Original Article

Cosmetic Results of Tear Trough Incision in External Dacryocystorhinostomy

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ABSTRACT

Purpose: To determine the cosmetic results of tear trough incision in patients undergoing external dacryocystorhinostomy for primary acquired nasolacrimal duct obstruction.

Study Design: Quasi experimental study.

Place and Duration of Study: Isra Postgraduate institute of Ophthalmology from May 2023 to November 2023.

Methods: This study included patients who underwent external dacryocystorhinostomy for primary acquired nasolacrimal duct obstruction (PANDO). The patients were followed up for 4 months and scar scoring was done in the same room and light at 100 cm from the patient. Grade 1 was labelled as invisible scar, Grade 2 when scar was minimally visible, Grade 3 when scar was moderately visible, and Grade 4 when scar was highly visible.

Results: A total of 50 surgeries were performed. An incision was given 5 mm medial and 1 mm above medial canthus and extended in the tear trough for 12 mm in a curved manner. Blunt dissection was conducted in horizontal plane to reach the periosteum; rest of the procedure was same as conventional DCR. Skin was closed in layers, orbicularis muscle with 6.0 vicryl suture and skin with 5.0 prolene suture. At first month follow up, ophthalmologist reported invisible scars (grade 1) in 35 out of 50 patients (70%),in the 2nd month follow up 40 out of 50 patients had invisible scar (80%). At final follow up invisible scars were observed in 89.1%(n=41) patients (p>0.05).

Conclusion: Tear trough incision produces good cosmetic results as the scar is hidden in tear trough area.

Keywords: Dacryocystorhinostomy, Scars, Dacryocystitis, Epicanthus.

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INTRODUCTION

External Dacryocystorhinostomy (Ex-DCR) is regarded as the gold standard for treating primary acquired nasolacrimal duct obstruction (PANDO).[1] Since Addeo Toti initially described it in 1904 and Dupuy-Dutemps and Bourguet improved it in 1921, the treatment has a success rate of about 90%.[1] A majority of surgeons choose Ex-DCR because of its better success rate and long-term results. According to a survey conducted from oculoplastic surgeons including members of the American Society of Ophthalmic Plastic and Reconstructive Surgery, it is cost effective and can be done under local anesthesia with less bleeding.[2,3]

One of the main drawbacks of external dacryocystorhinostomy (Ex-DCR) is the visible scar at the incision site, which has prompted the development of scarless alternatives such as endonasal dacryocystorhinostomy (En-DCR). However, En-DCR has variable success rates, higher costs, and a steep learning curve.[4,5] Proper placement of the Ex-DCR incision, on the other hand, can result in a scar that is barely perceptible to both the surgeon and the patient. Various incision sites for Ex-DCR have been described in the literature, including the conventional, V-shaped, W-shaped, and sub-ciliary incisions.[6-8]

Recently, a tear trough incision has been reported to yield minimal or almost invisible scarring.[9] Since Ex-DCR continues to be widely performed in our region due to its lower cost and high success rate, evaluating the tear trough incision technique is important to establish local evidence on its cosmetic and functional outcomes.

METHODS

This quasi-experimental study was conducted at Isra postgraduate institute of Ophthalmology after approval from Ethical Committee **(IRB number REC/IPIP/2023/076).** A sample size of 50 was calculated using the OpenEpi online software, based on an expected annual population of 250 dacryocystorhinostomy (DCR) patients and an anticipated Ex-DCR success rate of 95.8%, 95% confidence interval and 5% margin of error.[10]The patients with PANDO diagnosed by probing and syringing of nasolacrimal duct between May 2023 and November 2023 were included in the study. Patients with previous Ex-DCR surgery, scar at medial-canthus, acute dacryocystitis with fistula formation, and patients who were lost to follow up at 4 months were excluded.

Ex-DCR was performed by giving incision 5 mm medial and 1 mm above medial canthus and extended in the tear trough for 12 mm in a curve like manner, with No. 15 Bard Parker blade. Blunt dissection was conducted in horizontal plane to reach the periosteum; rest of procedure was same as conventional DCR.[11]A bony ostium was created using a Kerrison punch. A large, single U-shaped flap was fashioned from both the nasal and lacrimal mucosa. The anterior flap of the lacrimal sac was then sutured to the anterior flap of the nasal mucosa using three interrupted 6–0 vicryl sutures to prevent sagging or tension. After completing the procedure, skin was closed in layers. Orbicularis muscle was sutured with 6/0 vicryl and skin with 5/0 prolene suture (Figure 1).

After surgery, the patient was followed up at 1, 2 and 4 months. Scar scoring was done at every visit by observing in same room and by the same doctor at 100 cm from the patient. The grading criteria were similar to the one used by Wadwekar B, et al.[12] If the examiners could not identify the operated side, the case was classified as having no visible scar (grade 1). When the surgical side was identifiable by the presence of a scar, they were asked to assign a grade: minimally visible scar as grade 2, moderately visible scar as grade 3, and clearly visible scar as grade 4.

Data was analyzed through SPSS version 25.0 for statistical analysis. Using Shapiro Wilk test, data was found to be normally distributed. For quantitative variables such as age, Mean ± S.D was calculated. Qualitative variables like gender and grading scale were presented in the form of frequencies and percentages. Chi square test was used to check association between grading scale and outcomes. P-value <0.05 was considered as statistically significant.

