Endonasal endoscopic dacryocystorhinostomy: our experience

D. Deviprasad · S. G. Mahesh · K. Pujary · S. Pillai · S. A. Mallick · V. Jain

Abstract

Objectives To study the outcome of endonasal endoscopic dacryocystorhinostomy (DCR) with or without mucosal flap preservation, without mitomycin local application, silicon tube stenting or laser assistance. To determine the duration of the surgical procedure of DCR, influence of simultaneously performed endonasal endoscopic procedures for concomitant sinonasal diseases.

Methods Combined retrospective and prospective study in our tertiary referral center. 24 patients with chronic dacryocystitis underwent 25 standard endonasal endoscopic DCR procedures, 10 with and 15 without mucosal flap preservation. 6 of these had concomitant sinonasal diseases for which they underwent septoplasty or functional endoscopic sinus surgery (FESS) or both, simultaneously or as staged procedures. Relief from epiphora and patency of the nasolacrimal fistula was assessed by nasal endoscopy and syringing of the lacrimal apparatus at 1 week, 3 weeks and 3 months postoperatively.

Results Out of 18 patients who underwent only DCR, 17 patients (94.44%) had complete relief from epiphora. Out of 6 patients who underwent 7 DCRs with concomitant sinonasal surgery, 5 patients (85.71%) had complete relief from epiphora. Overall 23 out of 25 DCRs (92%) had complete relief. In 15 of the 25 procedures, mucosal flap

was excised completely. In remaining 10 procedures, flap was trimmed, repositioned to cover exposed bone around the newly created nasolacrimal fistula. In either situation, only one patient each had partial block of the nasolacrimal fistula. Average duration of the surgical procedure of DCR was 18 min.

Conclusion Endonasal endoscopic DCR is a viable alternative to external DCR, co-existing sinonasal diseases can be managed simultaneously, as may be required in 25% of cases. It can be performed under 20 min without mucosal flap preservation, mitomycin local application, silicon tube stenting or laser assistance and can still provide a good success rate (92%) with less complications.

Keywords Epiphora · Endoscopic dacryocystorhinostomy · DCR · Mucosal flap

Introduction

Adeo Toti first described the external dacryocystorhinostomy (DCR) in 1904. West performed modified endonasal DCR in 1910 [1]. Endoscopic intranasal DCR was first performed by Rice in 1988. Advances in nasal endoscopic surgeries gave new hopes of overcoming the failures of external DCR. Umer et al. in their large series of endonasal endoscopic non-laser DCR found that 21.5% of cases require additional endonasal procedures. Therefore it is advisable that otolaryngologists are involved in this procedure. Ramakrishnan et al. performed endoscopic DCR without nasal mucosal flap preservation. They had success rate comparable with previously reported mucosal sparing endoscopic techniques and external approaches.

Though modifications, such as laser assisted endoscopic DCR, use of silicon stents, application of mitomycin-C to the nasolacrimal fistula area to reduce stenosis have been described, most of the surgeons still follow the standard

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endoscopic DCR procedures. In this paper, we describe our experience with the standard endoscopic DCR with and without mucosal flap preservation and also the influence of endonasal procedures performed for concomitant sinonasal diseases.

Materials and methods

Twenty-four patients who underwent endonasal endoscopic DCR at our institution between January 2006 and March 2007 were included in the study. Epiphora was the chief complaint in all the patients.

All patients were operated under general anesthesia. Nasal cavity was packed with cottonoids containing 4% xylocaine and 1:10,000 adrenaline. Wherever the need existed for good exposure or the sinus disease was present, septoplasty and FESS were performed. With 0° or 30° rigid nasal endoscope guidance, lateral wall of the nose anterior to the uncinate process was infiltrated with 2% xylocaine and 1:2,00,000 adrenaline. A posterior based 'C' shaped mucosal flap of 1.5 square centimeter was created using a sickle knife and Freer's elevator. Hajek's bone punch was used to remove the lacrimal bone and the adjoining part of the frontal process of the maxilla. Thick part of the frontal process of the maxilla was drilled using a 3 mm burr, so as to expose the entire medial wall of the lacrimal sac. The sac was made to bulge medially by irrigating with saline in primary cases or Bowman's lacrimal probe in revision cases. Medial wall of the sac was incised with sickle knife and excised with a Blakesley forceps or a through-cut forceps. Patency was checked with normal saline irrigation via the inferior canaliculus, which was seen in the nasal cavity. The mucosal flap was excised completely or trimmed, refashioned and repositioned so as to cover any exposed bone but care was taken to prevent the mucosa from overlapping the newly created nasolacrimal fistula region. No stents were used in any of the patients. Nasal pack was used whenever required for hemostasis.

