

# Clinical Study on Prognostic Indicators of Endonasal Dacryocystorhinostomy

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## ABSTRACT

**Aim:** To assess various preoperative and peroperative clinical findings in endonasal dacryocystorhinostomy (DCR) as prognostic indicators of the surgical outcome.

**Materials and methods:** A prospective study of 25 cases of chronic dacryocystitis with epiphora. All the patients were divided into two groups based on the presence or absence of medial canthal swelling with regurgitation of mucopus on finger pressure over medial canthus. Other factors included duration of epiphora, associated nasal problems, condition of the bone, sac wall, and lumen of the sac during surgery.

**Results:** Out of 14 patients with medial canthal swelling (group I), all were successful on the table with free flow of saline, but one patient developed symptoms on 6 months follow-up and that was treated as failure. Out of 11 patients without medial canthal swelling, five were successful with free flow of saline on the table and six were unsuccessful because of tight or absent flow with regurgitation.

**Conclusion:** Presence of medial canthal swelling and regurgitation of mucopus on digital pressure over medial canthus is a good prognostic indicator for a favorable surgical outcome. In patients without medial canthal swelling, we need to rely on syringing or dacryocystogram. Early intervention gives good results.

**Keywords:** Dacryocystorhinostomy, Endonasal, Prognosis, Surgical.

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## INTRODUCTION

The most common cause of epiphora is chronic dacryocystitis. The most standardized and routinely performed procedure for this is endonasal DCR. Even though obstruction to lacrimal drainage system at any level leads to epiphora [like punctal stenosis, common canalicular obstruction, sac fibrosis and scarring, nasolacrimal duct (NLD) obstruction, and obstruction at multiple levels], the best result out of endo DCR can be expected when the obstruction is at single level, i.e., at NLD with patent system above the duct. The most important clinical assessment tool for diagnosing lacrimal drainage system pathology is lacrimal syringing.<sup>1</sup> But the interpretation of syringing is not straightforward like positive or negative. It needs so many other details to understand the level of obstruction. They are needed for punctal dilatation before syringing, size of the cannula used, up to what level the cannula has been inserted, whether there is soft stop or hard stop for the cannula, if there is regurgitation, whether the regurgitation is coming through the same punctum or opposite punctum, whether the regurgitated material is saline or mucopus, and the amount of pressure required to apply on the syringe.<sup>2</sup> Most often we do not have all this detailed information in the patient notes. Furthermore, there is so much subjective variation in interpretation of syringing results and that needs patient cooperation. In this background, we may need to repeat syringing or else we may need to rely on some other clinical findings to understand the pathology.

Dacryocystorhinostomy with its endoscopic version is the standardized procedure for epiphora secondary to chronic dacryocystitis.<sup>3</sup> Surgical result largely depends on the level of obstruction. There are different clinical methods and investigations to diagnose nasolacrimal system obstruction and to delineate the level of obstruction like syringing, methylene blue instillation in lower fornix, and dacryocystogram. Most favorable surgical result can be obtained when the obstruction is below the sac level. In our observation, we found that medial canthal swelling with regurgitation of mucopus on finger pressure over medial canthus gives favorable result when compared with cases without medial canthal swelling.

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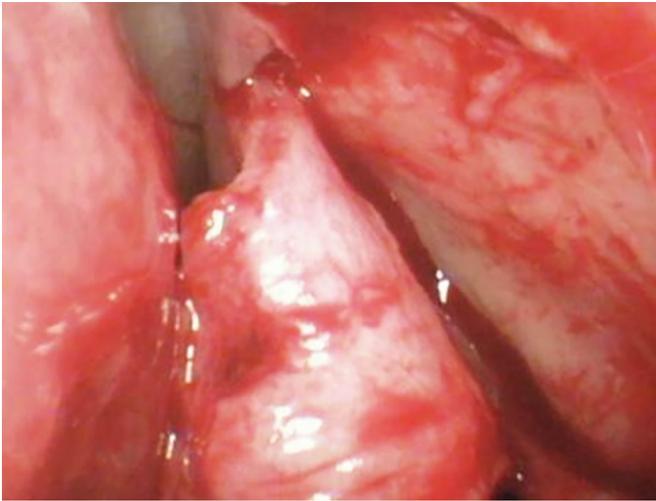


