

External versus Endoscopic Endonasal Dacryocystorhinostomy: Our Experience

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Abstract

Aims and Objectives: The present study was conducted to compare the success rate of external and endonasal endoscopic dacryocystorhinostomy (DCR) for acquired nasolacrimal duct (NLD) obstruction.

Material and Methods: It was a prospective study performed in the department of Ophthalmology and department of otorhinolaryngology at Ananta Institute of Medical Sciences, Rajsamand, Rajasthan during the period of 4 years from February 2016 to February 2020. A total of 120 patients with the clinical diagnosis of chronic dacryocystitis and nasolacrimal duct obstruction were included in the study. 40 patients underwent external DCR and 80 patients underwent endonasal DCR.

Results: Total 120 patients were included in the study out of which 104 (86.66%) were female and 16 (13.33%) were male. The age of the patients ranges from 20 years to 70 years with the mean age of 52.5 years. Postoperative anatomical patency of NLD was achieved in 95% in external DCR group and 93.75% in Endonasal DCR group. Long term anatomical patency of NLD and symptom relief (assessed 6 months after surgery) was achieved in 87.5% patients in external DCR group and 86.25% patients in endonasal DCR group. The total incidence of complications in external and endonasal DCR group was 12.5% and 10% respectively.

Conclusion: Dacryocystorhinostomy (DCR) is the treatment of choice for nasolacrimal duct obstruction and can be done by external or endonasal endoscopic approach. Both the procedures have similar results with minimal complications.

Keywords: chronic dacryocystitis; Nasolacrimal duct; Endonasal, Lacrimal sac; Dacryocystorhinostomy.

Introduction

Dacryocystorhinostomy (DCR) is the most accepted procedure for nasolacrimal duct obstruction. It can be done with external (Ex) or endonasal (En) access. The basic indication is same in all cases and either route can be used.

External DCR was first described by Toti in 1904.¹ It is performed through a cutaneous incision to access the lacrimal sac. The procedure was later modified by suturing of mucosal flaps and thus creating an epithelial lined fistula.² The procedure

gained popularity among ophthalmologists due to its efficacy and relatively low complication rates.

Endonasal approach for DCR was first introduced by Caldwell in 1893 and was modified later by West in 1910 and Halle in 1914.^{3,4,5} The endonasal approach gained momentum only after advancement of new endoscopy system and techniques.⁶ It has advantage of direct visualization under endoscopic guidance. This approach avoids an external scar and neurovascular disruption along the tract exposing the lacrimal sac.

The success rate of both the procedures is ranges from 63% to 97%.^{7,8} The wide range of success is likely due to surgical variability, patient demographics, and lack of standardized outcome measures in the medical literature. The present study aimed to compare success rates of DCR surgery performed by external versus endoscopic routes and to appraise the results for anatomical as well as functional patency.

Materials and Method

The present study was a prospective study performed in the department of Ophthalmology and department of otorhinolaryngology at Ananta Institute of Medical Sciences, Rajsamand, Rajasthan during the period of 4 years from February 2016 to February 2020. A total of 120 patients with the clinical diagnosis of chronic dacryocystitis and nasolacrimal duct obstruction and undergoing either external or endoscopic DCR surgery were included in the study.

Pre operative syringing was performed in all the study participants to check the patency of nasolacrimal drainage system along with complete nasal and ophthalmic examination.

Well informed written consent was taken from all the study participants. Both the types of procedures were explained to the patients in details with their advantages and disadvantages.

Inclusion criteria

All the patients attended Eye or ENT OPD with the clinical diagnosis of chronic dacryocystitis with nasolacrimal duct blockage.

Exclusion criteria

1. Patients having history of similar procedure done in the past.
2. Patients who refused to give consent.

Out of 120 patients, 40 patients underwent external DCR and 80 patients underwent endonasal DCR.

Surgical Procedure

- A. *External DCR*: All the external DCR surgeries were performed under local anesthesia with sedation, in some cases. After making

a curvilinear incision over anterior lacrimal crest, medial palpebral ligament was identified and orbicularis oculi was separated. Periosteum was separated from bone using Freer's elevator and then reflected and lacrimal sac was dissected carefully to expose lacrimal fossa. Bony ostium of sufficient size was then created using Kerrison bone punch. Bowman's probe was passed through lower punctum to tent the sac and then using the probe as guide, an H-shaped incision was made right across the sac from fundus to the nasolacrimal duct to make anterior and posterior flaps. Posterior flap was then cut. Nasal mucosa was cut to make anterior and posterior flaps. Subsequently anterior to anterior and posterior to posterior flaps were sutured with 2 to 3 interrupted sutures by 6-0 vicryl.

- B. *Endonasal DCR*: Endonasal DCR surgery was performed either under general or local anesthesia. Nasal cavity was packed with gauze soaked in 4% xylocaine with 1:200,000 adrenaline, 15 minutes before the procedure. Both 0° and 30° nasal endoscopes were used. The nasal mucosa anterior to uncinat process was infiltrated with 2% xylocaine with 1:200,000 adrenaline. Using the sickle knife a rectangular cuff of mucosa of 10mm x 5mm just anterior to superior half of the uncinat process was incised. The mucoperichondrium flap then elevated using freer's elevator. Ascending process of maxilla and adjacent lacrimal bone was then exposed. Bony process overlying sac and NLD which are usually ascending process of maxilla, lacrimal bone and agar nasii were then removed using 2-3 mm kerrison. The bone removal was then continued nasally to expose the lacrimal sac. Lacrimal probing was done to tent the medial wall of sac. The sac was then slit open with an angled knife. The medial wall of sac was then removed with a tissue punch. Syringing was done with saline to confirm the free flow and patency. All the patients were taught and advised to perform alkaline nasal douching for at least 10 days after surgery. Also regular massaging over sac area was advised postoperatively for 10 days.

