ORIGINAL ARTICLE

Aesthetic Appearance of External Dacryocystorhinostomy Scar: A Comparison between W and C Shaped Incision

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ABSTRACT

Purpose: To compare the post-operative appearance of external Dacryocystorhinostomy scar resulting from W and C shaped incisions.
Study Design: Interventional case series.
Place and Duration of Study: Khalid eye clinic, Karachi, from July 2018 to June 2019.
Methods: We recruited ninety-six patients of nasolacrimal duct obstruction by convenience sampling technique. Age ranged from 20 to 50 years and both genders were included. Two groups were made. Group A comprised of patients who underwent external Dacryocystorhinostomy (Ex-DCR) surgery through W shaped incision and group B patients underwent Ex-DCR with curvilinear C shaped incision. Main outcome measure was to observe minimal to no visible scarring at wound site after six months of follow up. All patients were explained about the difference in incision technique and consent was obtained from each patient.
Results: Mean age was 34.3 ± 6.897 years. There were thirty-six (37.5%) males and sixty (62.5%) females. Right side was affected in forty-six (47.9%) cases whereas left side was involved in fifty (52.1%) cases. In Group A, 20 (41.6%) out of 48 patients, whereas in Group B, 38 (79.2%) out of 48 patients had no visible scar at all and it was statistically significant with a p-value of < 0.05. Suture abscess developed in four (8.3%) patients in group A, no other serious complications were observed in either group.
Conclusion: Curvilinear C shaped incision in Ex-DCR has better cosmetic outcome.
Key Words: External dacryocystorhinostomy, C shaped incision, W shaped incision.

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INTRODUCTION

External dacryocystorhinostomy (Ex-DCR) was first performed in 1904 as an exterior approach to the sac via a skin incision in the medial canthus by Toti.[1] It has since then been done as a cost effective, customary procedure in patients with nasolacrimal duct impediment with > 90% accomplishment rate depending upon the surgeon's experience.[2] The chief downside of Ex-DCR is the presence of a cosmetically unappealing blemish which may occur in up to 9 to 33% of the cases and is difficult to predict.[3] It is of great apprehension for both the surgeon and the patients and all efforts are made in order to curtail the appearance of an unsightly scar. Factors that can influence the configuration of a scar include the site and shape of incision, careful surgical technique and blood free surgical field.[4] Not many studies have been done to evaluate the visibility of Ex-DCR surgical scars. A study done by Devoto, showed that 9% of the patients who went through Ex-DCR quantified the

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surgical scar as very perceptible and 26% graded it as moderately noticeable.[5] Alternative procedures such as endonasal DCR have yet to progress to achieve equivalent success rates as Ex-DCR, therefore it is desirable that a skin approach to DCR is planned that can productively conceal the visibility of the surgical scars.[6]

The rationale of this study is to assess the consequence of incision shape along the skin tension lines, in effectively reducing the visibility of the scar tissue by using W and C shaped incisions in patients undergoing Ex-DCR for nasolacrimal duct obstruction.

METHODS

This prospective interventional case series was carried out at Khalid eye clinic, Karachi, during the period of July 2018 to June 2019. It included ninety-six patients with nasolacrimal duct obstruction between the ages of 20 to 50 years. Both genders were included in the study. Patients were informed about the study dynamics and consent was taken from every patient. The purpose, method and basis of the study were conveyed to all the patients. The institutional ethical review committee approved the study. The exclusion criteria was presence of any concomitant pathology of intranasal cavity, obstruction of the canaliculi, trauma, dacryocystitis along with fistula, dermal disorder that might influence the course of wound remedial. The entire surgery of each patient was done under the influence of regional anesthesia along with sedation by a single oculoplastic surgeon. All patients were divided into two groups with forty eight patients each. Diagnosis of nasolacrimal duct obstruction was established by lacrimal probing and syringing. Group A included individuals who underwent Ex-DCR through W shaped incision and group B patients underwent curvilinear C shaped incision (Figure 1) Ex-DCR. The exterior incisions were analyzed by the individuals themselves and two co-authors, six months after each procedure. Main outcome measure was to observe minimal to no visible scarring after six months of follow up. Data was analyzed via SPSS version 25.0 for statistical analysis. A P-value of < 0.01 was accepted statistically significant.

All patients underwent Ex DCR under local anesthesia. In the patients of group A, a W-shaped incision was fashioned by forming three uninterrupted triangles of 4 mm in length with two tips and one base adjacent to the medial canthus and was 12 mm in length. In patients of group B, a C shaped incision of 10mm X 8mm was constructed medial to the medial canthus. The surgical technique was otherwise same in all the patients. At the end of the surgery, the subcutaneous tissues and the dermal incisions were approximated with 6-0 Vicryl. The W Shaped incision was closed with interrupted sutures placed at the tips and gaps that had been formed by the incision whereas the C Shaped incision was closed using interrupted sutures. There were no per-operative problems in any case, such as angular vessel damage leading to excessive bleeding or postoperative complications in either group.

Postoperatively, all patients received topical antibiotic drops and ointment for a period of 2 weeks and vasoconstrictor nasal spray. Patients were followed-up on day 1 after surgery, then after 10 days, and later on at 1, 3 and 6 months. Sutures were removed after 2 weeks of surgery. The scar analysis was performed under same light conditions and distance at each visit. Co-authors and patients were asked to grade the scar visibility. If unable to see the scar, it was graded as 1. Minimally perceptible scar was labeled as grade 2, reasonably visible scar was graded as 3, and easily noticeable scar was grade 4.

