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Research Article

Adhesive Glue vs Subcuticular Sutures for Cesarean Section Skin Closure: A Double Blind Randomized Controlled Trial

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Abstract

Objectives: The objectives of the study were to compare the wound complication rate, postoperative pain and overall patient satisfaction between adhesive glue and subcuticular suture in women undergoing elective Caesarean Section (CS).

Methods: A double blind Randomized Controlled trial was conducted among pregnant women undergoing an elective CS, who were randomly assigned to skin closure with adhesive glue or with a Polyglactin 3-0 subcuticular suture. In both groups after closure of the rectus fascia, the subcutaneous fat layer was closed with 3-4 interrupted catgut or Vicryl 1-0. In the adhesive glue group, 2 layers of adhesive glue were used to close the outer skin layer. In the suture group, the skin was closed with Polyglactin 3-0 suture under the skin using a continuous suture technique. A sample of 52 in each group was needed to achieve any significant finding with a power of 80%. Primary outcome assessed were parenteral analgesic use, daily subjective pain scores while in hospital, 6 week postoperative subjective pain score and scar cosmetic score 6 weeks post-operatively. Secondary outcome assessed were surgeons satisfaction, duration of surgery, duration of hospitalization after the caesarean, and wound complications.

Results: Two hundred pregnant women at term for elective caesarean were assessed for eligibility of which 132 fulfilled the criteria and were randomized into two groups. Sixty women in each group completed the required follow up. Patients' baseline demographic and clinical backgrounds were similar in both the groups. Postoperative day 3 subjective pain score was significantly lower in adhesive glue group (p=0.023) compared to suture group. Skin closure time with glue required less time compared to suture (glue 2.57±.67 minute vs suture 3.2±1.18 minute, p=0.001). Total operative time was also less in adhesive glue group though the difference was not significant (39.52±8.24 minute vs 42.1±6.10, p=0.054). Scar assessment by the modified patient and observer scar assessment scale (POSAS) at 6 weeks postpartum showed similar cosmetic outcome between the two groups. Patient Scar cosmetic score was 11.8 for glue group and 12.7 for suture group (p=0.330) while the Observer Scar cosmetic score was 10.8 for glue group and 11.7 for suture (p=0.252). No significant differences were observed between the groups in blood loss, surgical site infection, length of hospitalization, or wound breakdown.

Conclusion: Adhesive glue may be a useful option for skin closure of Pfannenstiel skin incisions after caesarean delivery. It has the advantages like shorter skin closure and operating time, less postoperative pain and similar cosmesis and satisfaction among surgeons with no increases in wound complication rates.

Keywords: Adhesive glue, suture, caesarean section, skin closure

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Caesarean section (CS) is one of the most common surgical procedures performed during reproductive years in women and the trend has been increasing globally. However, despite being commonly performed surgery, evidence on many aspects of the preferred surgical technique is still lacking.[1]

Most commonly, a caesarean delivery is performed through a suprapubic low-transverse skin incision.[2,3] At the end of the operation, the skin incision is closed which forms an integral part of CS. An appropriately closed skin incision influences postoperative pain, wound healing, cosmetic outcome, and surgeon as well as patient satisfaction.[4]

Conventionally, the skin incision is apposed with the placement of either a continuous subcutaneous suture that dissolves overtime or multiple metal staples that need to be removed at a later date.[2, 3]

Additionally, skin closure with suture carries a risk of needle stick injury, the need for suture removal, and possibility of leaving permanent suture tracks. Lack of tensile strength after suture removal will also put the patients at increased risk of wound breakdown or opened scar if adequate healing has not occurred before the removal.[5]

A recent Cochrane review has suggested staples as inferior to other techniques and recommends further research on skin closure technique after CS.[6] So, currently there is no definite evidence regarding the best method for skin closure after CS.[6-8] Given the confusing data and evidence available, obstetricians are many times left to base their decisions on their personal preference.

