ORIGINAL RESEARCH

A Prospective Study to Compare the Outcome of Endoscopic (Endonasal) DCR with Conventional (External) DCR in a Tertiary Care Center

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ABSTRACT

Background: Epiphoracan be extremely troublesome and a source of social embarrassment. There are various methods of performing dacryocystorhinostomy for the treatment of nasolacrimal duct obstruction. Present study is planned to evaluate the results of Endoscopic Endonasal DCR without silicon stent in patients with nasolacrimal duct obstruction at tertiary level health care center.

Materials & Methods: A hospital based prospective study done on 40 patients diagnosed as nasolacrimal duct obstruction or chronic dacryocystitis at department of ENT, at RVRS Medical College, Bhilwara Rajasthan, India during one year period.Patients were divided into two groups:Group I for Endonasal Endoscopic DCRwithout silicone stent (N=20)and Group II for conventional (external) DCR (N=20).Nasolacrimal Duct Obstruction Symptom Score (NLDO-SS) questionnaire was given and symptom score were calculated.Lacrimal syringing was performed in all the cases.Subsequent follow up done post-operatively at fourweek, 12 week & 6 month.

Results: The mean age was 45.51±11.43 years (range 15 to 77 years). The demographic variables such as age, sex, laterality, associated nasal pathology and additional procedure was statistically non significant. The mean surgical duration in group I was 40.23±9.45 minutes & in group II was 41.2±8.76 minutes, which was statistical non significant (P>0.05).The success rate of En DCR is 95%. Complete objective & symptomatic relief was seen in 19 (95%) cases, & 1(5%) reported no symptomatic relief after one month and 90% success rate after 6 month in both groups.

Conclusion: We concluded that endonasal DCR is a procedure that has recently gained by otorhinolaryngologists due to its minimal invasive nature, high patient satisfaction, and high success rates.

Keywords: Endonasal DCR, External DCR, NLD Obstruction, Dacryocystorhinostomy, Epiphora.

INTRODUCTION

Tearing and recurrent chronic conjunctival discharge are the most frequent symptoms and signs of lacrimal pathway obstruction. Epiphoracan be extremely troublesome and a source of social embarrassment. Epiphora can be because of an obstruction, stenosis, punctual malposition or functional disorder of the lacrimal passages.[1]The symptoms of nasolacrimal duct obstruction (NLDO) were described in papyrus documents by the ancient Egyptians.[2]

NLDO causes inflammation of the lacrimal sac known as dacryocystitis. It generally affects two age groups, infants and adult females over 40 years of age. Congenital dacryocystitis is almost always chronic, while acquired dacryocystitis may be acute or chronic. Chronic dacryocystitis is the common form of dacryocystitis which arises from nasolacrimal duct occlusion. While obstruction of the nasolacrimal duct may present with epiphora, it may also present with a mucocele, pyocele or recurrent acute dacryocystitis.[3] The incidence of nasolacrimal duct obstruction is estimated to involve approximately 10 percent at 40 years increasing to 35-40 percent at 90 years of age.[3]

There are various methods of performing dacryocystorhinostomy for the treatment of nasolacrimal duct obstruction. Endoscopic dacryocystorhinostomy is becoming more popular, compared with conventional external dacryocystorhinostomy. It has gained momentum over the last decade, due to increased familiarity of otolaryngologists with the endoscopic anatomy of nasal cavity.[3,4]

The endonasal approach to the lacrimal sac was first described by Caldwell in 1893[5], and later in 1911 by West, however, its use remained limited due to difficulties in visualizing the endonasal structures during operation. The introduction of the rigid endoscope provided the catalyst for endonasal dacryocystorhinostomy.[6]

The most common causes of DCR failure are obstruction of the osteotomy site and obstruction of the common canaliculus (it has been thought that an adequately size osteotomy at the end of surgery would eventually narrow down to a final size of 2 mm due to scarring). Therefore, some authorities postulated that intubation of the nasolacrimal system during DCR, may prevent closure and scarring of the osteotomy or stenosis of the common canaliculus and so improve the success rate.[7]

Thus, insertion of silicone stents is almost universally employed to prevent rhinostomy stenosis and to help to stabilize epithelialization between two mucosal surfaces having surgical continuity.[8]There is some controversy, however, regarding the use of stenting for DCR. Those who advocate its use report an increased patency rate, due to maintenance of the ostium of the lacrimal sac into the middle meatus and correction of presaccal stenosis.[9] Allen and Berlin, however reported a higher failure rate when using silicone tubing. Formation of granulomatous inflammation, punctal erosion and slitting of the canaliculi in association with silicone intubation as the reason for failure.[10,11]

Present study is planned to evaluate the results of Endoscopic Endonasal DCR with or without silicon stent in patients with nasolacrimal duct obstruction at tertiary level health care center.

