ORIGINAL ARTICLE

A retrospective analysis of endoscopic dacryocystorhinostomy with and without mucosal flap

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Introduction: Dacryocystorhinostomy (DCR) is a surgery through which the flow of tears is restored into the nose from the lacrimal sac when the nasolacrimal duct (NLD) is obstructed. This study aimed to compare that the success rates of two different techniques in endonasal endoscopic DCR, namely, with flap excision and two mucosal flap excision techniques were used in the other group. Material and methods: A total of 74 patients who underwent endoscopic DCR for primary NLD obstruction in past 1 year were evaluated retrospectively with at least 3 months follow-up. They were analyzed based on those who underwent DCR with flap excision technique and the other with two flap preservation technique. Thirty-five cases underwent the with flap excision technique and 39 cases underwent the two-flap preservation technique. **Results:** Both with flap technique and without flap technique used for treating primary NLD obstruction resulted in equal success rate. **Conclusion:** Success was defined as the achievement of patency of the NLD throughout the period of follow-up with significant improvement in epiphora.

KEY WORDS: Dacryocystorhinostomy, Nasolacrimal duct obstruction, Lacrimal sac.

INTRODUCTION

Dacryocystorhinostomy (DCR) is a surgical procedure that creates an anastomosis between the lacrimal sac system and the nasal mucosa. The procedure can be performed externally or endoscopically through the nose without creating a scar. DCR procedures involve a small opening at the medial wall of the lacrimal sac, with minimal handling of nasal mucosa.[1]

Inadequate exposure of the lacrimal sac, due to limited resection of bone as well as excessive and unnecessary removal or injury of the surrounding nasal mucosa and, hence, exposure of bone around a small neo-ostium, appear to contribute to obstruction of the neo-ostium by granulation tissue.[2]

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To remove the bone after a metal probe had been inserted through the canaliculus and into the lacrimal sac, Caldwell invented endonasal DCR in 1893. Before the development of endoscopy, problems included limited visibility and extensive bleeding, which resulted in insufficient removal of soft tissue and bone. The difficulty persisted for many decades despite West and Halle's modifications to the procedure in 1910 and 1914, and breakthroughs in surgery only came with the development of rigid nasal endoscopes, which opened the door for developments in the field of endoscopic DCR. The modern-day approach to endonasal dacryocystorhinostomy was first reported by McDonogh and Meiring in 1989.[3]

The primary acquired nasolacrimal duct (NLD) obstruction is believed to occur due to chronic inflammatory process resulting in fibrosis, stenosis, and closure of the duct ostium.[4] After complete exposure of the lacrimal sac and inadequate opening of the sac in a H-shaped manner, there persists problem of epiphora in many cases as a result of reapproximation of the flap ends. This problem

is more common among patients of rural background who are not compliant to post-operative care and follow-up. To overcome the problem, the authors performed the trimming of the flap.

To overcome these problems, the author proposed the concept of trimming of the mucosal flap.

MATERIALS AND METHODS

This was a 3-month follow-up hospital-based retrospective study and was carried out in the Department of Otorhinolaryngology and Head and Neck Surgery, Rohilkhand Medical College and Hospital, Bareilly, a tertiary care and teaching hospital in Western Uttar Pradesh. All patients undergoing Endoscopic Dacryocystorhinostomy in the Department of ENT Rohilkhand Medical College and Hospital, Bareilly in the stipulated period fulfilling the inclusion criteria were enrolled for study.

A total of 74 subjects who had primary NLD obstruction and who underwent endoscopic dacryocystorhinostomy in past 1 year were evaluated retrospectively with at least 3 months follow-up and were divided into two groups. Group 1 had subjects who underwent endoscopic dacryocystorhinostomy with flap excision technique and group 2 had subjects who underwent two flap preservation techniques.

Eligibility criteria included all patients who had epiphora with or without purulent eye discharge. Regardless of age, both sexes (males and females) were included in the study.

Exclusion criteria included incomplete medical records, follow-up that was less than a year after surgery, a history of prior DCR surgery, and a diagnosis of the DCR that was not related to the primary obstruction of the NLD, such as secondary obstructions brought on by radiation or trauma, lacrimal sac abscesses, or nasolacrimal infections.

Probing and syringing were used to confirm the diagnosis of NLD blockage.

The mucosal flap operation the nasal mucosal flap is elevated during excision by 8–10 mm above the middle turbinate's axilla, up to the junction of the lacrimal bone and the maxillary frontal process. The lacrimal bone was then removed, exposing the entire lacrimal sac. With the help of the drill over the thick section of the bone, Kerrison type Hajek Koeffler was utilized to remove the entire bone portion of the lacrimal fossa without causing any damage to the lacrimal sac. Following that, a keratotomy knife is used to make a longitudinal incision in the lacrimal sac. When necessary, the top portion of the mucosal flap can be reinstalled on the axilla of the middle turbinate to cover any remaining bone to this level after the remainder portion of the flap was removed.