Tissue adhesives for closure of surgical wounds were developed to overcome these problems.[9] A Cochrane review showed significant difference in the surgeons' assessment of cosmetic appearance with higher mean rating for tissue adhesives.[9] However early use of tissue adhesive with butyl cyanoacrylate was limited mainly to areas with low tension because of its physical properties by which it becomes brittle and fractured over long scars and skin creases.[10]

The octyl cyanoacrylate tissue adhesive (Dermabond™, Ethicon, USA), on the other hand, is a long-chain cyanoacrylate derivative that is stronger and more pliable than the butyl derivative. Dermabond in addition to the reduction in needle stick injury,[11] it also provides protective antibacterial barrier.[12] Featured as monomers in a liquor form, it polymerises on contact with tissue anions and forms a strong bound to hold the edges of the wound together. It's easy to acquire the application skill of Dermabond.[13] There is no need to remove the glue as its slough off when wound re-epithelialisation occurs in around 5 to 10 days.

The use of Dermabond has been studied in port closure for laparoscopic surgery, open surgical incisions,[14] breast surgery;[15] thyroid surgery,[16] paediatric laceration repair, and hand surgery[17] with satisfactory results.18 Randomized controlled trials comparing its use in Caesarean section skin closure are sparse. Therefore, clear, conclusive recommendations are lacking. A study by Cheng H H et al.[19] observed favourable trend towards lower cumulative wound complication rate with no significant differences in cosmesis or pain score with adhesive glue in addition to nylon sutures. Daykan Y et al.[20] observed that skin closure with glue following CS had similar results to subcuticular sutures. However, some of these studies were either observational or had smaller sample size and did not evaluate patient satisfaction and cost of adhesive glue versus subcuticular method of skin closure.

Therefore, objectives of the study was to compare the wound complication rate, postoperative pain, overall patient satisfaction and cost of adhesive glue and subcuticular suture in women undergoing elective caesarean section.

Methods

Study Design and Setting

The study conducted from September 2019- to December 2020, was a prospective interventional, double blinded randomized controlled, single centered trial conducted at the Department of Obstetrics and Gynaecology at Central Referral Hospital- teaching hospital of Sikkim Manipal Institute of Medical Sciences (SMIMS), Gangtok, India. The objective was to compare the wound complication rate, postoperative pain and overall patient satisfaction between adhesive glue and subcuticular suture in women undergoing elective caesarean section. The study was approved by SMIMS ethics committee (IRPEC/398/19-088) at the Central Referral Hospital (CRH). Written informed consent was obtained from the women who participated in the study. The procedures followed were in full accordance with the ethical standards laid down in the Declaration of Helsinki and its amendments.

Inclusion and Exclusion Criteria

The study included the patients admitted in the maternity ward of Obstetrics and Gynaecology department with indications for elective caesarean section at term. Inclusion criteria were pregnant women between 37-42 weeks in reproductive age group (18-44 years) of any race or parity who were scheduled for caesarean Section (Primary or repeat with transverse incision) under regional or general anaesthesia. Women who were excluded from the study were those were underwent emergency caesarean section pre-

vious CS not using Pfannenstiel/transverse incision, clinical signs of infection at the time of CS, uncontrolled diabetes mellitus (defined as Hemoglobin A1c >6%,unbalanced daily glucose measurements, and fasting glucose >95 mg/dl), history of keloid, known hypersensitivity to adhesive glue or any suture materials used in the protocol, and any disorders requiring chronic corticosteroids or immune suppressants (e.g. maternal connective tissue disorder, Maternal Steroid Use etc).

Randomization and Procedure

Patients were recruited consecutively[1-3] days prior to an elective CS during the routine preoperative assessment. All patients scheduled for an elective CS for various indications who agreed to participate in the study were included and provided signed informed consent. Pregnant women fulfilling the eligibility criteria were subjected to detailed history and physical examination following which they were randomized into two groups, with one group to receive adhesive glue and other subcuticular suture for closure of their CS wound closure. A staff member not involved with the trial generated allocation envelopes for each group, using the random number table, which were then sealed in consecutively numbered opaque envelopes. Once a woman consented to participate in the trial, the next sealed envelope was opened, irreversibly randomizing her group allocation. The randomization list and envelopes were kept securely by the staff member in a locker.

This study was double blind trial where in the women and person evaluating the outcome (a dedicated medical officer) were blinded to the treatment. Being a surgical procedure, the operating surgeon was aware of the treatment allocation. The caesarean procedure followed usual practices including preoperative prophylactic antibiotics. In both groups after closure of the rectus fascia, the subcutaneous fat layer was closed with 3-4 interrupted 1-0 catgut sutures.

