ORIGINAL ARTICLE

Results of Endoscopic Endonasal Dacrocystorhinostomy

Muhammad Azeem Aslam,[1] Aneequllah Baig Mirza,[2] Imran Azam Butt[3]

Abstract

Objectives: To analyse the results of Endonasal Endoscopic Dacrocystorhinostomy regarding complications and success rate.

Methods: The prospective quasi-experimental study was conducted at the Departments of Otolaryngology and Ophthalmology of Islamic International Medical College Teaching Hospital, Rawalpindi, from August 2008 to July 2012. Patients presenting with epiphora and diagnosed with chronic nasolacrimal duct obstruction were included in the study. Endonasal Endoscopic Dacrocystorhinostomy was performed under general anaesthesia. Patients were followed up for at least 6 months after the removal of dacrocystorhinostomy tube. Complications during and after the procedure were recorded.

Results: Of the 31 patients in the study, 27(87%) were females and 4 (13%) were males with an overall mean age of 45.7±13.4 years (range: 21-70). The duration of symptoms ranged between 6 months and 13 years (Mean: 4.1±3.2). Average duration of endoscopic dacrocystorhinostomy was 40±17.5 minutes (range: 25-70). The tube was removed 6 months after operation in 27 (87%) patients and after 3 months in 4 (13%). Complications encountered were per-operative haemorrhage in 4(13%), ecchymosis in 2(6%), nasal adhesions in 3(9.6%), granulations at osteotomy site in 1(3.2%), retrograde tube displacement in 3(9.6%) and symblepheron in 1(3.2%) patient. Of the total, 26(84%) patients were symptom-free 6 months after the removal of the tube. Two (6.4%) patients underwent revision surgery and were symptom-free 6 months after the removal of the tube. Overall success rate of the procedure was 28(90%).

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

Keywords: Dacryocystorhinostomy, Nasolacrimal obstruction, Endoscopic surgery. (JPMA 64: 619; 2014)

Introduction

Dacryocystorhinostomy (DCR) is a surgical procedure which involves the diversion of lacrimal flow into the nasal cavity by creating an opening at the level of lacrimal sac. This operation can be performed by external approach as well as by intranasal approach. External approach was first described in 1904 whereas first account of intranasal approach can be traced back to 1893 which was later abandoned due to poor visualisation in nasal cavities due to primitive instruments of that era.[1] For the last 100 years, external approach is considered the standard approach of DCR. Last two decades have brought about a revolution in nasal and sinus surgical techniques due to the invention of Hopkin rod telescopes. Modern telescopes with fibreoptic light and magnification along with the newer instrumentation for endoscopic sinus surgery totally changed the scenario due to which a renewed interest is generated among the rhinologists for adopting endonasal approach for DCR.[2] The results of endoscopic endonasal DCR are not only encouraging, but are associated with many other additional advantages e.g., avoidance of facial scar, preservation of medial canthal anatomy, better visualisation resulting in less intra-operative trauma and blood loss and reduced operative time.[3,4] Due to these advantages, there is a gradual shift from external approach in favour of endonasal approach, but in Pakistan, external approach is still the norm. The present study was planned to analyse the results of Endonasal Endoscopic DCR regarding complications and success rate in our environment.

Patients and Methods

The prospective quasi-experimental study was conducted at the Departments of Otolaryngology and Ophthalmology of Islamic International Medical College Teaching Hospital, Rawalpindi, from August 2008 to July 2012, and comprised 31 patients who presented with chronic epiphora regardless of age and gender. All patients were jointly evaluated by ophthalmologist and otolaryngologist. Pre-operative evaluation consisted of standard relevant eye and ear-nose-throat (ENT) examination, including regurgitation test, irrigation of lacrimal pathway and endoscopic examination of nasal

[1]Department of Otolaryngology, Head & Neck Surgery, [2]Department of Ophthalmology, Islamic International Medical College, Rawalpindi, [3]Department of Ophthalmology, AJK Medical College, Muzaffarabad, Pakistan.
Correspondence: Muhammad Azeem Aslam. Email: drazeemaslam@gmail.com

cavities by sinoscope. Only those cases with nasolacrimal duct obstruction were selected to undergo DCR. Patients with any type of previous surgical treatment for epiphora, lacrimal fistula as well as post traumatic cases were excluded. Informed consent was obtained by all the patients.

