Original Article

Facial Laceration Repaired with Non-absorbable Monofilament Suture

Cosmetic Outcome and Time Taken for Closure in Facial Laceration Repaired with Single Layer of Non-absorbable Monofilament Suture

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ABSTRACT

Objective: To determine the cosmetic outcome of superficial facial lacerations repaired with single layer of non-absorbable monofilament suture and to observe time taken for closure and rate of infection and dehiscence.
Study Design: Prospective case series study
Place and Duration of Study: This study was conducted at the Accident and Emergency Department, Liaquat National Hospital, Karachi from 14th May 2009 to 31st January 2010.
Materials and Methods: In our study we repaired 70 superficial lacerations presented within 24 hours to accident and emergency department; with single layer of 6/0 prolene suture. We restricted the age group from 18 to 40 because young individuals are more concerned about scars.
Results: 36 patients presented within 3 hours of injury and among these 35 patients (97.2%) resulted in satisfactory outcome, 23 patients presented between 3 to 6 hours of injury and gave 95.7% satisfactory result while 11 patients presented after 6 hours and 7 patients (63.6%) gave satisfactory outcome. It indicates that repair of lacerations within 6 hours gives best outcome.
Conclusion: Single-layer closure of nongaping, minor facial lacerations, with nonabsorbable monofilament suture yield satisfactory cosmetic outcome. Cosmetic outcome improved when repaired within 6 hours of injury but there is no impact of time on rate of infection and dehiscence.
Key Words: Facial, Laceration, Scar, infection. Dehiscence, Cosmetic outcome

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INTRODUCTION

Facial laceration is one of the most common injuries presented to Accident and Emergency department.[1,2] All facial wounds should be repaired in less than 24 hours to decrease the risk of infection and achieve the best cosmetic result.[3] Although number of factors determine cosmetic outcome of facial scar like site, laceration parallel to relaxed skin tension lines etc. a variety of wound closure methods are available includingsteri-strip dressings, sutures,[4] glue or staples but by far suture closure is most popular techniques.[3] Nonabsorbable 6.0 monofilament or absorbable 5-0 vicryl (polyglactin) sutures can be used for interrupted or intracuticular technique.[5]

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Whether facial lacerations should be routinely closed using more than one layer of sutures is debatable.[6] As placement of deep dermal layer is not only technically challenging but more time consuming (mean difference of 7 minutes p value 0.007), many emergency physicians do not routinely perform multilayer closure of facial laceration.[7] Different studies have been done to compare various methods of facial laceration repair, in majority of which cosmetic outcome is similar.[8,9,10,11] Some studies showed that monofilament suture is associated with a lower risk of infection compared with a polyfilamentsuture.[3] In a study comparing single versus double layer closure showed infection and dehiscence rate of 0.00 in both groups (p-value 1.00).[2] In another study comparing absorbable versus non absorbable suture showed infection rate of 7% in absorbable group and no infection in non-absorbable group while dehiscence rate of 0.00 in both groups.[9] While single layer closure is a simple, cheaper and less time consuming method with similar cosmetic outcome (mean difference of 1.0 with p value 0.73 on visual analogue scale), data is available internationally but no local study is done as yet.[7] As professionals, plastic surgeons strive for the best possible cosmetic outcome when repairing facial laceration. If the results are less

than ideal, the patient unfortunately may wear a scar, like a trademark. Various methods of assessing scar quality are available and Manchester scar assessment proforma described by Beausang et al is an appropriate tool for assessing linear scars.[12]

In accident and emergency departments where facial lacerations share a large number of patients, this study may be able to help ensure that the desired cosmetic result can be achieved with single layer closure in less time while we will also be able to give rate of infection and dehiscence for comparison with international studies.

MATERIALS AND METHODS

Study was conducted in Department of Accident and Emergency at Liaquat National Hospital, Karachi from 14th May 2009 to 31st January 2010. Sample size of 70 patients of facial laceration. All patients presented to Accident and Emergency department with facial laceration fulfilling inclusion criteria were included in this study.

Inclusion criteria:

- Age group 18 to 40
- Superficial laceration
- Presented to emergency within 24 hours of injury

Exclusion criteria:

- Deep laceration
- Presented to emergency after 24 hours
- Severe contamination/ crush injury/ animal bite
- Diabetes, vascular disease, familial tendency for keloid or hypertrophic scar

Data Collection Procedure: All patients presented to Accident and Emergency department of Liaquat National Hospital with facial laceration fulfilling the inclusion criteria were included and lacerations were closed with a single layer of simple interrupted 6-0 polypropylene sutures.

