



Role of Endoscopic Dacryocystorhinostomy in Chronic Dacryocystitis with Special Reference to Failed External DCR

KEYWORDS

External DCR, Endoscopic DCR, Epiphora

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ABSTRACT

Aims and objectives: To evaluate the effectiveness of transnasal endoscopic dacryocystorhinostomy (DCR) in failed external DCR and to determine the causes and treatment of failed external DCR and to determine the incidence and nature of complications encountered postoperatively.

Materials and methods: 22 patients with previously failed external DCR were studied over a period of 4 years in a tertiary care hospital with respect to the various parameters associated with failed external DCR.

Results: Inadequate ostium in external DCR was noted as the most common cause for failure. Endoscopic sinus surgery in conjunction with endoscopic DCR has a role in improving results in DCR. Stenting produces granulations when compared to the non-stented group and complications are extremely minimal in endoscopic DCR. Synechiae was the most common complication of endoscopic DCR.

Conclusion: Endoscopic DCR plays an important role in producing improved results as a primary surgery or as a revision surgery in chronic dacryocystitis.

INTRODUCTION

Dacryocystorhinostomy (DCR) is a procedure to treat lacrimal drainage pathway obstruction by the creation of a surgical fistula between the lacrimal sac and the nasal cavity. External DCR was first described by Toti in 1904,¹ where he employed an external incision to make a cystorhinostomy and this procedure is practised to this day by ophthalmologists. Killian described the transnasal DCR before the advent of endoscopes in the year 1889 which was popularised by Caldwell in 1893.² Advent of microscopes modified the techniques which were popularised by West³ and Halle⁴ in the early 19th century, however, it didn't gain much success owing to the poor visualization of nasal cavity with the microscope. The use of endoscopes for transnasal techniques became popular in the late 19th and early 20th century and further modification in techniques have allowed better surgical exposure for the DCR procedure.

External and endoscopic DCR have got high and almost identical success rates. Literature has shown that both the approaches have got success rates above 90%.⁵⁻⁸ However, failures still occur due to ostium identification errors and inadequate knowledge of sinonasal anatomy.⁹ Revision endoscopic DCR has been advocated as the approach to treat failed external and endoscopic DCR.¹⁰ The objective of this study was to find out the factors that are responsible for failure of external DCR and identify the key areas where an endoscopic DCR may play a successful role in treating this morbid condition.

AIMS AND OBJECTIVES:

To evaluate the procedure of transnasal endoscopic dacryocystorhinostomy

- To determine the effectiveness of endoscopic revision DCR in failed external DCR.

- To determine the cause of failure of external DCR and subsequent treatment of the cause.
- Incidence and nature of complications encountered postoperatively.

MATERIALS AND METHODS:

The study conducted was a combined retrospective and prospective study conducted over a period of 4 years in a single tertiary care centre. The criteria of selection for the study group included patients with nasolacrimal duct obstruction due to failed previous external DCR. All the patients were subjected to a detailed clinical history and clinical examination. In the history, attention was paid to determining whether the watering of the eye was due to excess tear production (lacrimation) or due to obstructed outflow (epiphora). Previous history of midfacial fractures and nasal surgeries was elicited. Other coexisting related otorhinolaryngological problems were also addressed. Clinical examination included a complete ENT examination with special emphasis on anterior and posterior rhinoscopy to identify any focus of infection, allergic rhinosinusitis, nasal mass lesions and synechiae. All patients were subject to a detailed ophthalmic evaluation to determine any ophthalmic cause of epiphora. The patients were then subject to a diagnostic nasal endoscopy to identify any nasal pathology and a CT scan of the nose and paranasal sinuses. Ophthalmic investigations included probing and syringing of the lacrimal system to demonstrate the presence of block in the lacrimal drainage system and dacryocystography to determine the functional pathway obstruction in the lacrimal system. All patients underwent the revision endoscopic DCR procedure under general anaesthesia. During the procedure the cause for the failure of external DCR were ascertained and the presence of coexisting nasal and sinus pathologies were treated accordingly. A superiorly based U shaped flap was designed to expose 1 to 1.5cm²

area of bone. A cutting burr was used to expose the entire lacrimal sac. A Bowman's lacrimal probe was introduced through the lower lacrimal punctum and an incision was made on the medial wall of the sac and the entire medial wall of the sac was removed using straight Blakesley forceps. The patency of the cystorhinostomy was ascertained by visualization of the lacrimal probe in the nasal cavity. Few patients underwent underwent silastic canula stenting which was placed in both canaliculi for 6 to 8 weeks as per the decision of the operating surgeon. No nasal packing was done. The patients were followed up weekly for 6 weeks. Syringing was advocated daily for 4 days post-operatively and thereafter weekly for 6 weeks.

Subjective assessment was by means of a questionnaire for assessment of relief of symptoms. Objective assessment was done by irrigation of the lacrimal system and assessment of the flow through the stoma with a 30 degree nasal endoscope.