Postoperative care and follow-up Nasal cavity was cleared of all the clots and crusts on the first postoperative day by nasal endoscopy in the outpatient department. Lacrimal syringing was performed twice daily for first 3 postoperative days and then patients were discharged. Patients were reviewed in the outpatient department 1 week, 3 weeks and 3 months after surgery. Nasal endoscopy was performed during these visits to remove any crusts in the nasal cavity and to confirm the patency of the nasolacrimal fistula by directly visualizing the flow of the saline during lacrimal syringing.

Observations and results

Twenty-four patients presented to us with epiphora with duration of 4 months to 8 years (mean = 2.7 year). Out of

these 7 were male (29.16%) and 17 were female (70.84%) between the age of 5 and 55 years (mean = 34.8 years). Two patients were of pediatric age group. Chronic dacryocystitis was bilateral in 2 patients, right sided in 13 patients and left sided in 9 patients. Twenty-five endoscopic DCRs were performed. Six patients (25%) had associated sinonasal diseases. They underwent 8 concomitant intranasal surgeries, 4 septoplasties and 4 functional endoscopic sinus surgeries.

The average duration of the surgical procedure of endoscopic DCR was 18 min. Out of 18 patients who underwent only endoscopic DCR, 17 patients (94.44%) had complete relief from epiphora. Out of 6 patients who underwent 7 endoscopic DCRs with concomitant sinonasal surgery, 5 patients (85.71%) had complete relief from epiphora. Overall 23 out of 25 endoscopic DCRs (92%) had complete relief (Table 1). Septal and the sinus surgeries performed simultaneously had no significant influence on the final result. Three out of the 25 procedures were revision DCR surgeries and all gave complete relief from epiphora.

In 15 of the 25 procedures, mucosal flap was excised completely. In remaining 10 procedures, flap was trimmed, repositioned to cover exposed bone around the newly created nasolacrimal fistula. In either situation, only one patient each had partial block of the nasolacrimal fistula. Similarly only one case in either group had granulation at the fistula site. Hence the success rate for endoscopic DCR without mucosal flap preservation was 93.33% (14 out of 15 procedures) and with mucosal flap preservation was 90% (9 of 10 procedures).

Nine of the 24 patients had complications. Three patients (12%) had intraoperative bleeding but complete hemostasis was achieved at the end of the procedure. One patient (4%) had ecchymosis and minimal cellulitis of the left lower eyelid which was successfully treated with antibiotics and anti-inflammatory medications. Two patients (8%) had granulation at the surgical site, which was removed during the follow-up endoscopic cleaning. One patient who had undergone concomitant FESS had a synchiae between the middle turbinate and lateral wall, which had to be resected during the follow-up at 3rd week. Two nasolacrimal fistulae (8%) had partial stenosis at 3rd month follow-up (Fig. 1).

Endoscopic assessment with lacrimal syringing, showed partial block of the nasolacrimal fistula in 2 cases (08%) at 3 months (Table 2). Concomitant sinonasal surgeries had no negative influence on the outcome of endoscopic DCR, as

Table 1 Comparison of results of only endoscopic DCR and endoscopic DCR with concomitant sinonasal surgeries

Relief from epiphora	Total endoscopic DCRs	Complete	Partial
No concomitant sinonasal surgery	18	17	01
Concomitant sinonasal surgery	07	06	01

Fig. 1 Complications

Table 2 Endoscopic assessment of patency of the nasolacrimal fistula during lacrimal syringing

Nasolacrimal fistula	3 weeks (n=25)	3 months (n=25)
Completely patent	25 (100%)	23 (92%)
Partial blocked	00	02 (08%)

only one patient had partial block of the nasolacrimal fistula at the 3rd month follow-up, as did the patients who did not undergo any concomitant sinonasal surgeries.