To each eligible patient, procedure was explained, informed consent was taken. Lacerations were repaired by investigator with at least 2 year experience of suturing facial lacerations. Investigator measured the size and shape of the laceration, its location and orientation to relaxed skin tension line. All lacerations were examined under local anesthesia and washed with 0.9% saline solution. Time for repair was calculated by investigator, started from removal of suture from its packet and ended when outer layer of skin is completely closed. Patients were evaluated at 5 days for removal of sutures (recommended time for removal of facial stitches is 3 to 5 days), infection and dehiscence and at 3 months for cosmetic evaluation which was done by observer (a plastic surgeon with 3 years experience). All efforts were made to ensure that complete data is obtained from all candidates in the study. Manchester scar assessment proforma was used to calculate scar score. Data was collected in proforma and analyzed using SPSS version 12.

Statistical Methods: Data was analyzed with SPSS 12.0 for Windows. Categorical variables as gender, wound location, wound orientation and cosmetic outcome were presented as the percentage. Continuous variables as age, wound length and width, time taken for closure, were presented as means with standard deviations and 95 percent confidence intervals. The outcome was the long-term cosmetic appearance, as assessed by using the Manchester scar assessment proforma, time taken for closure and rate of wound infection, dehiscence. Stratification was undertaken on age, gender, site and size of wound to assess impact on outcome.

RESULTS

A total of 70 patients presented to emergency within 24 hours of injury with facial laceration were included in this study and lacerations were closed with a single layer of simple interrupted 6-0 polypropylene sutures. Most of the patients age were between 21 to 40 years of age that is 58(82.8%) as shown in Figure 1, the average age of the patients was 27.74 ± 7.34 years (95%CI: 25.99 to 29.49)similarly average time injury was 4.23 ± 2.36 hours (95%CI: 3.65 to 4.82).

Out of 70 patients, 58(82.9%) were male and 12(17.1%) were female. Characteristics of laceration of patients in length, width and shape are also presented in Table 1. Average length and width of laceration were 2.9±0.96 cm (95%CI: 2.67 to 3.13) and 0.48±0.23 cm (95%CI: 0.42 to 0.53) respectively. Regarding shape, 78.6% were linear and 21.4% were nonlinear.

Road traffic accident was the commonest causes of the injuries that were observed in 48(68.6%) cases followed by fall 16(22.9%), glass injury 4(5.7%), hit by fan 1(1.43%) and assault was also observed in only one case. Similarly chin, cheek, lips, eye brow was most effected location of laceration of patients which are presented in Table 2.

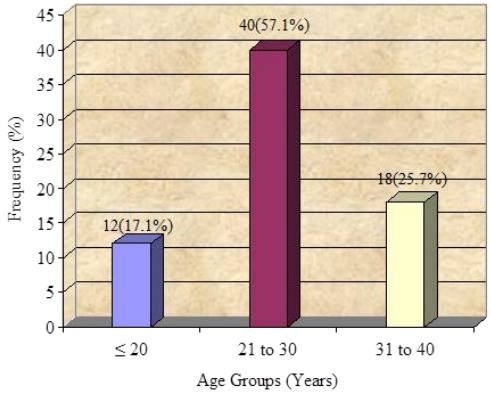

Figure No.1: Patients age with frequency

Time for repair was calculated and it started from removal of suture from its packet and ended when outer layer of skin is completely closed. The average time taken for closure was 13.47 ± 3.96 minutes (95%CI: 15.1 to 14.3). Time of closure observed in 27(38.6%)

cases was within 11 to 15 minutes, 21(30%) cases was within 6 to 10 minutes, 18(25.7%) cases was within 16 to 22 minutes and time taken for closure in 4(5.7%) cases was within 5 minutes.

