

Original paper

Outcome of Endoscopic Endonasal Dacryocystorhinostomy in Karbala, Iraq

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Abstract

Background: Dacryocystorhinostomy (DCR) is an operation that has been used for the past 100 years. Endoscopic endonasal DCR is less invasive than external DCR; therefore, it has rapidly gained acceptance for the treatment of intractable nasolacrimal duct obstruction and chronic dacryocystitis. Many ophthalmologists still believe that external DCR is the gold standard treatment for nasolacrimal duct obstruction. However, because incision of the facial skin is required, patients are reluctant to undergo external DCR.

Objectives: To analyze the results of Endonasal Endoscopic Dacryocystorhinostomy regarding complications and success rate.

Methods: A prospective study was carried out on 26 patients at Department of Otolaryngology, Al-Hussian Teaching Hospital, Karbala during the period September 2013 to November 2016. Patients presented with epiphora and diagnosed with chronic nasolacrimal duct obstruction were included in this study. Endonasal Endoscopic Dacryocystorhinostomy was performed under general anaesthesia. Patients were followed up for at least 6 months after the removal of dacryocystorhinostomy tube. Complications during and after the procedure were recorded.

Results: Out of total 26 patients 23 (88%) were females and 3 (12%) were males (F:M=7.7:1). The age range was 6 to 60 years with a mean age of 33 years. The duration of symptoms ranged between 8 months to 6 years. There were only 2 (8%) patients had bilateral symptoms while the other 24 (92%) patients had unilateral symptoms. Average duration of endoscopic DCR was 60 minutes. DCR tube was removed 6 months after operation in 24 (92%) patients and in 2 (8%) patients, it was removed after 3 months. Complications encountered during and after surgery were, haemorrhage in 4 (15%), ecchymosis in 2 (8%), nasal adhesions in 2 (8%), granulations at osteotomy site in 1 (4%), retrograde tube displacement in 2 (8%) patients. Overall, 24 (92%) patients were symptom-free 6 months after the removal of the tube. Out of the remaining 2 (8%) patients, one patient underwent revision surgery and was symptom-free 6 months after the removal of the tube whereas the other refused revision surgery. Overall success rate of endonasal DCR was 25 (96%).

Conclusions: Endonasal Endoscopic Dacryocystorhinostomy is an effective procedure with high success rate and minimal complications.

Keywords: Dacryocystorhinostomy, Nasolacrimal obstruction, Endoscopic surgery.

Introduction

Dacryocystorhinostomy (DCR) is an operation that has been used for the past 100 years. The original intranasal approach was described in 1893 by Caldwell⁽¹⁾ and the external approach in 1904 by Toti.⁽²⁾ The external approach became very popular and the mainstay of treatment with

modification in the 1920s⁽³⁾ with the addition of flaps, and in 1962 with silastic tube intubation by Jones.⁽⁴⁾ The intranasal approach was largely abandoned owing to problems with visualization but with modern endoscopes and rhinology instruments there has been renewed interest in the past 10 or so years. McDonogh and Meiring⁽⁵⁾ described the first modern

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endonasal DCR procedure in 1989 with Massaro *et al* ⁽⁶⁾ in 1990 using an argon laser for the osteotomy. In 1991 Gonnering *et al* ⁽⁷⁾ used an endoscope with the argon laser, rather than the operating microscope, for completing the endonasal procedure. Many ophthalmologists still believe that external DCR is the gold standard treatment for nasolacrimal duct obstruction (NLDO) ⁽⁸⁾ with success rates of 90%+ reported ⁽⁹⁾. Currently endoscopic DCR can be performed with laser assistance ^(10, 11) or other methods to remove bone and mucosa including powered drills, ⁽¹²⁾ punches, ⁽¹³⁾ and radio surgical electrodes. ⁽¹⁴⁾

Endonasal dacryocystorhinostomy is a surgical technique in which a fistula is created from inside the nasal cavity. ⁽¹⁵⁾ It can be performed surgically using drill or ronguer to remove the bone or by laser. ⁽¹⁶⁾ However, because incision of the facial skin is required, patients are reluctant to undergo external DCR ⁽¹⁷⁾. Endoscopic endonasal DCR is less invasive than external DCR; therefore, it has rapidly gained acceptance for the treatment of intractable nasolacrimal duct obstruction and chronic dacryocystitis ⁽¹⁸⁻²⁰⁾ The main advantages of endonasal approach include avoiding external approach problems such as skin scarring, infection, ectropion, and medial canthal tendon disruption. ⁽²¹⁾ Other advantages include good visualization, better localization and estimation of the rhinostomy site and size. ⁽²²⁾ Good visualization helps prevent the disruption of angular vessels, periorbital hemorrhage, epistaxis, disruption of medial canthal tendon, tear pump dysfunction and CSF leakage. ⁽²³⁾