Before applying adhesive glue, the incision site was cleaned with a sterile betadine solution and dried with a gauze piece. Both the angles of wound were held with a pair of Allis tissue forceps and Dermabond glue were applied manually close to the outer skin layer (Fig. 1). Based on manufacturer's recommendations, the first layer of glue was applied to attach the skin edges. Sixty seconds later, a second layer was applied to improve the strength of the adhesion and to create a barrier to prevent the wound infections. After applying adhesive, light pressure along the wound line should was maintained approximately for 30 seconds to achieve a full strength of the glue (Fig. 2). A total of one vial of Dermabond (0.5 ml) was used for each patient. In the suture group, the skin was closed with polyglactin 3-0 suture under the skin using a continuous suture technique. Sterile dress pore (25 cm x 10cm) was used to cover the wound for 24-48 hours in all patients, which was removed 48 hours after surgery.

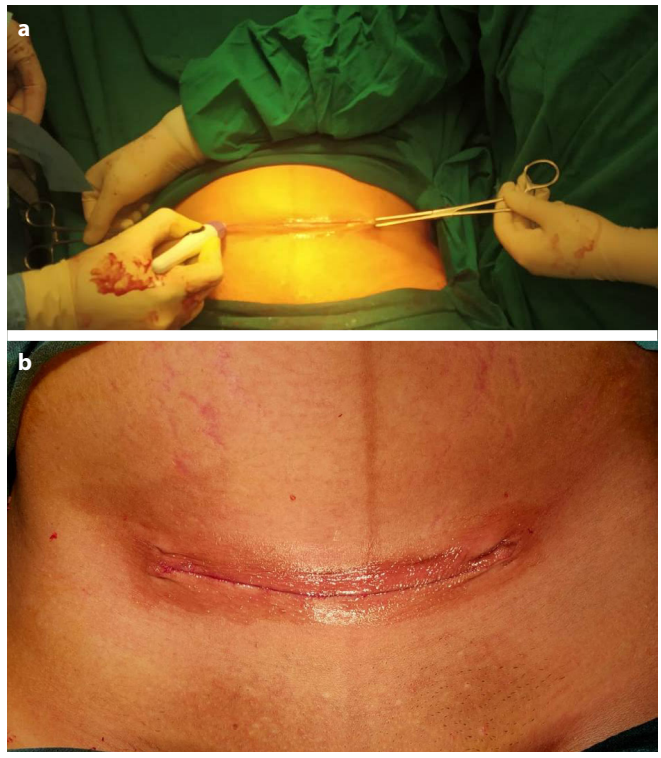

Figure 1. To achieve an even distribution of tension and approximation of wound margin, angles of wound were held with a pair of Allis forceps **(a)**, and glue was applied in 2 layers maintaining traction to have an uniform glue application **(b)**.

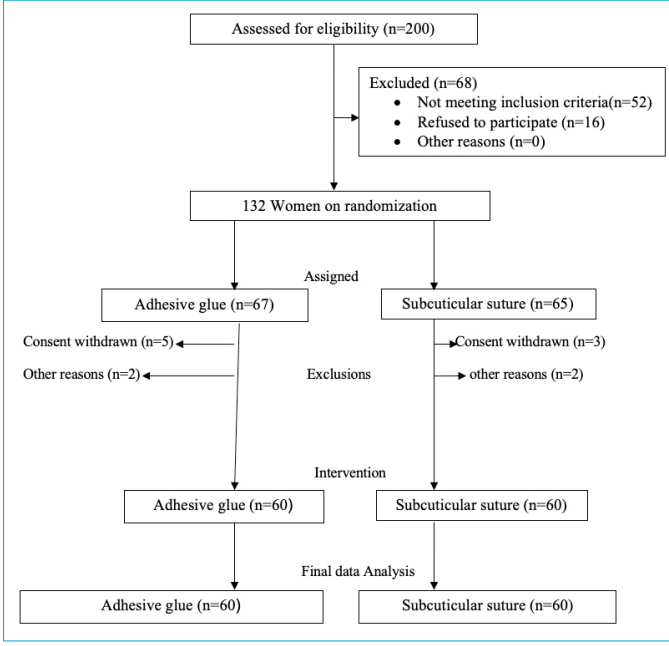

Figure 2. Consort flow diagram from randomization to analysis.