The two flap excision technique goes through the same steps as the flap excision technique: lifting the lateral mucosal flap, removing the lacrimal bone, exposing the entire lacrimal sac, making a longitudinal incision in the sac, and clipping a section of the mucosal flap.

The initial check-up was planned for 1 week after surgery. During the 3-month appointment at the outpatient clinic, the DCR tube was removed.

OBSERVATIONS

Out of selected 74 patients who were selected from ENT OPD, both underwent flap excision technique and two flap preservation technique in given stipulated time meeting the inclusion criteria. Results and observation are made in tabulated form along with graphical representation.

Two groups were made – Group 1 and Group 2. In Group 1, there were 35 patients who underwent flap excision technique, and in Group 2, there were 39 patients who underwent two flap preservation techniques and tabulated along with graphical representation, as seen Chart 1.

Out of 74 patients, 33 were male and 41 females which were taken randomly from ENT OPD, as seen in Table 1.

As shown in Table 2, out of the 74 subjects, 26 patients belonged to Urban and 48 patients belonged to rural background.

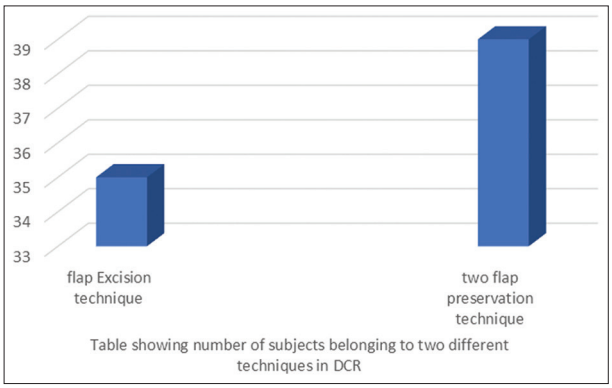


Chart 1: Number of subjects underwent different techniques for endoscopic dacryocystorhinostomy

Table 1: Sex distribution of patients

Males	Females
33	41

Table 2: Subjects belonging to different socioeconomic background

Urban	Rural
26	48

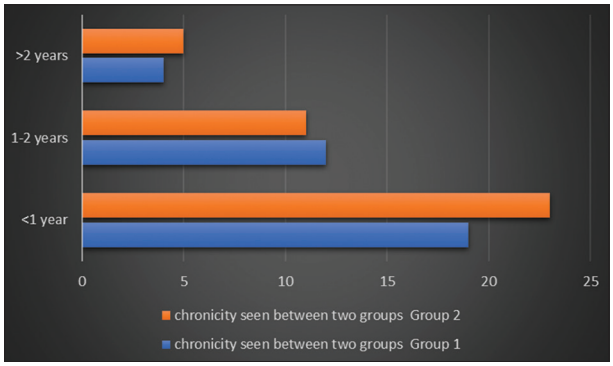


Chart 2: Chronicity seen between two groups

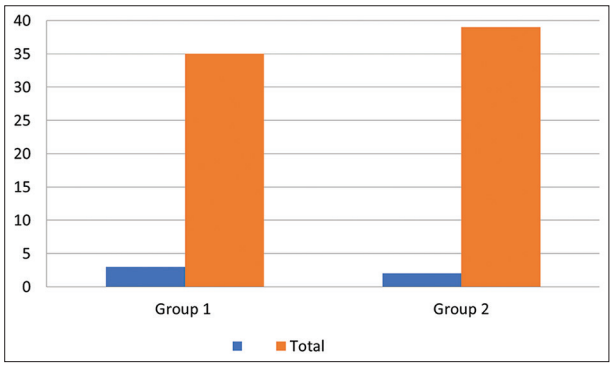


Chart 3: Post-operative improvement in Epiphora at 3rd month

As seen in Chart 2, chronicity was seen between the two groups which showed 19 patients had chronicity for <1 year in Group 1 and 23 patients in Group 2.

Out of which 12 patients showed 1–2 year of chronicity in Group 1 and 11 patients in Group 2. Minimal chronicity seen in both the groups after 2 years. Maximum chronicity was seen in <1 year. *P* value is 2.01. Chi-square is 8.258.

Minimal crusting postoperatively was seen in two patients in Groups 1 and 3 patients in Group 2.

Moderate crusting was seen at 7th day in 24 subjects in Group 1 and in 23 subjects in Group 2. Excessive crusting was seen in nine patients in Group 1 and in 13 patients in Group 2. *P* value is 1.08. Chi-square = 6.523 [Table 3].

In our study at one month, in Group 1 out of 35 patients, 28 showed no crusting and minimal crusting was seen in seven patients. In Group 2, out of 39 patients, 31 showed no crusting and eight patients showed minimal crusting. Moderate and excessive crusting was not present in either group. *P* value is 0.75. Chi-square is applied and comes out to be 6.523 [Table 4].