MATERIALS& METHODS

A hospital based prospective study done on 40 patients diagnosed as nasolacrimal duct obstruction or chronic dacryocystitis at department of ENT, at RVRS Medical College, Bhilwara Rajasthan, India during one year period.

INCLUSION CRITERIA

- Patients with history of persistent watering or mucoid/mucopurulent discharge from eye.
- Patients in whom sac syringing reveales obstruction in the lower passage with regurgitation from the other punctum.

EXCLUSION CRITERIA

- Patient with epiphora with no signs of lacrimal drainage obstruction on sac syringing.
- Patient with ectropion/ entropion/ lower lid laxity.
- Patient with canalicular and punctal obstruction.
- Patient with history of radiation therapy.

METHOD

A detailed history was taken as to age, sex, socioeconomic status, occupation, nature and duration of symptoms etc. Patients were divided into two groups:

1. Group I for Endoscopic (Endonasal)DCRwithout silicone stent (N=20)
2. Group II for conventional (external) DCR (N=20).

Nasolacrimal Duct Obstruction Symptom Score (NLDO-SS) questionnaire was given and symptom score were calculated.[12]Examination of nasal cavity was done with anterior rhinoscopy, posterior rhinoscopy and endoscopic evaluation in order to check for accessibility of lacrimal sac, deviated nasal septum, turbinate hypertrophy or any other associated pathology.

Radiological studies done like X-ray study of PNS water's view and NCCT paranasal sinuses where ever required. Routine blood investigations, urine examination, X-ray chest (PA) view, ECG was done in all patients.

SURGICAL PROCEDURE ENDOSCOPIC DCR

Pre-anaesthetic check-up and xylocaine sensitivity testing of all the patients were done. The procedure was done under local or general anaesthesia. In case of local anaesthesia the nose was prepared using cotton strips soaked in 4 percent xylocaine and adrenaline (1:10000, in a ratio of 4:1), 10-15 minutes prior to surgery. This ensures adequate decongestion, mucosal anaesthesia, easy access and a bloodless field. The surgery was done using a 0° 4-mm rigid endoscope and camera with a video display monitor.The incision began 8 mm above the axilla of middle turbinate and extended 6mm anterior to the axilla and onto the frontal process of maxilla. The incision then extended vertically downwards in a "C" shape towards the insertion of the inferior turbinate, and then continued posteriorly up to the insertion of the uncinate process. Mucoperiosteal flap elevated backward over the maxillary and lacrimal bone, using a Freer's suction elevator and round knife, and rolled over posteriorly on to middle turbinate.An osteotomy performed with straight 3 mm and 2 mm Smith-Kerrison punch forceps. Lacrimal bone removed with Freer's elevator or ball probe. It is important to meticulously locate and remove all small bony fregments. The lacrimal sac incised vertically on the anteromedial aspect of the sac using a sickle knife, pus, mucopus or mucus usually flowed from the sac. Two horizontal incisions made at the superior and inferior limit of sac and a U-shaped posterior based flap created and folded posteriorly. Nasal mucosal flap placed in apposition with the posterior lacrimal sac flap. Surgical site packed with a small piece of merocel (Merocel®, Medtronic Xomed Surgical Products, Jacksonville, USA) to hold the flap in position and to ensure haemostasis.