Monitoring and Assessment

A medical officer not involved in randomization and who was not a part of the operating team were involved in post-operative monitoring and assessment of outcomes. Patients were monitored in the postoperative ward for their vitals, analgesic requirement and other aspects of care. The post-operative wounds were assessed on day 3 and again after 6 weeks at the postnatal visit for pain and scar assessment by a medical officer who was not a part in the operating team.

Wound disruption was categorised as minor when it was reapproximated with clean dressing and reaproximation by adhesive closure strips. When it required putting suture, wound disruption was considered major. Wound infection was defined when there was purulent discharge, cellulitis, and abscess requiring additional antibiotics. The scar had been routinely assessed at 6 weeks postpartum by the modified patient and observer scar assessment scale (POSAS). The modified POSAS[21] is a reliable and valid scar assessment scale that measures scar quality from two perspectives: the patient and the clinician. It consists of two separate six-item scales for Observer Scale (vascularity, pigmentation, thickness, relief, pliability and surface area) and Patient Scale (is the scar painful, is the scar itching, is the colour of the scar different, is the scar more stiff, is the thickness of the scar different and is the scar irregular) both of which are scored on a 10-point rating scale. The lowest score is '1', which corresponds to the situation of normal skin (i.e. normal pigmentation, no itching). Score 10 equals the largest difference from normal skin (i.e. the worst imaginable scar or sensation). The total score of both scales can be simply calculated by summing up the scores of each of the six items. The total score can range from 6 to 60.

Outcome and Safety Measures

The primary outcome measures that were assessed in the study were use of parenteral analgesic use within 24 hour of surgery (intravenous or intramuscular), daily subjective pain score while in hospital (patient rated subjective pain score 0-10 based on visual analogue scale) until discharge from the hospital, 6 week postoperative subjective pain score (Patient rated subjective pain score assessed at the 6 week postpartum visit), Scar cosmetic score 6 weeks post-operatively (patient and observer 6 weeks post-operative scar cosmetic score were assessed).

The secondary outcome assessed were Surgeons' satisfaction scale, duration of surgery, duration of hospitalization after the CS, wound complications (within 6 weeks postpartum visit in the form of wound infection, separation, or seroma or hematoma formation) and patient satisfaction with their wound on a Likert scale.

Statistical Analysis

Assuming that a 20% (5-point) difference in POSAS score would influence clinical decision regarding the preferred method for skin closure, similar to previous studies that used this scoring system.[22] The sample size calculation indicated at least 52 participants would be needed for each arm of the study, using α=0.05 and 80% power. Accordingly we inflated our sample size over and above 52 in each group to give a total sample size more than 104 in the study.

The data were analyzed by intention-to-treat and statistical analysis included summary statistics with its 95% confidence intervals (CI) using SPSS data processor. In-case of continuous data, appropriate statistical test to compare mean (independent't' test) or median (Mann-Whitney test) was used. For categorical data Chi-square/Fischer's Exact tests were used to assess the statistical difference. All statistical tests were evaluated at the 0.05 significance level.

Results

Two hundred pregnant women at term for elective caesarean were assessed for eligibility before the recruitment was stopped of which 52 women did not meet the inclusion criteria and 16 women refused to participate. Remaining 132 women who fulfilled the criteria were randomized into two groups. Five women assigned to adhesive glue group and three women assigned to suture group withdrew their consent after randomization. Two women allocated in adhesive group went in to labour and delivered vaginally prior to their scheduled CS date while in suture group one woman delivered vaginally and one women had to undergo emergency cesarean section for fetal distress prior to their scheduled cesarean date. Sixty women in each group received the intervention and completed their required follow up. The final analysis was performed on 120 women. Figure 2 depicts details of the randomization.

The demographic characteristics and obstetrics profiles are shown in table 1.There were no differences in terms of maternal age (p=0.743), gravida (p=0.813) gestational age (p=0.198), co morbidities (p=0.835), BMI (p=0.601) and indications for cesarean sections (p=0.951).

There were no differences in terms of requirement of post operative parenteral analgesics (p=0.296) and day 1 pain score (p=0.455) between the two groups. However, day 3 postoperative subjective pain score was significantly low in adhesive glue group (p=0.023). Six week postoperative subjective pain score was low in adhesive glue group compared to suture group, however this difference didn't attain statistical significance (p=0.082).