RESULTS AND OBSERVATION: There were 22 patients in the study : 6 male and 16 female. 45% of the patients were in the age group of 20-40 years and 40-60 years respectively and 9% in less than 20 years. (13)59% underwent revision surgery on the left side and (8)38% on the right side and (1)3% of the patients underwent bilateral revision surgery. Intra-operatively the causes for failure of external DCR were ascertained. It was noted that 10 patients(45%) had an inadequate ostium, 4 patients(18%) had stenosis of the ostium secondary to scarring, 4 patients(18%) had associated deviated nasal septum and chronic sinus infection. The other factors that were noted intra-operatively as probable causes of failure of external DCR have been shown in Table 1.

TABLE 1: Cause of failure of external DCR

	Total	%
Inadequate ostium	10	45
Deviated nasal septum alone	2	9
Synechia	1	5
Chronic sinusitis alone	1	5
Scarring/Stenosis of the ostium	4	18
Deviated nasal septum with chronic sinusitis	4	18
Total	22	100

Of the 22 patients that underwent transnasal endoscopic DCR, 8 underwent surgery on the right side and 13 on the left side and 1 on both sides. 16 patients underwent nasal(12) and/or endoscopic sinus (10) surgeries along with the endoscopic DCR. The procedures combined with revision endoscopic DCR have been mentioned in Table 2.

TABLE 2: Other procedures carried out in conjunction with revision endoscopic DCR

	Total	%
FESS	2	9
Septoplasty	1	5
Septoplasty with FESS	3	14
Septoturboplasty	1	5
Total	7	32

11 patients had silastic tubing inserted intraoperatively and maintained postoperatively for a period between 6 to 8 weeks. 18.18% with stents developed synechiae when compared to 9.09% of patients without stents($p < 0.05$). Patients with stents(36.36%) also had a higher incidence of granulation tissue formation when compared to the non stented group(18.18%)($p < 0.05$). Hence, stented patients proved to have a higher complication rate when compared to patients without stents in the immediate post-operative period. 13.63% of the 22 patients developed exposure of orbital fat intra-operatively and subsequently orbital emphysema which resolved with application of cold ice packs in 4 days. There was no orbital hematoma in our study. All patients were followed up, the follow up period ranging between 3 to 48 months, the median period of follow up being 8 months. The mean duration of follow-up was 6.3 months. The comparison of symptoms pre- and post-operatively have been denoted in Table 3.

TABLE 3: Comparison of pre and postoperative symptoms:

Pre-Operative	Epi-phora	Visual Disturbance	Nasal Obstruction	Nasal discharge	Allergic features
No:of patients	22	10	5	4	3
%	100	45	23	18	14
Post-Operative					
No:of patients	3	1	0	0	3
%	14	5	0	0	14

At 6 months follow-up 20 patients(91%) showed a well healed ostium whereas 2 patients(9%) had a restenosis of the ostium and recurrence of symptoms.

DISCUSSION:

The failure of external and endoscopic DCR have been extensively studied in literature. It been linked to synechiae formation, septal deviation, granulation tissue, common canalicular obstruction and ostial location, however, the single most common cause that predominates the multifactorial causation of surgical failure is scarring and stenosis of ostium leading to inadequately sized ostium impairing lacrimal drainage.⁷⁻⁹ The other common causes are enlarged agger nasi cell which impedes the lacrimal flow.¹² In our study, we found inadequate size of the ostium as the most common cause followed by scarring/stenosis of ostium and presence of sinus and nasoseptal pathology for failure of external DCR. Inadequate size of the ostium can be countered by drilling bone over the frontal process of maxilla creating a wide area of exposure and we prevented restenosis in our series by removing the medial wall of the sac.

Silastic stenting has been employed by endoscopists to prevent restenosis of the ostium. Metson¹³ in his study of 5 revision endoscopic DCR, placed silastic stents for a period of 2 to 8 months post-operatively. In our study, 11 patients had a silastic stent placed for a period of 4 to 8 months. 18.18% developed synechiae with stents compared to 10.53% in the rest of the patients($p < 0.05$). The stented group also demonstrated higher incidence of granulation tissue formation (36.36%) against 21.05% in the non-stented group ($p < 0.05$). Allen and Berlin¹¹ study on 242 cases of DCR demonstrated a higher failure rate with stenting due to predominant formation of granulations in the nose and lacrimal fossa. They recommended the use of

stents only in a contracted sac, presence of scarring in the canaliculi and if there is a large valve of Rosenmuller. Our recommendation suggests that inadvertent use of stenting causes florid granulation formation which may progress to restenosis of the ostium and use of stenting should be advocated only in cases of soft stop on probing.

The presence of intra-operative and post-operative complications in endoscopic DCR is minimal, but it maybe encountered frequently in revision surgeries. Sprekelsen and Barberan¹⁵ studied the incidence of complications in primary endoscopic DCR and reported that exposure of orbital fat(10.5%) is the most common complication although it does not have any long term outcome on vision or visual movements. Presence of subcutaneous hematoma(44.1%), subcutaneous emphysema(9.1%) and synechiae(22.4%) were other common complications encountered immediately post-operatively without any long term implications in their study. In our study, 13.63% of the patients developed exposure of orbital fat and subsequent orbital emphysema which resolved with conservative management. There were no cases of orbital hematoma. 27.27% patients developed synechiae and 54.54% developed granulations as post-operative complication. We deduce that orbital complications can be commonly encountered in revision endoscopic DCR. It is essential that expertise of the surgeon plays an important role in recognizing the complication and treat the same as early as possible. It may prevent disabling visual loss and decreased intraocular mobility due to damage to intraocular muscles. Role of stenting should be minimized owing to increased restenosis due to granulation formation.

