



COMPARATIVE STUDY OF ENDOSCOPIC VERSUS EXTERNAL DACRYOCYSTORHINOSTOMY

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ABSTRACT

Introduction: Dacryocystorhinostomy (DCR) is the treatment of choice for acquired nasolacrimal duct obstruction, commonly caused by chronic dacryocystitis. DCR can be done either by external or endoscopic endonasal approach. External DCR is traditionally regarded as gold standard but endoscopic DCR is evolving as an equally effective alternative method with added advantages of less complications and early recovery.

Material & methods: This clinical prospective study was performed at Pacific Medical College and Hospital, Udaipur during the period from January, 2014 to January, 2016. A total of 70 patients with the diagnosis of chronic dacryocystitis and nasolacrimal duct obstruction were included in the study. 35 patients from the study underwent external DCR and rest 35 underwent endonasal DCR. Results of both the surgeries were assessed and compared.

Results: A total of 70 patients were included in the study out of which 56(80%) were female and 14(20%) were male. Mean age of the Patients was 56.5 years. Patency was achieved in 91.4% cases with external DCR and in 88.5% patients with endonasal DCR surgery. Long term anatomical patency and symptom relief (6-12 months postoperatively) was achieved in 80% patients with external DCR group and in 85.7% patients in the endonasal DCR group. The complication incidence was low and similar in both operations.

Conclusions: Results of both external and endonasal endoscopic DCR are comparable. The endoscopic DCR has the advantages that it leaves no scar and preserves the lacrimal pump system, unlike external DCR. An understanding of intranasal anatomy, however, is required for endoscopic surgery, with appropriate endoscopic training.

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INTRODUCTION

The lacrimal excretory pathway begins at a 0.3-mm opening on the medial portion of each eyelid termed the punctum.^{1,2} The punctal opening widens into the ampulla, which is 2 mm in height and directed perpendicular to the eyelid margin, before making a sharp turn into the canaliculi.

In more than 90% of individuals, the superior and inferior canaliculi merge to form a common canaliculus before entry into the nasolacrimal sac.^{2,3} The upper and lower canaliculi joined at the wall of the lacrimal sac without a common canaliculus in an additional 4%, with only 2% of systems having completely separate drainage of the upper and lower canaliculi into the lacrimal sac.⁴ The functional valve between the common canaliculus and the lacrimal sac has traditionally been attributed to the valve of Rosenmüller, although some studies have been unable to document this structure.⁵ The nasolacrimal sac and duct are portions of the same continuous structure. The sac rests in the lacrimal sac fossa, with its medial aspect tightly adherent to the periosteal lining of the

fossa. The lower nasolacrimal fossa and the nasolacrimal duct are narrower in females, which may account for the female predominance of nasolacrimal obstruction.⁶ The nasolacrimal duct then travels inferolaterally and slightly posteriorly in its bony course to the inferior turbinate for an interosseous distance of 12 mm and opens in inferior meatus. (Figure.1)

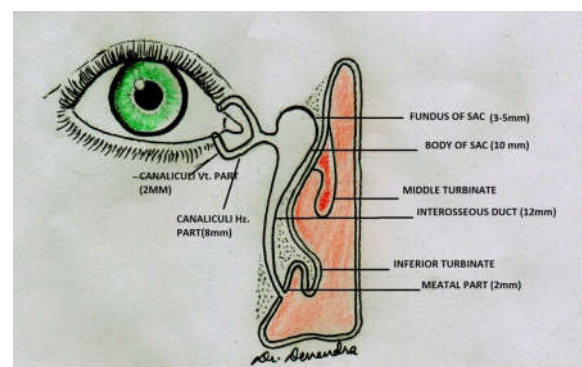


Figure 1 Approximate dimensions of the lacrimal excretory system.

Lacrimal secretion and drainage imbalance can lead to accumulation of too much lacrimal fluid in the lacrimal pools resulting into bothersome symptoms. Hyperlacrimation can be caused by Hyper secretion, lacrimal pump failure or drainage obstruction. This study is mainly focused on diseases of the sac i.e., chronic dacryocystitis and nasolacrimal duct obstruction.

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. The external approach is performed through a cutaneous incision to access the lacrimal sac. The procedure gained popularity due to its efficacy and relatively low complication rates. Endoscopic endonasal DCR has gathered momentum with direct visualization under endoscopic guidance. Caldwell first introduced the endonasal approach for lacrimal surgery in 1893. However endoscopic endonasal DCR has only become recently employed with new endoscopy instruments and technique.⁷ This approach avoids an external scar and neurovascular disruption along the tract exposing the lacrimal sac.

The reported success rates of both procedures range from 63% to 97%.⁸⁻⁹ 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.

MATERIAL AND METHOD

This clinical prospective study was performed at Pacific Medical College and Hospital, Udaipur during the period from January, 2014 to January, 2016. A total of 70 patients with the diagnosis of chronic dacryocystitis and nasolacrimal duct obstruction were included in the study. All patients underwent a comprehensive ENT and ophthalmic examination along with irrigation of the nasolacrimal drainage system and an intranasal examination.

Consent was obtained from all the patients. All patients had preoperative counseling and both procedures were explained in detail with their advantage and disadvantages. Patients with the previous history of similar procedure or age less than 16 years were excluded from the study. 35 patients from the study underwent external DCR and rest 35 underwent endonasal DCR.