Patient Scar cosmetic score 6 weeks post-operatively was 11.8 for glue group and 12.7 for suture group and this dif-

Table 1. Demographic and clinical profiles of study participants (n=120)

Characteristics	Adhesive glue n=60	Suture n=60	p
Maternal age (years) mean±SD	31.37 (30.41-32.32)±3.7	31.6 (30.55-32.65)±4.06	0.743
Gravida, median (IQR: Q1-Q3) Range: Minimum-Maximum	1 (IQR:1-2) Range:1-4	1 (IQR:1-2) Range:1-3	0.813
Gestational age (weeks) mean±SD	38.59 (38.36-38.82)±0.91	38.39 (38.2-38.59)±0.75	0.198
BMI Kg/m^2, mean±SD	25.37 (24.92-25.81)±1.72	25.17 (24.55-25.79)±2.40	0.601
Patients with co-morbid/medical conditions	15 (25%)	16 (26.67%)	0.835
Indications for caesarean sections, n (%)			
Maternal request	26 (43.33%)	24 (40%)	0 .951
Elderly primi with medical problem	12 (20%)	13 (21.7%)	
Previous CS	10 (16.7%)	12 (20%)	
Others	12 (20%)	11 (18.3%)	

ference was not statistically significant (p=0.330). Similarly Observer Scar cosmetic score 6 weeks post-operatively was 10.8 for glue group and 11.7 for suture, this difference were not statistical difference either (p=0.252) (Table 2).

Table 3 presents the intraoperative and postoperative outcome between the two groups. There was no difference in terms overall operative time (skin incision and closure) (p=0.054). However skin closure time with glue required less time compared to suture and this difference was statistically significant (p=0.001). Subcutaneous thickness was similar in both the groups (p=0.346). Patient with pre-operative to post operative hemoglobin difference >2 gm% was observed in 4 patients (6.7%) in glue group and 7 patients (11.7) in suture group (p=0.346). Two patients needed blood transfusion in suture group and none in glue group (p=0.496). There was no significant difference between glue and suture groups in terms of postpartum fever (p=0.496), duration of hospitalization (0.678) and surgical site infection (SSI) (p=0.717).

Overall wound disruption rate was 4.2% (5/120). In the glue group, it was 5% (3/60) vs 3.2% (2/60) in the suture group (p=0.999) (Table 3). One patient in the glue group had a

Table 2. Comparison of Primary outcome

Comparison of Primary outcome	Adhesive glue (n=60)	Suture (n=60)	p
No of doses of IV /IM analgesic use, mean±SD	4.42 (4.17-4.67)±0.96	4.62 (4.33-4.91)±1.12	0.296
Subjective pain score day 1 (0-10 based on VAC)	5.55 (5.08-6.02)±1.83	5.82 (5.28-6.35)±2.06	0.455
Subjective pain score day 3 (0-10 based on VAC)	2.32 (1.90-2.73)±1.6	3.03 (2.56-3.50)±1.81	0.023
Six week postoperative subjective pain score	0.75 (.49-1.01)±1.01	1.10 (0.80-1.40)±1.18	0.082
Patient Scar cosmetic score 6 weeks post-operatively.	11.82 (10.40-13.23)±5.48	12.72 (11.54-13.90)±4.57	0.33
Observer Scar cosmetic score 6 weeks post-operatively.	10.82 (9.67-11.97)±4.46	11.68 (10.71-12.66)±3.77	0.252

Table 3. Intraoperative and surgical outcome

Secondary Outcomes variables	Adhesive glue n=60	Suture n=60	p
Operative time (Skin incision to closure) mean (95% CI)±SD	40.74 (39.44-42.04)±8.243	42.1 (40.52-43.68)±6.108	0.054
Skin closure time (minute), mean(95% CI)±SD	2.57 (2.39-2.75)±0.678	3.2 (2.89-3.51)±1.18	0.001
Subcutaneous thickness >2 cm, N (%)	20 (33.3)	25 (41.7)	0.346
Patient with haemoglobin decrease >2 g%, N (%)	4 (6.7)	7 (11.7)	0.343
Blood transfusion, N (%)	0	2 (3.3)	0.496
Postpartum fever >38 C, N (%)	2 (3.3)	0	0.496
Prolonged hospitalization >4 days, N (%)	4 (6.7)	2 (3.3)	0.678
Surgical site infection, N (%)	3 (5)	5 (8.3)	0.717
Haematoma formation, N (%)	1 (1.7)	0	0.999
Wound disruption, N (%)	3 (5)	2 (3.3	0.999
Additional antibiotic use, N (%)	4 (6.7)	5 (8.3)	0.12