RESULTS

A total of 50 patients comprising of 27 (54%) males and 23 (46%) females were included in the study. Mean age was 42.26±16.52 years. Four patients (3 males and 1 female) were lost to follow up at third month. At the first month follow up, the ophthalmologist reported 70% (n=35) invisible scars (grade 1) as compared to 2nd month follow up at which it was 80% (n=40). Similarly, invisible scars were reported in 89.1% (n=41) patients at final follow up (p>0.05) as depicted in Table 1. No post-operative complications were observed in any of the cases.

Table 1: *Objective Grading of Scar.*

Grading Scale	Outcomes 1st Month n (%)	2nd Month n (%)	4th Month n (%)	P-value
Garde 1	35 (70)	40 (80)	41 (89.1)	0.382
Grade 2	8 (16)	6 (12)	4 (8.7)	
Grade 3	4 (8)	2 (4)	1 (2.2)	
Grade 4	3 (6)	2 (4)	0 (0)	

DISCUSSION

External dacryocystorhinostomy (Ex-DCR) is considered a gold standard for treating chronic dacryocystitis. The advantages of better access to the surgical site for appropriately sized and placed flaps between lacrimal sac and nasal mucosa and a large osteotomy make it still the surgery of choice for epiphora.[13] The main drawback has been the unsightly scar of the conventional incision. Cosmetically significant scar has been found to be associated with young age and dark skin.[14] Although Endoscopic Dacryocystorhinostomy (Endo-DCR) is gaining popularity due to an external incision, the surgical outcome of Ex-DCR is still better than the endo-DCR.[15] This drawback can also be avoided by

undertaking the various cosmetically appealing incisions recommended for this surgery including the subciliary, W shaped, C shaped, transconjunctival and the tear trough incisions.[6,12,16,17] Various parameters have been described to minimize scar appearance like perioperative antibiotics, layered wound closure intraoperative triamcinolone and local anesthetic with epinephrine.[18,19] These incisions provide additional advantage to the benefits of Ex-DCR.

In our study 50 patients underwent Ex-DCR with the tear trough incision and 70% of patients had grade 1scar in the 1st month, 80% in the 2nd month and 89.1% in the 3rd month. The number of cases with invisible scar were high and increased at each follow up.

Other researchers have also reported favorable outcomes with this incision. Chanlalit et al, conducted a similar study using a telephonic survey of patients and an in-person physician assessment of scars at the final follow-up visit, employing the Scar Cosmesis Assessment and Rating (SCAR) Scale.[9] According to the physicians' evaluation, 59.4% of scars were invisible, 34.4% minimally visible, 6.3% moderately visible, and none were very visible. Scar assessment was performed at least six months postoperatively, with a mean follow-up duration of 34.7 months. They evaluated scar characteristics such as spread, pigmentation, hypertrophy, suture marks, and erythema, which might explain the lower proportion of invisible scars in their series. In contrast, our study simply categorized scars as visible or invisible, assessed from a distance of 100 cm. Davies BW et al, reported that, at three months postoperatively, 25.5% of patients had invisible scars, 53.7% had minimally visible scars, 17.1% had moderately visible scars, and 3.7% had clearly visible scars. Their assessment was based on a survey in which three surgeons evaluated standardized cropped photographs of the incision sites.[11]

The tear trough incision offers several advantages, including avoidance of the angular vessels, easy access to the lacrimal sac fossa, and the ability for patients to wear glasses immediately after surgery. This approach also significantly minimizes scar visibility and has the added benefit of not crossing the epicanthal fold.[9,11]

Other cosmetic incisions have also demonstrated favorable outcomes. Wadwekar et al, reported that the C-shaped incision provided better cosmetic results than the W-shaped incision, with a shorter surgical duration.[12] They further observed that optimal scar appearance was achieved within the first three months postoperatively, and that younger patients exhibited more prominent scarring compared to those older than 55 years. Similarly, Kamil Z et al, found no significant difference in scarring with the C-shaped incision.[17] They noted that scar characteristics vary among different racial groups, which may account for variations in reported outcomes.

Multiple factors influence the final cosmetic outcome, one of the most important being the type of incision.[18,19] However, few studies have specifically evaluated the cosmetic results of the tear trough incision. Further research is needed to enhance awareness of its favorable outcomes and encourage its wider adoption in external DCR. By offering cosmetically appealing incision options, we can provide patients with a cost-effective, successful procedure that also delivers superior aesthetic results.

This study has certain limitations. It was conducted at a single center with a limited sample size, which may affect the generalizability of the results. The follow-up period of four months was relatively short and may not fully capture long-term scar maturation. Scar evaluation was based on direct visual inspection without the use of standardized photographic documentation or validated scar assessment scales, introducing the possibility of observer bias. In addition, patient-related factors such as age, skin type, and individual healing tendencies were not controlled for, and the absence of a comparison group using other incision types limits the ability to directly compare cosmetic outcomes.

CONCLUSION

The tear trough incision provides excellent cosmetic outcomes for patients undergoing external dacryocystorhinostomy for primary acquired nasolacrimal duct obstruction. It offers the advantages of minimal scarring, good surgical access, and the ability for patients to resume normal activities such as wearing glasses soon after surgery. Given its favorable results and aesthetic benefits, the tear trough incision represents a valuable alternative to conventional approaches in external DCR, though larger studies with longer follow-up are recommended to further validate these findings.

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Conflict of Interest: Authors declared no conflict of interest.

Ethical Approval: The study was approved by the Institutional review board/Ethical review board **(REC/IPIO/2023/076)**.

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