Assessment

Assessment was done by comparing the success

of both the procedures in terms of long term anatomical patency of NLD and symptom relief. Secondary assessment was done by comparing the incidence of complications in both the procedures.

Ethical clearance

Ethical clearance was obtained from institutional ethical committee.

Statistical analysis

Data analysis was performed using Statistical Package for Social Sciences (SPSS) software, version 19.0. Data of both the groups were compared and analyzed by Chi-square test or Student’s t-test.

Results

120 patients chronic dacryocystitis were included in the study out of which 104 (86.66%) were female and 16 (13.33%) were male. The age of the patients ranges from 20 years to 70 years with the mean age of 52.5 years. Demographics between the two study groups were similar.

The surgical success was defined as objective success based on demonstration of patent NLD through syringing and subjective success based on the improvement in patient’s symptoms.

Anatomical patency of NLD was achieved in 38 (95%) of 40 patients of external DCR group and 75 (93.75%) of 80 patients in Endonasal DCR group. The difference was not statistically significant.

Long term anatomical patency of NLD and symptom relief (assessed 6 months after surgery) was achieved in 35 (87.5%) patients in external DCR group and 69 (86.25%) patients in endonasal DCR group. This difference was also not significant. (Table 1).

Table 1: Assessment of success of procedure.

Assessment	External DCR	Endonasal DCR	P-value
Anatomical Patency	38/40 (95%)	75/80 (93.75%)	0.7161
Long term anatomical patency and symptom relief	35/40 (87.5%)	69/80 (86.25%)	0.5904

The complications were minor and incidence was low in both types of procedures. (Table 2) Among the external DCR participants, 1 patient had wound hemorrhage, 2 patients had infraorbital

ecchymosis, 1 had external hypertrophied scar and 1 patient had wound dehiscence. Thus total incidence of complications in external DCR group was 12.5%.

Table 2: Incidence of complications among participants.

Complications	External DCR	Endonasal DCR
Hemorrhage	1	1
Nasal Synechiae formation	-	3
Infraorbital ecchymosis	2	3
External hypertrophied scar	1	-
Granulation at ostium	-	1
Wound dehiscence	1	-
Total	5 (12.5%)	8 (10%)

In the endonasal group, the incidence of complication was 10% in which 1 patient had epistaxis, 3 patients had synechiae formation which were excised on follow up as outdoor procedure, 3 patients had postoperative infraorbital ecchymosis which was self-relieved in few days and 1 patient had developed granulation at site of ostium which was also healed without any intervention.

Discussion

External DCR was considered as treatment of choice for nasolacrimal duct obstruction for long time. This procedure has advantages of direct visualization of anatomy while performing surgery and a good success rate. However, the procedure also has the disadvantages of external visible scar and potential of injury to medial canthal structures.

Over the last few decades, endonasal endoscopic DCR has replaced external DCR as treatment of choice for NLD blockage because of its comparable long term success rate and advantage of minimally invasive approach with no external scar. However, this procedure requires costly sophisticated endoscopic instruments with expertise in the field.

In present study, 120 patients of NLD blockage were included out of which 104 (86.66%) were female and 16 (13.33%) were male. The age of the patients ranges from 20 years to 70 years with the mean age of 52.5 years.

Guy J Ben Simon et al performed a similar study in 2005 and included 143 patients in the study with 48 male (33.56%) and 95 female (66.43%) with the mean age of 63 years.⁹ Similar study by R Karim et al in 2011 included 202 patients with 62.4% female patients and mean age of 69 years.¹⁰

In present study, anatomical patency of NLD was achieved in 38 (95%) of 40 patients of external DCR group and 75 (93.75%) of 80 patients in Endonasal DCR group. Long term anatomical patency of NLD and symptom relief (assessed 6 months after surgery) was achieved in 35 (87.5%) patients in external DCR group and 69 (86.25%) patients in endonasal DCR group. Both the differences were not statistical significant.

Similar results were obtained in the studies performed in the past. Karim R et al performed the similar study and found long term success rate of 81.6% in external DCR group and 82.3% in endonasal group.¹⁰ Similar results were obtained in the studies done by Saroj Gupta et al in 2007 and Khan MKH et al in 2016.^{11,12} Guy J Ben Simon found the relatively higher success rate in endonasal DCR group (83.7%) than external DCR group (70%).⁹

In present study, the complications were less and minor in both the groups. The incidence rate of complications was 12.5% and 10% in external and endonasal DCR group respectively. Common complications include hemorrhage, nasal synechiae formation, external scar, wound dehiscence, infraorbital ecchymosis and granulation at ostium. All the complications were easily handled in the outdoor. Similar complications with comparable incidence rate were found in studies performed in the past.^{9,10,13,14}

Conclusion

Dacryocystohinostomy (DCR) is the treatment of choice for acquired nasolacrimal duct obstruction. DCR can be performed by external or endonasal route. Both the routes has similar success rate as well as low complication rates. Endonasal procedure offers distinct advantages over external procedure that it leaves no external scar and preserves lacrimal pump system with minimal intraoperative bleeding. However, endoscopic DCR is an expensive procedure as it requires costly endoscopic instruments and also requires proper training to expertise the procedure. While offering the treatment options, the patient must also be thoroughly explained about both the procedures with possible advantages and disadvantages of both the procedures.

Conflict of interest: No conflicts of interest exist for these authors. No relevant financial relationship exists between the authors and procedures or products used in this manuscript.

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