In all patients, surgical procedure was done under general anaesthesia. The nasal mucosa was de-congested with cotton pledgets placed in nasal cavity soaked in 0.1 % Xylometazoline for 10 minutes. After de-congestion of nasal mucosa, nasal cavities were examined by 30 degree telescope (4mm diameter, 18cms length) with fibreoptic light. Those patients in which septal deformity was obstructing the view of operative site, septoplasty was performed before starting DCR. Lateral nasal wall just anterior to the middle turbinate was injected with 2% Xylocaine with 1:100,000 adrenaline. A 'C' shaped incision was given with 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. Upper half was removed with drill utilising 3mm cutting burr. 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. The two ends of DCR tube were knotted and knot stitched with 4/0 silk with the nasal vestibule. Nasal cavity was lightly packed with ribbon gauze lubricated with antibiotic ointment. Surgical time was noted along with other relevant details in a pre-designed proforma.

Nasal packs were removed after 24 hours and patients were discharged on 5-daycourse of antibiotic (Coamoxiclav 625mg BD) and analgesics (Diclofenac Sodium 50mg BD) for 3 days. Patients were advised saline irrigation of nasal cavities for 1 week.

First follow-up visit was planned on 7th post-operative day and patients were examined by both Eye and ENT surgeon. Further visits were scheduled 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

Of the 31 patients in the study, 27(87%) were females and 4 (13%) were males with an overall mean age of 45.7±13.4 years (range: 21-70) (Table-1). All patients presented with epiphora with serous or mucopurulent discharge (Table-2). The duration of symptoms ranged between 6 months to 13 years (Mean: 4.1±3.2 years). Besides, 27 (87%) patients had unilateral symptoms and 4 (13%) had bilateral symptoms.

Table-1: Patient Demographics.

Characteristics	Total
Total number of patients	31
Gender	
◆ Male	04(13%0
◆ Female	27(87%)
◆ Female to male ratio	6.8:1
Age (years)	
◆ Mean	45.7±13.4 years
◆ Range	21 to 70 years
Decade wise distribution of patients	
◆ From 21 years to 30 years	3(9.67%)
◆ From 31 years to 40 years	15(48.38%)
◆ From 41 years to 50 years	516.12%)
◆ From 51 years to 60 years	412.90%)
◆ From 61 years to 70 years	4(12.90%)

Table-2: Symptoms Analysis.

Symptoms	No. of patients (%age)
Epiphora	31 (100%)
◆ With Serous discharge	21 (67.7%)
◆ With Mucoid discharge	02 (6.5%)
◆ With Mucopurulentdicharge	06 (19.3%)
◆ With Purulent discharge	02 (6.5%)
Mucocele	01 (3.2%)

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

Time of complication	Complication	Number of patients (%age)
Per-operative Complications	Haemorrhage	4 (13%)
	Tube detached from probe	3 (9.7%)
Post-operative Complications		
◆ Immediate	◆ Ecchymosis	2 (6.5%)
	◆ Nasal Adhesions	3 (9.7%)
	◆ Granulation tissue formation	1 (3.2%)
◆ Delayed	◆ Retrograde tube displacement	3 (9.7%)
	◆ Symblepheron	1 (3.2%)

Of the total, 13 (42%) patients had deflected nasal septum which was corrected with septoplasty before DCR. Average duration of endoscopic DCR was 40±17.5 minutes (range 25-70). DCR tube was removed 6 months after operation in 27(87%) patients and in 4(13%) patients, it was removed after 3 months. Complications encountered during and after surgery were noted (Table-3).

Overall, 26 (84%) patients were symptom-free i.e., no epiphora six months after the removal of DCR tube. Out of the remaining 5(16%) patients, 2(40%) underwent revision surgery and were symptom-free 6 months after the removal of the tube whereas 3(60%) refused revision surgery. Overall success rate of endonasal DCR was 28(90.3%).

Discussion

Majority (87%) of our patients were females. This trend is noted in most local[5-7] and foreign studies.[8,9] Probable reasons for this trend might be that the disease is not only more common in females due to narrow lumen of nasolacrimal duct[6] but the need to avoid facial scar for cosmetic reasons is more pressing in females compared to the males.[5]

Mean age of our patients was 45.7 years, although 48% of our patients were between 31 to 40 years of age and majority of them (72%) were females. These observation were also noted in other local studies[5-7] but in most of the foreign studies, majority of the patients presented in their fifth decade.[1,8,10] Twenty-seven patients (87%), in our study, had unilateral symptoms whereas 4 (13%) had bilateral symptoms. Similar trends were observed in other studies.[5,6,9,10]

Our diagnostic protocol included regurgitation test, irritation of lacrimal system and endoscopic endonasal examination. Various studies employed dacryocystography and computed tomography (CT) scan imaging.[8-11] 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.[8] 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.

