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Endoscopic dacryocystorhinostomy: our experience

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ABSTRACT

Background: The purpose of the study was to determine the outcome and safety of endoscopic dacryocystorhinostomy (ENDO-DCR) with the use of silicon stents in nasolacrimal duct obstruction.

Methods: This study was done in the department of otorhinolaryngology and head and neck surgery, Navodaya Medical College and Research Centre, Raichur, from January 2013 to June 2015, with a total of 82 cases (10 cases with bilateral disease) underwent a standardized procedure, with an endonasal approach to the lacrimal sac, surgical removal of nasal mucosa, lacrimal bone, and a fragment of the frontal process of the maxilla. The medial wall of the lacrimal sac was removed completely and canicular silicone intubation tube was placed for six weeks post operatively. Main outcome measures were resolution of epiphora, absence of discharge, and patency of the ostium confirmed by irrigation and endoscopic evaluation of neo osteum at 6 weeks.

Results: The ENDO-DCR procedure with adjunctive canicular silicon intubation tube was successful in 78 (95%) cases. No significant complications were encountered during or after operative period

Conclusions: Endoscopic dacryocystorhinostomy with canicular silicon intubation for shorter duration (6 weeks) is a safe and successful procedure for the treatment of nasolacrimal duct obstruction in adults as well as in children with a success rate of 95%.

Keywords: Nasolacrimal obstruction, Dacryocystorhinostomy

INTRODUCTION

Primary acquired nasolacrimal duct obstruction (NLDO) is a common cause of epiphora in adults, and it is 4-5 times more common in females.¹ Many factors were considered in the etiology of acquired NLDO, chronic inflammation being the most popular one.² Local trauma, iatrogenic causes, including complications of maxillary sinus surgery, rhinoplastic surgery, and midfacial fracture repair were assumed to be some other causative factors.²

Since 1904, the surgical management accepted for this disease was the external approach, although Caldwell was the first to propose, in 1893, the endonasal approach.^{3,4}

Closure of the rhinostomy opening was considered a major factor for surgical failure in external DCR. In external DCR, several methods such as use of silicone stent, application of mitomycin-C to the rhinostomy opening and suturing of the mucosal flaps have been suggested for providing a permanent rhinostomy opening after completion of mucosal healing. However, in endonasal DCR insertion of silicone stent is the most commonly preferred procedure.⁵ It has been claimed that silicone stent improves surgical outcomes of endoscopic DCR. On the other hand, some studies indicate that silicone stent itself is a reason of surgical failure due to granulation tissue formation and complications like punctal erosion and slitting of canaliculi.

The present study was undertaken to compare the surgical results of endoscopic DCR with silicone stent for shorter duration (6 weeks).

An external approach was used, in which an incision is made on the skin. The traditional technique-of-choice by ophthalmologists is the order to access the bone, followed by an external osteotomy, opening the nasal mucosa and creating the lacrimal sac flaps from outside to the inside.

The endoscopy-assisted endonasal approach follows the inverse pathway. A nasal mucosa flap is first created, followed by endonasal bone osteotomy to expose the lacrimal sac and its marsupialization to inside the nasal cavity. The endoscopic exposure and view of the entire lacrimal sac is simply fantastic. Success rates of this procedure by both approaches, the external and the endoscopic one, are higher than 90% in seasoned hands.

The advantages of the endoscopic approach are minor traumatization, preservation of lacrimal pump function, and reduction of surgical time. The success rate of endoscopic DCR is comparable to that of the traditional external procedure, with minimal morbidity and the possibility to treat simultaneous sinonasal diseases.^{6,7}

Personal clinical and surgical experience is here in described and surgical techniques, results and follow-up of DCR are discussed.

METHODS

Between January 2013 and June 2015, 72 cases of endoscopic DCR with canalicular silicon intubation tube placement procedures have been performed at the department of otorhinolaryngology and head and neck surgery, Navodaya Medical College and Research Centre, Raichur.

A diagnosis of NLDO was made from ophthalmic examination. All patients included to the study described epiphora as the major complaint. Documented obstruction on syringing and probing, combined with obstruction on lacrimal dacrocystography were used in the diagnosis of NLDO.