Table No.1: Characteristics of laceration

Characteristics of laceration	Frequency	Percentage
Length		
➢ 1.0 to 2.0 cm	21	30%
➢ 2.1 to 3.0 cm	29	41.4%
➢ 3.1 to 4.0 cm	14	20%
➢ 4.1 to 5.0 cm	06	8.6%
Mean ± SD (95%CI)	2.9±0.96 (95%CI: 2.67 to 3.13	
Width		
➢ ≤ 0.5 cm	59	84.3%
➢ > 0.5 cm	11	15.7%
Mean ± SD (95%CI)	0.48±0.23(95%CI:0.42 to 0.53)	
Shape		
➢ Linear	55	78.6%
➢ Non Linear	15	21.4%

Table No.2: Location of laceration of patients n=70

Location of laceration	Frequency	%age
Chin	16	22.9%
Cheek	11	15.7%
Lower and Upper Lip	11	15.7%
Eyebrow	10	11.4%
Infra Orbital	7	14.3%
Forehead	6	8.6%
Nose	5	7.1%
Upper Eyelid	3	4.3%
Lateral canthal area	1	1.4%

Table No.3: Cosmetic outcome of superficial facial lacerations with respect to characteristics of laceration

Characteristics of laceration	n	Less Satisfactory	Satisfac-tory
Length			
➢ 1.0 to 2.0 cm	21	1(4.8%)	20(95.2%)
➢ 2.1 to 3.0 cm	29	3(10.3%)	26(89.7%)
➢ 3.1 to 4.0 cm	14	2(14.3%)	12(85.7%)
➢ 4.1 to 5.0 cm	6	0(0%)	6(100%)
Width			
➢ ≤ 0.5 cm	59	5(8.5%)	54(91.5%)
➢ > 0.5 cm	11	1(9.1%)	10(90.9%)
Shape			
➢ Linear	55	2(3.6%)	53(96.4%)
➢ Non Linear	15	4(26.7%)	11(73.3%)
Orientation to relaxed skin tension lines: Parallel			
➢ **No**	**17**	4(23.5%)	13(76.5%)
➢ **Yes**	**53**	2(3.8%)	51(96.2%)

Infection and dehiscence infection was not observed in patients. Cosmetic outcome were measured by Manchester scar assessment score. Satisfactory (scar score 5 to 8) outcome was observed in 64(91.4%) patients while 6(8.6%) cases were less satisfactory (scar score 9 to 17)

Satisfactory scar condition was slightly higher in male (93.1%) than female (83.3%). Similarly these cosmetic outcome were analyzed according to age group, above 90% cases were found satisfactory in all age groups. One case of assault was less satisfactory and 5(10.4%) cases of road traffic accident scare outcome were less satisfactory.

Less satisfactory cosmetic outcomes were observed in patients whose time of injury was above 6 hours. Cosmetic outcome of superficial facial lacerations with respect to characteristics of laceration are also presented in Table 3.

DISCUSSION

The quality of care of acute facial lacerations can determine whether patient will receive aesthetic and functional restoration, or a disfiguring scar, with or without loss of function. The ultimate goal of facial laceration repair is to achieve a functional and aesthetically pleasing scar. This is best achieved by proper wound assessment and preparation followed by gentle tissue handling and meticulous wound closure. Proper application of plastic surgical technique is of vital importance in achievement of a minimally visible or hairline scar. In today's world where emphasis on personal appearance has increased significantly, both emergency physician and surgeons treating patients should be familiar with principles and techniques of facial soft tissue surgery to prevent subsequent cosmetic deformity or functional impairment.

Facial laceration repair is not a difficult task but an ideal repair combines gentleness with delicate tissues, thoroughness and willingness to spend time for precise closure. Using proper techniques may prevent costly scar revisions, which may never be as good as initial repair done properly. There is no single recommended method for facial laceration repair and despite of several studies on suture repair and alternate methods of facial laceration repair no major difference is found among all modalities. This indicates that general principles while repairing facial laceration are more important than method of repair. In a study of 65 patients comparing single versus double layer closure patients were randomized to closure with single layer of simple interrupted 6/0prolene suture and a double layer of simple interrupted 6/0prolene plus deep dermal layer of 5/0 polyglactin suture. Scar assessment was done at 90 days and author concluded that Single-layer closure of nongaping, minor facial lacerations is faster than double-layer closure. Cosmetic outcome and scar width are similar in sutured wounds whether or not deep

dermal sutures are used. In many studies comparing cosmetic outcome of facial laceration repaired with absorbable suture, non absorbable suture, tissue adhesive and steri strips concluded that there is no significant difference in cosmetic outcome in either group. Steri strips and tissue adhesive are good techniques but their use requires expertise. Non absorbable suture has advantage that we do not need to remove the sutures but generally we have seen bit more inflammatory reaction with these sutures and they are good for intradermal suture placement when it is required in closing deep wounds. In practice we have seen patients with facial lacerations repaired in some other hospitals with 2/0 silk suture, not well approximated and with wide distance from skin margins. Despite of time and resource expenditure the results are not good and such patients are then in search of re-suturing or later on presented with ugly scar. Secondly patients with facial lacerations are referred to our hospital only because of lack of plastic surgery specialties in most of the hospitals. With little changes in practices and cost, cosmetic outcome can be improved even in hospital where plastic surgical expertise is not available. Closing laceration with non absorbable prolene is easy and in majority of institutes worldwide it is done by emergency physicians and emergency theatre technicians. Only 16% facial lacerations in emergency are repaired by plastic surgeons.[13]