Fig. 1: Elevation of mucoperiosteal flap over lacrimal area



Fig. 2: Exposing the lacrimal sac after nibbling frontal process of maxilla

## MATERIALS AND METHODS

This is a prospective study of 25 procedures over a period of 18 months (23 cases with 25 procedures) with at least 6 months of follow-up. All the cases were divided into two groups based on the presence (group I) or absence (group II) of medial canthal swelling with regurgitation on digital pressure over medial canthus. One more division was based on the duration of symptoms whether the duration was less or more than 1 year. All the cases with regurgitation on syringing were included in the study. Syringing was done by different ophthalmologists. One case with ethmoid mucocele with epiphora and the one who had not completed 6 months of follow-up were excluded from the study. All the cases were subjected to same surgical procedure by a single surgeon. All procedures were done under local anesthesia, except for one female child at the age of 11 years operated under general anesthesia.

## TECHNIQUE

Patient was prepared with intravenous sedation along with nasal packing with gauze soaked in 4% xylocaine with 1 in 30,000 adrenaline. Later local infiltration was given at the axilla of the middle turbinate and along the lacrimal area with 2% xylocaine with 1 in 2 lakh adrenaline. A curvilinear incision was given starting at the axilla of middle turbinate curving anteriorly up to the superior aspect of inferior turbinate. Mucoperiosteal flap was elevated from the incision toward the uncinat process exposing posterior aspect of frontal process of maxilla and lacrimal bone anterior to the attachment of uncinat process (Fig. 1). Posterior aspect of frontal process of maxilla was nibbled with Kerrison's punch to expose the lacrimal sac. Part of the lacrimal bone was removed with the help of Freer's elevator and Blakesley forceps (Fig. 2).



Fig. 3: Regurgitation of mucopus on nibbling frontal process of maxilla

When satisfactory exposure of the sac was completed and confirmed by transmission of digital pressure over medial canthus, sac was opened with sickle knife to release the contents of the sac most often mucoid or mucopurulent collections. In group I with medial canthal swelling during nibbling of frontal process of maxilla, some of the collections were regurgitated back into the fornices (Fig. 3). In group II without medial canthal swelling after exposure of the sac, syringing helped in identification of the lumen of the sac during incision. Part of the medial sac wall was removed with the help of Kerrison punch to remove the anterior aspect and corneal scissors to remove the posterior aspect of the sac to create satisfactory stoma, i.e., around 6 to 8 mm (Fig. 4). Long-standing pathologies with thick lacrimal sac wall resulted in stoma of 3 to 4 mm only. Part of the nasal mucoperiosteal flap was resected and the remaining flap was fashioned onto the raw areas above and below the stoma. Gentle nasal packing was done with betadine impregnated gauze on the operated



**Fig. 4:** Creating stoma after draining mucopus from the sac

side and that was removed after 24 hours. Patients were followed postoperatively at 1 week, 1 month, and 6 month intervals, and symptoms, syringing findings, and endoscopy findings were recorded.

Simultaneous septal correction was needed in four cases to gain access to lacrimal area. For one case, simultaneous functional endoscopic sinus surgery was done to clear ipsilateral maxillary and ethmoid sinus pathology. Both eyes were operated for two patients and for one patient revision endo DCR was done after failure of external DCR.

Free flow of saline on syringing on the table was treated as success and tight or absent flow was treated as failure. On 6 months of follow-up if the patient was asymptomatic, if stoma was more than 2 mm, and if there was free flow of saline on syringing, then that was treated as success. If the patient develops symptoms of epiphora, scarring with stenosed stoma, and tight or absent flow with regurgitation on syringing, then that was treated as failure. Those patients who did not turn up for follow-up were enquired on phone and success and failure was decided based on absence or presence of symptoms. History, clinical findings, surgical findings, and follow-up findings were tabulated and the results were analyzed.

**Table 1:** Results—medial canthal swelling

	Group I (14)	Group II (11)
Success	13 (true +ve)	6 (false -ve)
Failure	01 (false +ve)	5 (true -ve)

**Table 3:** Results—medial canthal swelling analysis

	6 months after surgery
Positive predictive value	93
Negative predictive value	45
Sensitivity	68
Specificity	83

**RESULTS**

Out of 14 patients with medial canthal swelling (group I), all were successful on the table with free flow of saline, but one patient developed symptoms on 6 months follow-up and that was treated as failure. Out of 11 patients without medial canthal swelling, 5 were successful with free flow of saline on the table and 6 were unsuccessful because of tight or absent flow with regurgitation. Out of these six, one reported as asymptomatic after 6 months and that was considered as successful for the study. So out of 11 from group II after 6 months, 6 were successful and 5 were failures (Table 1). When it comes to duration out of 6 cases with less than 1 year duration, all were successful on 6 months follow-up and out of 19 cases with more than 1 year history, 13 were successful and 6 were failures (Table 2). The results were analyzed for both the variables by calculating positive and negative predictive values; sensitivity and specificity are tabulated (Tables 3 and 4).