Patients with acquired NLDO were informed about ENDO-DCR procedures, the surgical techniques and the possible complications. Patients with hypersecretion from ocular surface disease, epiphora from lid laxity or malposition, facial nerve weakness, canalicular or punctal stenosis, or obstruction identified on probing, and those with a history of previous nasolacrimal surgery, trauma, tumour or clinically suspected tumour, and granulomatous disease were not included in the study.

Preoperatively patients underwent an ophthalmic examination including irrigation of the nasolacrimal drainage system, and a pre-operative nasoendoscopic

evaluation to identify potentially significant intranasal pathology and those with nasal septal deviation in whom a septoplasty might be required. Two patients were found to have septal deviation that was corrected at the time of DCR and one patient had sinus pathology which was managed by pre-operative antibiotics and nasal decongestants.

ENDO-DCR was performed by an otorhinolaryngologist. All patients had silicone tubes inserted intra-operatively. ENDO-DCR was performed under general anaesthesia by using standard functional endoscopic sinus surgery (FESS) instruments and a 4 mm 0° rigid Hopkins nasal endoscope. The nasal mucous membrane is incised and removed to allow for the creation of a window on the lacrimal sac and upper nasolacrimal duct. A portion of the lacrimal and maxilla bone is removed by Kerrison's punch and using a sickle knife, a vertical incision is made in the lacrimal sac and nasolacrimal duct. Silicone tubes can be inserted and knotted to assist long-term patency.

Main outcome measures

Overall outcome was assessed at the first year after surgery, being 6 month after removal of the silicone tubes. Subjective success was based on patient's symptoms, objective success on patency with syringing. Subjective success was based on the degree of epiphora, which was graded by the patients as no epiphora (0 point), moderate (1 point), high (2 points). Objective success was determined by a patent nasolacrimal passage confirmed by a normal nasolacrimal lavage. Investigation of the nasolacrimal passage was made by the examination of the ophthalmologist with lacrimal syringing and by the examination of the otorhinolaryngologist with rigid nasoendoscopy to assess appearance of the rhinostomy.

RESULTS

The findings in 82 patients of chronic dacryocystitis undergoing endoscopic DCR with stent were analysed. It was observed that the age of patients in the study ranged from 9 to 60 years with the most common age group affected being 31 to 40 years (36%). The male to female ratio was 1:2.6. Of the 82 patients, 72 patients had unilateral and 10 patients had bilateral dacryocystitis. The commonest presenting symptom was epiphora, being present in all patients. Other symptoms noted were discharge from the eye in 84% patients, swelling over the lacrimal sac area in 10% patients and lacrimal sac fistula in 6%.

All the patients were subjected to diagnostic endoscopy. Deviated nasal septum to opposite side was present in two patients. Intraoperative findings were also recorded as given in Table 1. Patients were regularly followed at 1 week, 2 weeks, 6 weeks. Subjective evaluation was made in terms of complete / partial / no relief from symptoms. Objective evaluation was done by syringing.

Table 1: Intra operative findings.

Findings	No. of cases (n=82)	Percentage (%)
Mucoid discharge	20	24%
Mucopurulant discharge	16	20%
Purulent discharge	34	42%
Hypertrrophied sac	10	12%
Atrophied sac	2	2%

Syringing was performed at 1 week, 2 weeks, 6 weeks and results were evaluated as given in Table 3.

- **Patent:** There was no resistance to the flow of the fluid through sac to nasopharynx.

- **Partially patent:** When some of the fluid regurgitated through the upper punctum and some passed into nasopharynx.
- **Blocked:** When whole of the fluid regurgitated through the upper punctum and no. Subjective evaluation was made in terms of complete / partial / no relief from symptoms

And by endoscopic evaluation of neo-ostium we can categorize the status of ostium as follows and the percentage of number of cases are presented in Table 4.

- **Wide and patent:** Neo-ostium is seen clearly wide and patent with flow of fluid through it.
- **Narrow but patent:** Neo-ostium is visualized but narrow and flow of fluid noted on lacrimal massage.
- **Obstructed:** Neo-ostium is not visualized and no flow fluid noted on lacrimal massage.