In our study we repaired 70 superficial lacerations presented within 24 hours to accident and emergency department; with single layer of 6/0 prolene suture and majority of our patient (91.4%) came in satisfactory result's category with acceptable cosmetic outcome. We restricted the age group from 18 to 40 because young individuals are more concerned about scars. Among these patients 57.1% were between 21 to 30 years of age indicates that younger people are more prone to trauma. There is no significant difference in cosmetic outcome among age groups.

36 patients presented within 3 hours of injury and among these 35 patients (97.2%) resulted in satisfactory outcome, 23 patients presented between 3 to 6 hours of injury and gave 95.7% satisfactory result while 11 patients presented after 6 hours and 7 patients (63.6%) gave satisfactory outcome. It indicates that repair of lacerations within 6 hours gives best outcome.

JP Shepherd a maxillofacial surgeon in one of his work on assessment of repair of facial laceration repair concluded that there is still no ideal suture for skin closure. Sutures should be easy to handle and should facilitate efficient wound closure. Secure, optimal skin/ wound edge co-aptation will produce minimal tissue reaction; primary wound healing and therefore minimal scarring, particularly where infection is prevented.[14]

Brown et all summarized in paper on advanced laceration management that the majority of lacerations to the face and fingertip can be managed by the emergency clinician.[15]

In majority of studies done on facial lacerations, the rate of infection and dehiscence is very minimal but the long-term cosmetic appearance is more important to both patients and physicians that's why we emphasize more on cosmetic outcome unlike many studies in which infection rate is used as primary outcome.

In one study by Singer A J the mean time taken for facial laceration repair with single layer was 14.7 minutes, the rate of infection and dehiscence was zero and the optimal scar score was 6.[7]

It is indicated by our study that single layer closure is as effective as any other modern technique in achieving cosmetically pleasing scar. In our study the optimal scar score and the final outcome of scar is comparable with international studies and additionally there is no wound infection and dehiscence which is also comparable with international studies where almost same results are achieved with suture closure of facial laceration in comparison with other methods. Internationally little work is done on adult population while more work is done on pediatric lacerations where emphasis is more on non-absorbable suture because suture removal is problematic in children. Unfortunately we do not have any local study done on this topic as yet.

Our study has some Limitations which need to be discussed. We have presented case series and have compared with international results. We have not done our own comparison of different modalities. But as it is first such study we may be able to do further work in our institution. We have done our study in single institute so we cannot compare with other institute's results unless we do multicenter study or same study being duplicated in other institutes also. In our study we have done scar assessment at three months and this timing is also a topic of debate. Although studies suggest that the cosmetic appearance of scars at 3 months reliably predicts 1-year outcome, one study found differences between the cosmetic appearance of wounds at 6 and 46 months.[7] In our study we have used scoring system which has some draw backs. These types of scorings assume different scar characteristics to have the same level of importance (e.g., the score for a gross mismatch in color is assigned the same influence as that for a severe distortion). This implied weighting will not only contribute to the consistency of scores but may also lessen the sensitivity of the assessment. This is not to say that these methods are deficient; indeed, in an area that lacks general agreement regarding a premier method, and considering the broad spectrum of clinical scars that have been thus assessed, they are extremely functional tools.

CONCLUSION

Our study demonstrates that single-layer closure of nongaping, minor facial lacerations, with

nonabsorbable monofilament suture yield satisfactory cosmetic outcome. With little change in practice as selection of suture material, proper handling of tissues and proper approximation of wound edges, the outcome can be improved significantly in facial lacerations. Cosmetic outcome improved when repaired within 6 hours of injury but there is no impact of time on rate of infection and dehiscence.

Author's Contribution:

Concept & Design of Study:	Batool Urooj Rajput
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Final Approval of version:	Batool Urooj Rajput

Conflict of Interest: The study has no conflict of interest to declare by any author.

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