small haematoma formation which needed to open a small area of wound to drain it and later needed to put two additional sutures. One patient in suture group also had an opening and needed to put additional suture on 8th day after surgery. In both the patient's with additional antibiotic use and sterile dressing, the wound healed subsequently without any sequel.

We assessed lead surgeons experience and satisfaction on personal preference of both the procedure's closure technique (p=0.162), estimated time difference for closure of skin (p=0.501), skin edge approximation (p=0.086) and satisfaction at the end of the skin closure (p=0.495) (Table 4). We observed that surgeons those who newly adopted adhesive glue, their satisfaction score improved after a few procedures and ultimately we did not find any difference of these parameters between the two groups (p>0.05).

At the end of six weeks we assessed patients overall satisfaction with their cesarean scar, 86.7% (52/60) in the glue group and 90% (54/60) in the suture group were satisfied with their scar (p=0.569). Fifty patient in the glue group (83.3%) and 52 in the suture group (86.7), said that they would recommend similar type of wound closure technique to others (p=0.609) (Table 5). The compared product cost, cost of adhesive glue is significantly higher than the cost of suture (p<0.001). However this doesn't include other aspects like consumables, operating time, cost of complications etc.

Discussion

Adhesive glue for skin closure is widely used for skin closure of many surgical wounds as an alternative to sutures. Cochrane review[23] showed that the use of adhesives glue compared to sutures for closure of surgical wounds had a lower complication rate including wound dehiscence when sutures were used. This is because Dermabond forms a waterproof layer above the surgical wound and acts as a barrier to bacterial invasion.

However, these studies were for small surgical and laparoscopic wounds. Adhesive glue is rarely used in caesarean section, one of the most common surgeries performed all over the world. This may be due to the lack of clinical experience of obstetricians with tissue adhesive application for skin closure of large transverse incisions after caesarean delivery. The main finding of this study is that 2-octyl cyanoacrylate tissue adhesive can be safely and effectively used for skin closure after caesarean delivery. Our study suggests that use of adhesive glue results in wound outcomes better or equivalent to those of sutures for Pfannenstiel incisions, as assessed by VAS score and POSAS assessment 6 weeks after surgery.

We observed an insignificant favourable outcome towards Dermabond in terms of requirement of postoperative analgesia and significant less pain score assessed using VAS by patients at day 3 postoperative periods. This was also observed in a previous study comparing Dermabond with prolene in a mammoplasty surgery, suggesting an overall preference towards the use of Dermabond with better pain and cosmesis score using VAS by patients (p<0.05).[24]

In this study we used VAS, and POSAS score for assessment of pain and scar respectively, which have been proven to be highly reproducible and to minimise inter-observer errors.[25, 26] Subjective scar assessment scale used both by patient and surgeon is an important scar evaluation tool. Using POSAS, other authors found equivalent cosmetic ap-

Table 4. Surgeons preference, experience and satisfaction Analysis

Survey variables [Mean Score (95% CI) ± SD]	Adhesive glue n=60	Suture n=60	p
Skin closure technique personal preference (score 1-5) How comfortable were you with technique?	4.65(4.51-4.79)±0.55	4.78(4.66-4.91)±0.49	0.162
Operating time estimated as longer (score 1-5) Was estimated total operating time longer compared glue/suture?	1.57(1.32-1.82)±0.96	1.47(1.31-1.63)±0.62	0.501
Wound approximation edge to edge, How much skin were approximated with the closure technique?	4.52(4.34-4.69)±0.68	4.72(4.57-4.87)±0.59	0.086
Closure appearance/satisfaction at end of CS (Score 1-5) Were you satisfied with final closure appearance?	4.65 (4.48-4.82) ± 0.66	4.57(4.39-4.74)±0.67	0.495