Patients and Methods

A prospective study was carried out on 26 patients with epiphora lasting for more than 6 months were selected at Department of Otolaryngology Al-Hussian Teaching Hospital, Karbala, Iraq during the period September 2013 to November 2016. Epiphora was diagnosed on the basis of

clinical symptoms and the presence of obstruction detected by irrigation. Patients with chronic dacryocystitis and recurrent exacerbations were included, while those with congenital nasolacrimal duct obstruction, tumor, hypersecretion from the ocular surface or granulomatous disease, and/or facial nerve weakness were excluded. All patients gave informed consent and were examined by an ophthalmologist. Anatomical obstruction was defined if tearing continued with a closed irrigation test. Functional obstruction was defined if tearing continued despite an open irrigation test. Functional and anatomical success was defined if complete cessation of the tearing was ensued after surgical interventions. ⁽²⁴⁾ Regardless of results of the patients' previous scintigraphy, all the functional cases were excluded from the study by an open irrigation test. Before planning the endoscopic surgery coronal and axial paranasal sinus CT scans were performed in selected cases. All the surgeries were performed by two surgeons, an otolaryngologist and an ophthalmologist. The nasal mucosa was decongested with cotton pledgets placed in nasal cavity soaked in 0.1 % Xylometazoline for 10 minutes. Under general anesthesia, the nasal cavity was assessed by 0 and 30 degree nasal endoscopes. After infiltration of lateral nasal wall just anterior to the middle turbinate with epinephrine 1:100,000 and lidocaine 1%. A 'C' shaped incision was done and the mucosal flap was prepared with a sickle knife on the lateral nasal wall along the maxillary line just anterior to the anterior end of middle turbinate. A posteriorly based mucosal flap was created and flap excised. Ascending process of maxilla identified, lower half of which was nibbled out with rongeurs.

After creating osteotomy, lacrimal sac was identified. At this stage, ophthalmologist dilated the lacrimal puncta with lacrimal dilator and passed the lacrimal probes through the puncta which tented the medial wall of lacrimal sac. The ENT surgeon

incised the medial wall with sickle knife and removed the entire medial wall with the help of micro-scissors and forceps. DCR tube was then passed through the upper and lower canaliculi, the probes of which were delivered into the nasal cavity by the ENT surgeon. Nasal cavity was lightly packed with ribbon gauze lubricated with antibiotic ointment. Nasal packs were removed after 24 hours and patients were discharged on antibiotic and analgesics for 5 days. Patients were advised saline irrigation of nasal cavities for 1 week. All patients were examined by both Eye and ENT surgeon on 7th post-operative day. Further visits were planned on 1, 3 and 6 months after the operation. Lacrimal irrigation was performed on 7th post-operative day and then at 3 and 6 months. DCR tube was removed 6 months after the operation. Patients were again evaluated 3 and 6 months after the removal of the DCR tube.

Results

Out of total 26 patients 23 (88%) were females and 3 (12%) were males (F:M=7.7:1). The age range was 6 to 60 years with a mean age of 33 years (Tab.1). Eighteen out of 26 epiphora patients were found to have history of serous discharge while only 5 patients presented with mucopurulent discharge and 3 patients presented with mucoid discharge (Tab.2). The duration of symptoms ranged between 8 months to 6 years. There were only 2 (8%) patients had bilateral symptoms while the other 24 (92%) patients had unilateral symptoms. Average duration of endoscopic DCR was 60 minutes. DCR tube was removed 6 months after operation in 24 (92%) patients and in 2 (8%) patients, it was removed after 3 months. Complications encountered during and after surgery were noted (Table-3).

Table 1. Patient Demographics.

Characteristic	Total
Total number of patients	26
Gender	
Male	3(12%)
Female	23(88%)
Female to male ratio	7.7:1
Age (years)	
Mean	33
Range	6-60

Table 2: Symptoms Analysis.

Symptoms	N0. Of patients (%)
Epiphora	26 (100%)
With Serous discharge	18 (69%)
With Mucopurulent discharge	5 (19%)
With Mucoid discharge	3 (12%)

Table 3. Per-operative and post-operative complications.

Complications	No. of patients
Per-operative Complications	
Haemorrhage	4 (15%)
Post-operative Complications	
Immediate	
Ecchymosis	2 (8%)
Nasal Adhesions	2 (8%)
Granulation tissue	1 (4%)
Delayed	
Retrograde tube displacement	2 (8%)

Overall, 24 (92%) patients were symptom-free i.e., no epiphora six months after the removal of DCR tube. Out of the remaining 2 (8%) patients, one patient underwent revision surgery and was symptom-free 6 months after the removal of the tube whereas the other refused revision surgery. Overall success rate of endonasal DCR was 25 (96%).