RESULTS

This one year interventional study was conducted on ninety six patients between the ages of 20 to 50 years. Mean age was 34.3 ± 6.897 years. There were thirty six (37.5%) males and sixty (62.5%) females. Right side was affected in forty six (47.9%) cases whereas left side was involved in fifty (52.1%) cases. In Group A, 20 (41.6%) out of 48 patients, whereas in Group B, 38 (79.2%) out of 48 patients had no visible scar at all (Table 1). Cross – tabulation for group outcomes was statistically significant with a p-value of < 0.01 (Pearson Chi-squared test). Suture abscess developed in four (8.3%) patients in group A, no other serious

Fig. 1: W and C shaped incision markings before surgery.

complications were observed in either group. Mean follow up period was 188.2 ± 12.42 days.

Table 1: *Comparison between the two groups according to scar grading.*

Scar Grade	Group A	Group B	Total
1	20	38	58
2	3	5	8
3	10	3	13
4	15	2	17
	48	48	96

DISCUSSION

Ex-DCR is a consistent but an intricate surgical technique requiring substantial surgical experience. The formation of scar at the surgical site is a chief disadvantage and a cosmetic blemish for patients undergoing Ex DCR. Many types of surgical incisions like curvilinear tear trough, sub-ciliary lower eyelid, W-shaped nasal, and trans-conjunctival subcarancular have been tried in different studies to reduce the visibility of scar.[6,7,8]

We fashioned the incision contour in such a way that it takes into account the standard dermal tension lines, which effectively reduce the formation of a scar. A study done by Langer highlighted the standard tensile dermal strength lines and stated that the incision line course was one of the most important factors in determination of the final scar configuration.[9] Another study reported the significance of making an incision corresponding to the dermal tensile strength lines.[10] Another study evaluated the significance of the Ex DCR linear surgical scar as assessed by the patients. A total of 20.6% scars were felt to be visible (grade 4) by the patients, 10.5% were labeled as grade 1 and 4% were rated as grade 2.[11] In our study, 31.3% in group A (W shaped incision) and 4.2% in group B (C shaped incision) reported an easily visible scar tissue (grade 4).

The aesthetic outcome of Ex-DCR in another study following conventional Ex DCR was 30% with no visibility of a scar.[12] Similarly, another study reported that 40% of their patients did not see a visible scar at the end of the 6 months follow up period.[11] This study reported an improved aesthetic outcome of 41.6% in group A with W shaped incision and a very good cosmetic result of 79.2% in group B with C shaped incision with no visibility of a surgical scar. The mean age in our study was 34.3 ± 6.897 years which was lower than the study done by Ekinci et al[7] (40.8 ± 14.3 years) and much lower than the studies done by Devoto et al[5] (61 years), Sharma et al[3] (67y) and Kashkouli et al[13] (52.9y). Studies have suggested that more prominent scarring in younger age group is due to the presence of smoother, less flawed skin, making the scar more conspicuous.[14,15] Davis[4] concluded that scarring after C shaped incision during Ex DCR is modestly noticeable to the surgeons and nearly indistinguishable to patients but the study did not have a comparison. The final follow up of the aforementioned study was 90 days, whereas in this study it was six months. The lower chance of scarring is based on a number of factors such as the use of anesthesia, surgical site and shape, incision direction, proper closure of wound and dermal flap approach.[16,17,18,19]

In this study no significant alteration in scarring was noticed to occur between 3rd and 6th month of follow up, though both differed from the 1st month, concluding that the greatest scar development was achieved in the initial three months. It was also found that Ex DCR with C shaped incision was cosmetically superior to W shaped incision ($p < 0.05$). The time required to carry out Ex DCR with C shaped incision was also lesser than W shaped incision. The post-surgical scarring improved at the end of follow up period of six months. The percentage of patients having a visible scar mark was significantly lower in group B as compared to group A. Dirim et al compared C and W shaped incisions and found no noteworthy disparity between the presence of scarring among both groups (40% in C shaped vs. 50% in W shaped).[20] Scarring differs among different races and therefore our results are not universal.

The limitation of this study is the simple grading system, which did not take into account the other characteristics of a scar such as width, height, pigmentation and colour of the suture marks.

CONCLUSION

External dacryocystorhinostomy remains the successful gold standard surgery for the management of nasolacrimal duct obstruction and this study found that curvilinear C shaped incision in Ex DCR is aesthetically more appealing and has a better cosmetic outcome as compared to a W shaped incision.

Ethical Approval

The study was approved by the Institutional review board/ Ethical review board. **(ERC-14-20)**

Conflict of Interest

Authors declared no conflict of interest.

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Authors' Designation and Contribution

Zeeshan Kamil; *Consultant Ophthalmologist: Concepts, design, Literature research, Data Analysis, Statistical analysis, Manuscript preparation, Manuscript editing.*

Qirat Qurban; Consultant Ophthalmologist: *Concepts, design, Literature research, Data Analysis, Statistical analysis, Manuscript preparation, Manuscript review.*

Khalid Mahmood; Consultant Ophthalmologist: *Data acquisition, Manuscript review.*