EXTERNAL DCR TECHNIQUE

The procedure was done under local or general anaesthesia.Make a 10-20 mm (depending on age) skin incision with a No 15 scalpel blade with 3-4 mm medial to medial canthus and 2-3 mm above the MCT, and curve the incision along the apex of the anterior lacrimal crest, extending it inferiorly and laterally. Dissect through subcutaneous tissue and orbicularis to the periosteum. It is important to avoid inadvertently injuring your nasal mucosa by Initial controlled inward fracture of the lacrimal fossa bone with the Freer's periosteal elevator, and gentle insertion of the Kerrison's bone punch between bone and nasal mucosa during bone

removal. Probe the lacrimal sac with a Bowman probe 0 or 1. Use the probe to tent the lacrimal sac and to create counterpressure for to incise the sac.Tent the lacrimal sac more posteriorly as this will create a longer anterior flap. Incise the lacrimal sac in an H-configuration, thereby creating both anterior and posterior flaps.The 1st incision is made in a superiorinferior plane with a crescent knife. One can also use spring scissors to extend the incision superiorly and inferiorly. Try to make the nasal mucosal incision the same length as the one in the lacrimal sac. Suture the posterior nasal and lacrimal sac flap together with 4-0 chromic or 6-0 vicryl.Intubate the upper and lower canaliculi with Crawford or other preferred lacrimal stents and pass the tubes out through the nose. Tie the tubes together with 4-0 silk just inside the nasal opening so they do not become displaced.Skin is closed with interrupted 6-0 silk suture.

POST-OPERATIVE ASSESSMENT

Merocel nasal pack removed on 3rd post operative day. All the patients were treated with Antibiotic eye drops given four times a day for three to four weeks in order to ensure continuous flow through the lacrimal system, and intranasal saline spray or saline nasal drops advised four to five times a day to avoid crust formation for one month. Advice to avoid nose blowing for four to seven days was given to avoid nasal hemorrhage and orbital emphysema. During the postoperative visit the rhinostoma site and middle meatus were cleaned with suction by using 0^o nasal endoscope in local anesthesia. Lacrimal syringing was performed in all the cases.Subsequent follow up done post-operatively at one month, three month, six month. This include symptom evaluation and scoring (i.e. checking for subjective improvement in eye watering) and endoscopic evaluation of the newly created ostium, in order to check for adhesion formation and restenosis. The surgical outcome was considered successful if the saline solution freely reached the nose during the lacrimal sac irrigation and if the patients had no tearing or recurrent infection of the lacrimal sac.[13]

RESULTS

The mean age was 45.51±11.43 years (range 15 to 77 years). Our study showed that age, sex, laterality, associated nasal pathology and additional procedure was statistically non significant (table 1).

Table 1: Comparison between two groups for baseline characteristics

Variables		Group I	Group II	Statistics
Age Group	**<40**	9	5	P>0.05
	>40	11	15	
Sex	**Male**	4	3	P>0.05
	Female	16	17	
Laterality	**Unilateral**	17	16	P>0.05
	Bilateral	3	4	
Associated Nasal pathology	**Present**	5	6	P>0.05
	Absent	15	14	
Additional Procedure	**Done**	4	1	P>0.05
	Not done	16	19	
Comparison of surgical duration	**Mean duration of surgery**	40.23±9.45	41.2±8.76	P>0.05

The mean surgical duration in group I was 40.23±9.45 minutes & in group II was 41.2±8.76 minutes, which was statistical non significant (P>0.05).

The success rate of En DCR is 95%. Complete objective & symptomatic relief was seen in 19 (95%) cases, & 1(5%) reported no symptomatic relief after one month and 90% success rate after 6 month in both groups (table 2,3).

Table 2: Comparison of Objective analysis by syringing results between two groups

Syringing results (Objective analysis)	Group I (n=20)	Group II (n=20)
Patency at 4th week	19 (95%)	19 (95%)
Patency at 12th week	18 (90%)	18 (90%)
Patency at 6th Months	18 (90%)	18 (90%)

Table 3: Comparison of Post-operative Symptomatic relief between two groups

Post-operative Symptomatic relief	Group I (n=20)	Group II (n=20)
Complete relief at 4th week	19 (95%)	19 (95%)
Complete relief at 12th week	18 (90%)	18 (90%)
Complete relief at 6th Months	18 (90%)	18 (90%)

DISCUSSION

External DCR surgery was regarded as the gold standard treatment for treating nasolacrimal duct operation at the turn of the century. Endonasal DCR had gained increasing popularity and acceptance in the last decade for the treatment of primary nasolacrimal duct obstruction (NLDO). A strong driving force for this decision in general is patient's preference to avoid a facial scar as well as lesser complication rate as compared to external DCR surgery.