Table 2: Postoperative subjective evaluation.

Epiphora	1 week	2 week	6 week	6 month	1 year
No epiphora	68 (83%)	75 (91%)	78 (95%)	80 (97.5%)	80 (97.5%)
Moderate epiphora	4 (5%)	3 (4%)	2 (2.5%)	0 (0%)	0 (0%)
High epiphora	10 (12%)	4 (5%)	2 (2.5%)	2 (2.5%)	2 (2.5%)

Table 3: Postoperative objective evaluation by syringing.

Period of follow up	1 week	2 week	6 week	6 months	1 year
Duration	1 week	2 week	6 week	6 months	1 year
Patent	40 (49%)	52 (63%)	78 (95%)	80 (97.5%)	80 (97.5%)
Partially patient	30 (37%)	26 (32%)	2 (2.5%)	0 (0%)	0 (0%)
Blocked	12 (14%)	4 (5%)	2 (2.5%)	2 (2.5%)	2 (2.5%)

Table 4: Endoscopic appearance of neo-ostium.

Wide and patent	Narrow but patent	Obstructed	Total
78 (95%)	2 (2.5%)	2 (2.5%)	82 (100%)

DISCUSSION

Endoscopic DCR is a commonly performed operation in which a fistulous tract is created between the lacrimal sac and the nasal cavity in order to relieve the epiphora due to nasolacrimal duct obstruction. Silicone stent has been proposed to maintain the patency of fistula during postoperative healing period.

The recent study was undertaken to evaluate and compare the results of endoscopic DCR with. In our study, complete relief from symptoms was seen in 95% patients with stent and two patients had partial obstruction due to narrowing of rhinostomy site by the granulation tissue and in two patients no improvement was found due to closure of rhinostomy. Results of our study have been

found to be promising as compared to others with the success rate of 95%. Jin reported primary success rate of 83% with endoscopic DCR with stent and in 17% cases rhinostomy opening was found to be obstructed by granulations or synechiae.⁸ Sprekelson reported success with endoscopic DCR with stent in 85% of patients.⁹

Singh et al and Sham et al on the basis of their studies opined that silicone stenting is not routinely indicated in endoscopic DCR.^{10,11} Moreover, silicone stent is associated with high failure rate due to granulomatous inflammation and complications as punctal erosion and slitting of canaliculi. But our study shows good results without complications. The failure rate was less in our study and in only two cases we encountered granulation tissue which was causing partial obstruction which was

managed successfully by excising the granulation tissue at 6 weeks and the patency of neo-ostium was maintained. Only in two patients there was failure of DCR due to inadequate osteotomy during surgery which required a revision surgery. Most of the studies suggest that the stent has to be kept for approximately 3 months, removal before this time is often the cause of failure. Granulation tissue may be detected after 3 months of stenting, but we suggest to keep the stent for 6 week post postoperatively to prevent complications like granulations, slitting of canaliculi and punctual erosion, fibrosis and with good success rates of 95% which is comparable to other studies.¹²⁻¹⁴

Nevertheless, use of the stent is not well established in the literature. According to some authors, in fact, this procedure is contraindicated on account of an increase in the occurrence of DCR stenosis; others have described no differences in the success rate using the stent system.¹⁵⁻¹⁷

Some authors have described the use of topical applications of mitomycin-C, 0.2 mg/mL for 25 minutes or 0.5 mg/mL for 30 minutes: this antimetabolite reduces scar formation, determining an increase in the success rate of endoscopic DCR.^{18,19} We have no personal experience in the use of mitomycin-C.

CONCLUSION

ENDO-DCR with canicular silicon intubation for shorter duration (6 weeks) is a safe and successful procedure for the treatment of nasolacrimal duct obstruction in adults as well as in children with a success rate of 95%. As the duration of the stent in-situ is of short duration and thus associated complications are very minimal. Hence we recommend ENDO-DCR with canicular silicon intubation as one of the safest method.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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