As many as 42% of our patients had significant nasal septal deviation which was limiting the access to the osteotomy site. In these cases, septal correction was done surgically just before starting the DCR. We did not encounter any other deformity limiting our access to the osteotomy site. Septoplasty was required in 46% of cases in a study consisting of 104 cases of endonasal DCR.[1] In a recent local study,[5] 6.3% of patients required septal surgery and 12.5% required middle turbinate trimming to have better exposure of the surgical site but the number of cases in this study was only 16. In our opinion, unobstructed view of osteotomy site is of paramount importance. If the view is restricted due to any anatomical factor like septal deviation, it should be treated before the start of DCR. This will give more room for surgery, better visualisation, less trauma to surrounding structures and consequently less post-operative nasal adhesions. This view is shared by another study consisting of 46 endonasal DCR surgeries.[11] Inadequate exposure of lacrimal sac and injury to surrounding nasal mucosa are considered to be the common causes of surgical failure.

Average time of endoscopic DCR in our study was 40 minutes. This is the time taken by the DCR surgery alone and did not include the time required for nasal septal correction, which was done in those cases where septal deviation was blocking the view of the osteotomy site. However, time of the DCR procedure progressively decreased with increasing surgical expertise. In a study which compared the endoscopic endonasal DCR with external DCR showed that average time taken by the former technique was 38 minutes whereas external DCR took 78 minutes.[9] Another study of endonasal DCR involving 52 procedures showed that average time for primary DCR was 30 minutes.[8]

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[9,12] whereas others suggest that the DCR tube is responsible for the granulation tissue formation, patient discomfort and extra cost.[6,13] Many are of the opinion that DCR tube usage or otherwise does not affect the success of the procedure.[8,14] 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.[9,12]

The optimal time for silicon tube extubation is another controversy. We planned to keep the DCR

tube for 6 months after the surgery. In 27 (87%) patients, it was removed after 6 months as planned, but in 4(13%) patients, it was removed after 3 months. The reason for removing the tube in 3 patients was repeated retrograde displacement of tube. One patient removed the tube accidently by herself. Other studies keep the tube for a variable period ranging from 3 to 6 months.[5-8,15] Further studies are required to decide about the optimal time for silicon tube extubation.

Complications reported with endoscopicendonasal DCR include haemorrhage during operation which can compromise the view of endoscope, difficulty in localisation of lacrimal sac, restenosis of rhinostomy site, granulation tissue formation, retrograde displacement of DCR tube and nasal adhesion formation. Adequate training and experience in endoscopic nasal surgical techniques along with safe and proper use of appropriate equipment is an essential prerequisite for performing the endonasal DCR. Experience gained through cadaver dissection and supervised training is necessary to minimise the complications associated with the procedure.

We encountered excessive haemorrhage in 4(13%) 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 per-operative complication is also noted in another study.[15] DCR tube was detached from the probe while it was delivered into the nasal cavity by ENT surgeon in 3(9.7%) cases. In all of them, we replaced the tube. 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.[5,15,16] We encountered nasal adhesion in 3(9.7%) of our patients during the follow-up visits. Two of these 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.[9] 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.[7,17,18]

Delayed complications (i.e., those encountered 3 months after surgery) noticed were symblepheron in one patient and retrograde DCR tube displacement in 3. Retrograde tube displacement is not an unusual problem and is reported in other studies.[6,19] 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, 84% of our patients were symptom-free i.e., no epiphora six months after the removal of the DCR tube. The remaining five patients developed reoccurrence of epiphora between 3 and 4 months after the removal of the DCR tube. Two of them underwent revision surgery and were symptom-free 6 months after the removal of the tube so overall success rate of endonasal DCR was 90.3%. Other local studies claim success rate between 94% to 100% with 8 months to 1 year of follow-up after the removal of the DCR tube.[5-7,15] Review of international literature suggests overall success rate between 81% to 96% with follow-up ranging between 6 months and 1 year.[1,8,9,11,20]

Conclusion

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

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