Epiphora is the most frequent symptom of PANLDO, which causes vision impairment and eyelid irritation problems.[14-17] DCR is the main treatment of an option for epiphora in patients with obstruction distal to the common canaliculus.[18-20]

Outcomes after EN-DCR and EXT-DCR were comparable, with good results maintained over time. A recent retrospective comparison of outcomes between EN-DCR and EXT-DCR showed that the success rate (94%) for EXT-DCR is slightly better than that (86%) for EN-DCR.[21]However, Leong and co-workers, in a systematic review of outcomes after DCR in adults, showed that the failure rate for laser-assisted DCR was higher.[21]

The mean duration of Endoscopic DCR surgery was 40.23±9.45 minutes and for External DCR it was 41.2±8.76 minutes (P>0.05) which was statistical non significant. The success rates in both groups were found to be equivalent while patient satisfaction was noted to be slightly higher with endonasal DCR surgery. Which may be due to the shorter surgery time; lack of external incision; quicker return to work and lesser follow-up appointments (no suture removal) surgical technique is significant contributor to achieving a high success rate in DCR surgery.

Endoscopic dacryocystorhinostomy, compared with external DCR has the advantages ofgreater cosmetic acceptability, reduced surgical time, minimal learning curve, minimal blood loss, less risk of interfering with the physiological lacrimal pump mechanism, simultaneous management of intranasal pathology, and the facility for biopsy if necessary, as the lacrimal sac is opened and visualized directly.[4,6]

The results in our studies are well in line with those of earlier studies assessing the effect of EN-DCR, where the success rate has varied between 90% and 93%.

Javate and Pamintuan[22] noted a successrate of 98% in 117 patients who underwent EDCR using radiofrequency instrumentation for mucosa removal, followed by mitomycin C application(0.5 mg/mL for 3 minutes), followed by placement of a double stent.Cokkeser et al.[23] reported success in 87% of 62 patientswho underwent bone removal with a hammer and chisel technique. Ibrahim et al.[24] described their experience with an endoscopically guided trephination procedure and reported success in 83% of 19 patients in their study. We found free flow of normal saline in 18 out of 20 cases (90%).

The creation of nasal or lacrimal sac mucosal flaps was reported by several investigators in recent years. Wormald and Tsirbasnoted success rates of 95.7% and 91% in patients who underwent EDCR with nasal and lacrimal sac flaps.[25] Massegur et al. reported success in 93% of patients who

underwent hammer and chisel EDCR in conjunction with lacrimal sac and posteriorly based nasal mucosal flaps.[26]

In our study the The success rate of En DCR is 95%. Complete objective & symptomatic relief was seen in 19 (95%) cases, & 1(5%) reported no symptomatic relief after one month and 90% success rate after 6 month in both groups. Sundus Aslan et al.2009[27] in their study of 42 eyes with prolene stent reported asuccess rate of 92.9%. They reported that the results were very good in 81%, as good in 11.9% and no change in 7.1%, which is similar to our results.

Many variations of endoscopic dacryocystorhinostomy with little modifications like the use of stents, laser and Mitomycin-C have been described in the last decade, with equally good results. A bicanalicular silicone tube is the stent most often used in DCR procedures to prevent obliteration of the rhinostomy opening after DCR.

In the present study, primary EN-DCR was found to result in marked improvements in quality of life (QoL) and in symptoms related to obstruction of the nasolacrimal duct in both the groups. Our finding supports those of previous studies. reporting a positive impact on QoL related to EN-DCR.[28,29] Our study indicates that successful primary EN-DCR has a significant impact on the patients QoL, and the health benefits improved significantly up to six months after operation.

CONCLUSION

We concluded that endonasal DCR is a procedure that has recently been gained by otorhinolaryngologists due to its minimal invasive nature, high patient satisfaction, and high success rates. The success of endoscopic DCR is similar to external DCR, therefore, endoscopic DCR can be tried as the first choice due to it's less invasive nature. Endoscopic DCR may be indicated on a primary basis or as revision surgery following failed external DCR.

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