for cervicotomy.<sup>11</sup> A recent Cochrane database systematic review of eight randomized controlled trials concluded that tissue adhesives are an acceptable alternative to standard wound closure for repairing simple traumatic lacerations; there was no significant difference in cosmetic outcome between tissue adhesives and standard wound closure, or between different tissue adhesives. Tissue adhesives were advocated to reduce procedure time and pain, albeit with a small, but statistically significant, increased rate of dehiscence.<sup>12</sup> The first study comparing tissue glue with standard suturing techniques in long surgical incisions demonstrated comparable rates of wound healing by day 10, with a tendency to reduced wound infection rates in the group closed with glue.<sup>13</sup> Subsequently, cosmetic results comparable with conventional wound closure have been attained in breast surgery,<sup>14</sup> pediatric surgery<sup>15,16</sup> and laparoscopic port site closure.<sup>17,18</sup> Furthermore, glue closure is faster compared to sub-cuticular suturing of incisions in inguinal hernia repair<sup>19</sup> and in body contouring surgery.<sup>20</sup> In our study we have observed that majority of the Patients in Group A were having excellent Result at the end of one month i.e. (36.36%) as compared

to Group B i.e. 9.09%) and Poor results were more prevalent in Group B i.e. 39.39% than Group A i.e. 9.09%) this observed difference is Statistically Highly significant ( $\chi^2 = 15.22$ ,  $df = 4$ ,  $P < 0.0043$ ). Overall the complications were more common in Group B as Compared to Group A i.e. 90.90% and 78.78% respectively. The Complications like Erythema, Uneven scars were more common in Group B i.e. 21.21% and 69.69% and 0%, 46.15% respectively while Wound Gaping was more prevalent in Group A i.e. 6.06% and 0% respectively this observed difference was statistically significant ( $\chi^2 = 7.651$ ,  $df = 2$ ,  $P < 0.0218$ ). These findings are similar to Iavazzo and Gkegkes IDGatt<sup>22</sup>, C. R. QuickStillman and colleagues<sup>21</sup>

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