Table 3: Post-operative crusting

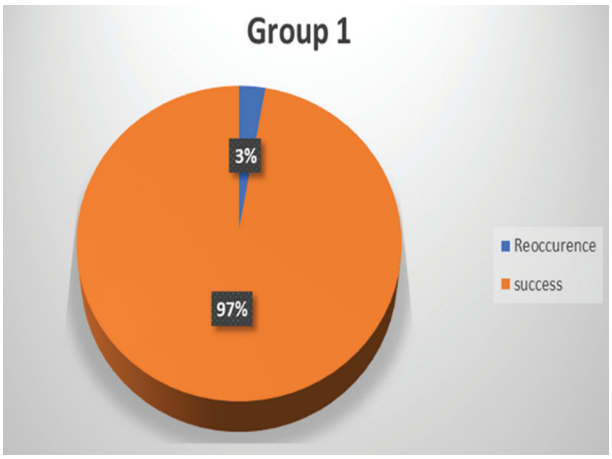
Amount of crusting	Group 1	Group 2
Minimal	2	3
Moderate	24	23
Excessive	9	13
Total	35	39

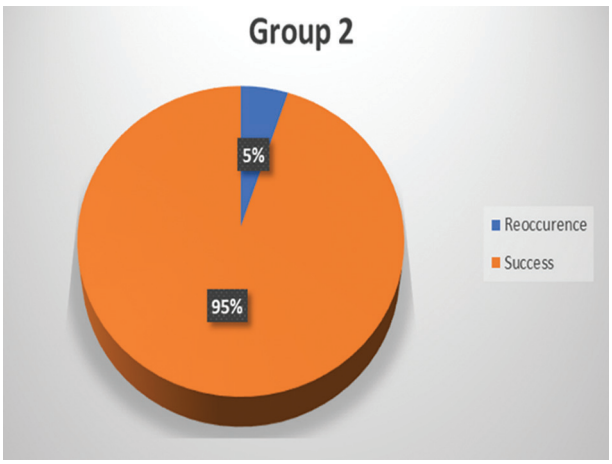
Table 4: Crusting seen postoperatively after 1 month

Amount of crusting	Group 1	Group 2
None	28	31
Minimal	7	8
Moderate	-	-
Excessive	-	-
Total	35	39

Table 5: Postoperatively synechiae formation at 3rd month

Synechiae at 3 month	Group 1 (35)	Group 2 (39)
Synechiae Formation at 3 months	3	2





As seen Table 5, synechiae formation at 3rd month in Group 1 was in three patients, and in Group 2, it was in two patients. *P* value was calculated to be 0.89. Chi-square came out to be 8.53.

Success was assessed in terms of improvement in epiphora seen in 97% of patients and it shows that only 3% patients had reoccurrence in Group 1 patients. It also shows 95% success rate and 5% rate of reoccurrence was seen in Group 2 patients [Chart 3].

DISCUSSION

Complete removal of lacrimal bone with full exposure of the lacrimal sac does not always lead to a successful outcome as there is another factor which is also a deciding factor for a patent nasolacrimal passage and that is wide opening over the lacrimal sac which is conventionally done by creating flap. However, sometimes, the flap gets approximated to each other and lead to closure of the neostium which is a big challenge for any surgeon and is more commonly seen among non-compliant patients who are irregular in follow-up and not compliant with post-operative irrigation.[5,6]

The above challenge can be overcome by trimming of the flap so that even if neo-ostium contract, the nasolacrimal patency is still the same.

In comparison to other standard treatment methods for NLD blockage, Peng *et al*. described a modified preserved nasal and lacrimal mucosal flap technique that was straightforward, safe, and effectively covers the exposed bone around the opening sac.[2]

Kansu *et al*.[7] conclude that the closure of bare bone with a posteriorly based nasal mucosal flap had created an anastomosis between the lacrimal sac mucosa and the nasal mucosa which lead to decrease in the formation of granulation tissue.

In our study, as there was no significant difference between the two groups with more of the case presented with granulation. Hence, covering the bone with mucosa does not affect the outcome of surgery.

Tsirbas and Wormald used the technique in endonasal DCR, in which the creation of a large ostium and construction of nasal and lacrimal mucosal flaps was done with an anatomic success rate that was 91% which compared it with the success rate of other techniques used for endonasal DCR which was significant with our study.[8]

Ciger and Islek[9] found a success rate of 97.9% with flap preservation and a lower successful outcome of 89.6% in group undergoing DCR without flap preservation technique. Our study totally differs that finding and a higher success rate were seen in our study in group undergoing surgery with without flap preservation technique through the result was found to be statistically significant.[10]

Other complications which indirectly affect the overall success rate of surgery like crusting in post-operative, synechiae formation, and granulation were found to be statistically not significant in the two groups. The study done by Horn *et al*.[10] and Rahman *et al*.[11] found 10% and 23.8% incidence of above post-operative findings.

CONCLUSION

In both group who underwent endoscopic dacryocystorhinostomy with flap excision technique or two flap preservation technique, there were no differences found in the success rate. The technique of flap removal is very suitable for patients belonging to rural background when weekly follow-up visit is relatively difficult.

There are other factors which decide the success rate of endoscopic DCR:

1. Complete removal of bone
2. Maximum size of neo-ostium.

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