Discussion

Endonasal dacryocystorhinostomy is a surgical technique in which a fistula is created from inside the nasal cavity.⁽¹⁵⁾ It can be performed surgically using drill or ronguer to remove the bone or by laser.⁽¹⁶⁾ However, because incision of the facial skin is required, patients are reluctant to undergo external DCR⁽¹⁷⁾. Endoscopic endonasal DCR is less invasive than external DCR; therefore, it has rapidly gained acceptance for the treatment of intractable nasolacrimal duct obstruction and chronic dacryocystitis⁽¹⁸⁻²⁰⁾. In our study there was overall female predominance, with a female to male ratio of 7.7:1 this finding is similar to other reports^(15, 25-28). Probable reasons for this might be that the disease is not only more common in females due to narrow lumen of nasolacrimal duct^(25, 29, 30) but the need to avoid facial scar for cosmetic reasons is more pressing in females compared to the males⁽¹⁵⁾. Mean age of our patients was 33 years, although 34% of our patients were between 31 to 40 years of age. These observation were also noted in some studies^(15,25,26) but in contrast with the other studies where majority of the patients presented in their fifth decade.^(27,31,32) Twenty four (92%) patients, in our study, had unilateral symptoms whereas 2 (8%) patients had bilateral symptoms and this also in agreement with other studies.^(15,25,28,31) Our diagnostic protocol included regurgitation test, irrigation of lacrimal system and endoscopic endonasal examination. Various studies employed dacryocystography and computed

tomography (CT) scan imaging.^(27,28,31,33) Although these investigations can provide additional information in few selected cases, but routine use of these investigations are not required in majority of cases. CT scan should be reserved for post-traumatic cases or in cases of malformation or associated sinus disease.⁽²⁷⁾ We think that irrigation of the lacrimal system can establish correct diagnosis in majority of cases, and it is also an easy, safe and low-cost investigation. Similarly, endoscopic endonasal examination can give adequate anatomical information and any anatomical variants can be managed during surgery. Average time of endoscopic DCR in our study was 60 minutes, which is longer than other studies^(27, 28), time of the DCR procedure progressively decreased with increasing surgical expertise. Review of relevant literature suggests that there is considerable controversy regarding the use of DCR tube. Proponents of DCR tube usage claim that best endonasal DCR results can be obtained with the use of DCR tube^(28, 34) whereas others suggest that the DCR tube is responsible for the granulation tissue formation, patient discomfort and extra cost.^(25, 35) Many are of the opinion that

DCR tube usage or otherwise does not affect the success of the procedure.^(27, 36) We used silicon tube in all of our patients. We think that silicon tube is necessary in those DCR procedures in which the adjacent flaps of the lacrimal sac and nasal mucosa are not sutured, as is the case with the technique we used in our study. This view is shared by other studies.^(28, 34) The optimal time for silicon tube extubation is another controversy. We planned to keep the DCR tube for 6 months after the surgery. In 24 (92%) patients, it was removed after 6 months as planned, but in 2 (8%) patients, it was removed after 3 months. The reason for removing the tube in 3 months was repeated retrograde displacement of the tube. Excessive haemorrhage encountered in 4 (15%) cases during surgery which prevented adequate

view through endoscope but it was managed by placing the vasoconstrictor pack for 10 minutes and by lowering the blood pressure of the patient. This perioperative complication is also noted in another study⁽³⁷⁾. Post-operative complications noted in our study was ecchymosis in 2 cases which was settled within a week without the need of any specific treatment. Ecchymosis was encountered as one of the commonest complications in few other studies.^(15,37,38) We encountered nasal adhesion in 2 (8%) of our patients during the follow-up visits, those patients did not come for the first follow-up visit one week after the operation, but came at the end of the second week. The intranasal suction clearance of debris, which we routinely perform during the first follow-up visit, was not done in these two patients which can be the cause of nasal adhesions. Another study highlighted the importance of nasal clearance of debris and mucus during follow-up visits.⁽²⁸⁾ We encountered granulation tissue formation at osteotomy site in one of our patients which resulted in restenosis of rhinostomy opening, leading to failure. Different studies mentioned the use of topical Mitomycin C in reducing the granulation tissue formation.^(26, 39, 40) Delayed complications (i.e., those encountered 3 months after surgery). Retrograde tube displacement is not an unusual problem and is reported in other studies.^(25, 41) It can be repositioned easily by pulling the tube through the nose. In two of our patients with this problem, we had to remove the tube 3 months after the surgery due to repeated retrograde displacement. Those two patients remained free of epiphora six months after the removal of the tube. In the present study, 92% of our patients were symptom-free i.e., no epiphora six months after the removal of the DCR tube. The remaining two patients developed recurrence of epiphora between 3 and 4 months after the removal of the DCR tube. One of them underwent revision surgery and was symptom-free 6 months

after the removal of the tube and the other refused revision surgery, so overall success rate of endonasal DCR was 96%. Other studies claim success rate between 94% to 100% with 8 months to 1 year of follow-up after the removal of the DCR tube.^(15,25,26,37) Review of other international literatures suggests overall success rate between 81% to 96% with follow-up ranging between 6 months and 1 year.^(27,28,32,33,42)

Conclusions

We demonstrated that endoscopic endonasal DCR is a safe procedure associated with high success rate and minimal complications.

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