Discussion

Among the patients attending the eye clinics, 3 to 4% complain of excessive tearing [2]. Chronic dacryocystitis is one of the commonest cause of chronic excessive tearing. External DCR was the standard surgical procedure for chronic dacryocystitis for most of the years in the 20th century. But external DCR has failure rate ranging from 3 to 15% [3]. After the advances in the nasal endoscopic surgeries, endonasal endoscopic DCR gained more popularity. Endoscopic DCR avoids external incision, hence avoids the scar. It preserves the pumping action of the orbicularis oculi muscle. It can be performed in active infection of the lacrimal sac, which is a relative contraindication for external DCR. It is particularly useful in the revision of the external DCR as it avoids another external incision and subsequent further scarring [4].

Umer et al. [5] performed 256 endonasal non-laser endoscopic DCR between 1994 and 2002, out of which 55 cases (21.5%) required additional endonasal procedures. Thus he highlighted the need for otolaryngologist to be routinely involved in this surgery. In our study, we also found that 25% (6 out of 24) patients needed concomitant endonasal procedures for associated sinonasal diseases. Thus we too highlight the need for involving otolaryngologist in endoscopic DCR.

Ramakrishnan et al. [6] performed 27 endoscopic DCRs in 20 patients between May 2003 and October 2006, without mucosal flap preservation. They noticed success rate of 100% for anatomic patency and 93% for complete resolution of epiphora. They concluded that mucosal flap preservation may not be required to achieve successful outcome. Our study had comparable success rates with (90%) or without (93.33%) preservation of the mucosal flap.

Selig et al. [7] performed endoscopic DCR with intra-operative topical application of mitomycin-C, an antineoplastic often used in ophthalmologic procedures to reduce scarring and formation of adhesion following surgery. They had success of 87.5% (7 out of 8 cases). In our study we did not use mitomycin but with meticulous postoperative cleaning, we found no excessive granulation or scar tissue formation and success rate was superior.

Smirnov et al. [8] performed 46 consecutive primary endoscopic DCR procedures in 42 patients during 2004–2007. In this prospective randomized study overall success rate was 89%: with silicon tube it was 78% and without silicon tube it was 100%. We had overall success rate of 92% without use of silicon tubes. Hence we too agree with the conclusion of Smirnov et al. that the use of silicon tube after primary endoscopic DCR was not necessary.

Maini et al. [9] performed 60 laser endoscopic DCRs and 66 conventional endoscopic DCRs at an average duration of 25 min and 20 min respectively. Success rate was 82% at 3 months and 68% at 12 months in laser group, 76% at 3 months and 74% at 12 months in conventional group. Hence they concluded that long term results were better with conventional endoscopic DCRs. We performed surgical procedure of endoscopic DCRs at an average duration of 18 min. Though we did not have 12 months follow-up, our 3 months results were superior to those with the use of laser in study by Maini et al. So we too were of the opinion that laser was not required to provide a good long-term result for endoscopic DCR.

Cunningham et al. [10] performed endoscopic DCR in 4 children. They concluded that the smaller anatomical dimensions of the child's nasal airway pose a technical challenge and use of ophthalmologic lacrimal sac illumination guidance enhanced the safety and success. In our study we had only 2 cases of pediatric age group (5 and 7 years). Both underwent endonasal endoscopic DCR without any sac illumination. Both procedures were successful without any complications. Though sample size was inadequate to make a generalized conclusion, we too faced the same technical challenge due to anatomical constraints.

Conclusions

Endonasal endoscopic DCR is a better alternative to external DCR because, it avoids external scar, preserves pumping action of orbicularis oculi muscle and co-existing sinonasal diseases can be managed simultaneously, as may be required in 25% of cases. Conventional endoscopic DCR can be performed under 20 min without mucosal flap preservation, with a good success rate (92%) and with less complication.

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