Table 5. Patients satisfaction and attitude survey

Survey items	Adhesive glue n=60	Suture n=60	p
Are you satisfied with your operation scar? n (%)	52 (86.7)	54 (90)	0.569
Would you recommend this type of skin closure to others? n (%)	50 (83.3)	52 (86.7)	0.609

pearance of CS scars when comparing different methods of skin closure in CS.[20,27]

Our study noted overall operating time was lesser in glue group compared to suture group (39.52±8.24 minute vs 42.1±6.10), the difference though didn't attain statistical significance (p=0.054). This would be better to evaluate with large sample size. However we observed significant faster skin closer time between the group (glue 2.57±.67 minute vs suture 3.2±1.18 minute, p=0.001). In a previous study in caesarean section total operating time was similar between the sutures and glue groups.[20] Additionally, a Cochrane review that included randomized clinical trials indicated significantly faster closure with sutures compared to tissue adhesives when tissue adhesives used for closure of surgical incisions.[28]

With more experience with Dermabond, and in other clinicians' hands, use of Dermabond may decrease the operating time. This operative time saving may be greatly helpful in surgeries with long incision sites like CS. Furthermore skin closure time and postoperative pain at the time of discharge were lesser in glue group compared to suture group, and this difference was statistically significant.

Post operative wound outcome and infection may considerable costs to the patient and to the health care system. We observed a non significant lower surgical site infection rate in Dermabond group compared to suture group. Other authors also noted similar infection rate comparing the use of Dermabond, sutures, and staples in laparotomy wounds.[29] Siddiqui et al. in their observational study also noted similar wound disruption and SSI rates with glue compared to staples and subcuticular sutures for closure of CS wound.[8] Other operative outcome blood transfusion, hospital stay and postpartum febrile pyrexia were similar between the two groups and are in agreement with other authors.

Most obstetricians are used to close CS wound with suture material. Our observation showed that surgeons after using Dermabond in a few cases, their preference rating improves and at the end of the study we found surgeons gets equally comfortable with both glue and suture. In their study by Mackeen et al.,[30] who found that obstetricians tended to have a strong preference for staples or sutures. In this study we observed at the end of the CS surgeons were more satisfied with closure appearance with adhesive glue although difference was not significant. It is important to note that adhesives has other advantages like it provides a waterproof barrier with antimicrobial properties.[12] Patients satisfaction survey revealed similar level of satisfaction in adhesive glue and suture group (p=0.569).

As Dermabond is less used method of skin closure, so it is more expensive than suture in most countries. Total cost of the adhesive glue when compared suture was found to be significantly higher in adhesives (p<0.001). However, cost analysis requires consideration of operating time, wound complication costs, and costs of the removal of sutures etc. Given that CS is so commonly performed operation with more use and more production it may be a cost effective option for skin closure in CS. Furthermore, previous studies had shown that tissue adhesive closure in general and breast surgery resulted in less overall cost compared to suture closure.[15, 31]

A limitation of the study was, technically it was not feasible to blind the surgeons to the method of closure, which could cause bias in cosmesis as well as the surgeon satisfaction score. However, the potential bias was eliminated by an independent assessment by a medical officer not involved directly operation or postoperative care who were blinded to the method of skin closure. Another limitation was because of Covid 19 pandemic some patient could not come for 6 weeks postoperative follow up; their scar was assessed by observer over tele-consultation with the help of an image of the scar area. Although the photos were taken by different person and the photo taking technique was not standardised, results of tele assessment of wounds have been proven to be similar to those of realtime assessment by previous authors.[32]

Conclusion

Tissue adhesive may be useful for skin closure of Pfannenstiel skin incisions after caesarean delivery. It has many advantages like shorter skin closure and operating time, less postoperative pain and similar cosmesis and satisfaction among surgeons with no increases in wound complication rates. Future large randomized controlled trials comparing tissue adhesives and alternative methods of skin closure are needed in specialised obstetric groups like obesity and to see long term cosmetic outcome.

Disclosures

Ethics Committee Approval: The study was approved by SMIMS ethics committee (IRPEC/398/19-088) at the Central Referral Hospital (CRH).

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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Authorship Contributions: Concept – H.R; Design – H.R; Supervision – H.R, E.K; Materials – H.R; Data collection &/or processing – H.R ; Analysis and/or interpretation – H.R, E.K; Literature search – H.R, E.K; Writing – H.R; Critical review – E.K.

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