**DISCUSSION**

Not many studies have focused on the importance of syringing and clinical observations but focused on investigations to diagnose site of obstruction and different surgical techniques to compare the results.<sup>4</sup> Our study highlights the importance of syringing and various parameters to be observed during syringing, like need for punctal dilatation before syringing, size of the cannula used, up to what level the cannula has been inserted, whether there is soft stop or hard stop for the cannula, if there is any regurgitation, whether the regurgitation is coming through the same punctum or opposite punctum, and also to evaluate the regurgitated material whether it is saline or mucopus and the amount of pressure required to apply on the syringe. This study also highlights the importance of other simple clinical observations like soft fluctuant medial canthal swelling with regurgitation of mucopus on finger pressure over medial canthus which means that there is single level obstruction at NLD level with patent system above, which gives excellent result with endo DCR. Practical problems in selecting good

**Table 2:** Results—duration

	<1 year duration (6)	>1 year duration (19)
Success	06 ( true +ve)	13 (false -ve)
Failure	00 (false +ve)	06 (true -ve)

**Table 4:** Results—duration analysis

	6 months after surgery
Positive predictive value	100
Negative predictive value	31.5
Sensitivity	31.5
Specificity	100

surgical candidates are especially with stenosed canalicu- lar system and with multilevel obstruction where there can be regurgitation on syringing but can be identified by other parameters of syringing like regurgitation of clear saline through same punctum in canalicular stenosis, regurgitation of clear saline through opposite punctum in common canalicular stenosis, may need to apply more pressure for syringing, and there can be partial regurgita- tion and partial flow through the nose. There can be soft stop for cannula. Even though we cannot replace syring- ing, good surgical candidates with isolated NLD obstruc- tion can be selected by our simple clinical observation of medial canthal swelling and there is minimal observer variation in this finding. This does not mean that cases without medial canthal swelling are poor surgical can- didates and detailed syringing should be done in those cases preferably by operating surgeon. We have not done syringing preoperatively in this study, reliance given to our ophthalmologist's findings and referral. On the table after surgery and on follow-up, we have done syringing. We have studied the other parameters to compare the prognosis like duration of symptoms, thickness, and sclerosis of frontal process of maxilla. Patients with less than 1 year symptoms before going for surgery are doing better than those patients with symptoms for more than 1 year, probably because long-standing stagnation in lacrimal system leads to multilevel obstruction, thereby reducing the success rate. Sclerosed frontal process and very thick bone above, near frontomaxillary suture is giving more granulations during healing phase, resulting in more scarring reducing the success.

Even though we fashioned the nasal mucosal flap onto raw areas of bone, we were unable to cover very thick superior portion and the exposed bone anterior to stoma that has resulted in granulations.<sup>8</sup> We may reduce this bony exposure by using frontal drill but we have not used frontal drill in our study, depended on Kerrison's punch.

Ji et al<sup>5</sup> conducted a study on 120 patients to compare the results of nasal mucosal sparing and covering the raw area around the osteum (group I) vs removed nasal mucosa (group II). On follow-up, excessive granulation tissue was found in 15% of patients in group I and 39% in group II. At the end of 1 year, excess scar tissue was found in 9% in group I and 31% in group II. Overall success rate was 98% in group I and 84% in group II.

We have not included peroperative lacrimal stenting for canalicular pathologies in our study because of our previous bad experience with stenting, contrary to the study conducted by Moscato et al<sup>6</sup> who concluded that silicon intubation has good long-term success for relief of epiphora in patients with presumed functional NLD obstruction.

We have not taken biopsies from lacrimal sac on regular basis but taken in one case with suspicion of other primary pathology because of very thick friable sac, but histopathology revealed it as chronic nonspecific inflammation.<sup>7</sup>

Even though we fashioned nasal mucosal flap onto exposed bony portion, we have not done any suturing between lacrimal and nasal mucosa. In fact the stoma created in thick-walled sacs was as small as 3 mm and corneal scissors is a handy instrument in doing so. We have not used debridor in our study. Fashioning stoma in thin-walled patent sacs was not a problem.<sup>8</sup>

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