The success rates of revision endoscopic DCR as per the studies in literature ranges between 60% to 94%.¹⁴ The success rate of revision endoscopic DCR in our study was 91% which is in accordance with the literature. Symptomatic improvement was the most prominent indicator of success in our study apart from the patent ostium. Epiphora, visual disturbance, allergic features, nasal obstruction and nasal discharge tremendously improved post-operatively. This proves that combination of endoscopic sinus surgery and septal correction concomitant with endoscopic DCR may provide better results when compared to endoscopic DCR alone.

CONCLUSION:

The therapeutic modality of choice for acquired nasolacrimal duct obstruction, irrespective of the cause, is dacryocystorhinostomy. Both the traditional external approach and the endoscopic approach have high success rates. The external approach suffers the disadvantages of an external scar, which, in addition to poor cosmesis, can make revision surgery extremely difficult. Failure of surgery can occur due to an improperly sized and positioned ostium, or due to an undetected pathology in the nose and paranasal sinuses. The endoscopic approach offers the added advantage of avoiding an external scar, thereby providing for improved cosmesis. It also has the advantage of being a one-stage procedure wherein any coexisting nasal pathology can also be treated. The ostium can be fashioned more accurately under endoscopic visualization. The endoscopic approach is considered superior for revision surgery. Endoscopic revision allows the intranasal ostium to be safely reopened in the presence of fibrosis from prior surgery. Under direct endoscopic vision, the ostium can be sufficiently enlarged and properly positioned to increase the likelihood of continued patency. However, the only drawback of revision endoscopic DCR is that it requires a lot of expertise to correctly identify the predisposing factors for failure of previous surgery.

REFERENCE

- (1) Toti A. Nuovo metodo conservatore dicura radicale delle soppurazioni croniche del sacco lacrimale (dacriocistorinostomia). *Clin Moderna*. 1904;10:385-7.
- (2) Caldwell GW. Two new operations for obstruction of the nasal duct with preservation of the canaliculi and an incidental description of a new lacrimal probe. 1893;10:189-93. Cited in Lindberg JV, editor, *Lacrimal surgery*, New York: Churchill Livingstone; 1988:325.
- (3) West JM. Eine fensterresektion des ductus so-lacrimalis in fallen von stenose. *Archives of Laryngology and Rhinology*. 1911;24:62-4.
- (4) Halle M. Intranasalen operation amanensack. *Archives of Laryngology and Rhinology*. 1914;28:256-66.
- (5) Tzirbas A, Wormald PJ. Mechanical endonasal dacryocystorhinostomy with mucosal flaps. *Br J Ophthalmol*. 2003;87:43-7.
- (6) Cokkeser Y, Evreklioglu C, Er H. Comparative external versus endoscopic dacryocystorhinostomy: results in 115 patients (130 eyes). *Otolaryngol Head Neck Surg*. 2000;123:488-91.
- (7) Hartikainen J, Antila J, Varpula M, Puukka P, Seppa H, Grenman R. Prospective randomized comparison of endonasal endoscopic dacryocystorhinostomy and external dacryocystorhinostomy. *Laryngoscope*. 1998;108:1861-6.
- (8) Hartikainen J, Grenman R, Puukka P, Seppa H. Prospective randomized comparison of endonasal endoscopic dacryocystorhinostomy and external dacryocystorhinostomy. *Ophthalmology*. 1998;105:1106-1113.
- (9) Welham RA, Wulc AE. Management of unsuccessful lacrimal surgery. *Br J Ophthalmol*. 1987;71:152-7.
- (10) Demarco R, Strose A, Araujo M. Endoscopic revision of external dacryocystorhinostomy. *Otolaryngol Head Neck Surg*. 2007;137:497-499.
- (11) Allen K, Berlin AJ, Levine HL. Intranasal endoscopic analysis of dacryocystorhinostomy failure. *Ophthalm Plast Reconstr Surg*. 1988;4:143.
- (12) Liang J, Hur K, Merbs SL, Lane AP. Surgical and anatomical considerations in endoscopic revision of failed external dacryocystorhinostomy. *Otolaryngol-Head neck surg*. 2014;150(5):901-5.
- (13) Metson R. The endoscopic approach for revision dacryocystorhinostomy. *Laryngoscope*. 1990;100:1344-7.
- (14) Hull S, Lachlan S, Pflver JM. Success rates in powered endonasal revision surgery for failed dacryocystorhinostomy in a tertiary referral centre. *Ophthalm Plast Reconstr Surg*. 2013;29:267-71.
- (15) Sprekelsen MB, Barberan MT. Endoscopic dacryocystorhinostomy: Surgical techniques and results. *Laryngoscope* 1996 Feb;106(2 Pt 1):187-9.