Surgical Procedure

External DCR

Surgery was performed under local anesthesia with sedation, if required. Incision was taken over anterior lacrimal crest. Medial palpebral ligament was identified and orbicularis oculi was separated. Reflection of periosteum and dissection of lacrimal sac from lacrimal fossa was done. Sac was excised to make 'H' shaped anterior and posterior flaps. Bony osteum of sufficient size was made with bone punch. 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.

Endonasal DCR

Surgery was performed either under general or local anesthesia. Nasal cavity was packed with gauze soaked in 4%

xylocain with 1:100,000 adrenaline, 15 minutes before the procedure. The mucosa anterior to uncinat process was infiltrated with 2% xylocain with 1:100,000 adrenaline. A 300 rigid endoscope was used. 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 mucosal cuff was then elevated with a periosteal elevator and removed using a pair of cutting forceps. The frontal process of maxilla and the very thin lacrimal bone is then identified. A 2 mm Kerrison punch was used to nibble away the thick bone at the frontal process of the maxilla. 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.

RESULTS

A total of 70 patients were included in the study out of which 56(80%) were female and 14(20%) were male. Mean age of the Patients was 56.5 years. The operation was classified as successful by the objective demonstration of a patent nasolacrimal system through irrigation. Patency was achieved in 32 (91.4%) of 35 patients for the external DCR and 31 (88.5%) of 35 patients for endonasal DCR surgery (refer to table no.1). The difference was not statistically significant ($P = 0.7096$). Long term anatomical patency and symptom relief (6-12 months postoperatively) was achieved in 28 (80%) of 35 patients in the external DCR group and 30 (85.7%) of 35 patients in the endonasal DCR group. This difference was not statistically significant ($P = 0.5291$)

Table 1 summary of surgery success

Surgical result	External DCR	Endonasal DCR	p-value
Patency	32 (91.4%)	31 (88.5%)	0.7096
Long-term anatomical patency and symptom relief	28 (80%)	30 (85.7%)	0.5291

The complication incidence was low and similar in both operations (refer to table no. 2).

Table 2 Complications

S.No.	Complication	External DCR	Endonasal DCR
1.	Hemorrhage	2	1
2.	Nasal Synechia Formation	-	2
3.	Granulation at ostium	-	1
4.	External hypertrophied scar	1	-

Three patients had postoperative haemorrhage (one who had endonasal DCR surgery and two having external DCR surgery). Postoperative haemorrhage was either wound haemorrhage or epistaxis. All of these patients were treated conservatively. Two patients of endonasal DCR group had nasal synechia formations which were removed successfully as OPD procedure. One patient had formation of granulation at the ostium with narrowing in the endonasal group. One patient of external DCR group had hypertrophied external scar.

DISCUSSION

Dacryocystitis is a very common affection sparing no specific age group. Obstruction of nasolacrimal duct can be approached

either externally by an ophthalmologist or endonasally by the rhinologist or an ophthalmologist.

Advantages of endoscopic DCR over the traditional external approach include avoidance of skin incision along with its possible complications; preservation of the pump mechanism of the orbicularis oculi muscle, less bleeding and the ability to address nasal or paranasal sinus abnormality at the same time. Limitation of injury to tissues at the osteotomy site, and faster rehabilitation are also noted. Drawbacks include longer operative time, technical difficulties, and specific instrumentation^{10, 11, 12}. However, some investigators have found similar or even shorter operative times in endoscopic DCR in comparison to external DCR^{13, 14}. External DCR is technically easier, with an unimpaired view of the surgical area and well-defined landmarks allowing the creation of a wide bony window and the use of mucosal flaps to obtain an epithelialized DCR tract¹³.

Published results for successful endonasal endoscopic DCR range from 63% to 99%^{11, 13, 14} with endosurgical DCR being more successful than endolaser DCR¹¹. Despite a general belief that external DCR is more successful than endonasal DCR, some authors conclude that it is difficult to make a definite evidence-based determination about the relative efficacies of endonasal and external DCR because of deficiencies in the reported literature¹². A learning curve of the endoscopic procedure has also been demonstrated in several studies, with higher success in more experienced surgeons¹⁵. In the present study, the immediate success rate was 91.4% in external DCR and was 88.5% in endonasal DCR as demonstrated by post-operative patency demonstration by irrigation. Long term anatomical patency and symptom relief (6-12 months postoperatively) was achieved in 80% cases in the external DCR group and 85.7% cases in the endonasal DCR group (Table no. 3).

Table 3 comparison of success rate of external and endonasal DCR with previous studies

S.No.	Investigator	Number of cases		Success rate	
		External DCR	Endonasal DCR	External DCR	Endonasal DCR
1	Ben Simon GJ et al	90	86	70.0%	83.7%
2	Karim R et al	98	102	81.6%	82.3%
3	Khan MKH	15	15	80%	73.3%
4	Tsirbas et al	24	31	96%	94%
5	Present study	35	35	80%	85.7%

Most complications for both external and internal DCRs are extremely rare. We encountered only few complications during operation as well as during the follow ups. Mild post-operative hemorrhage, nasal synechia and granulation tissue formation were the only and easily handled complications in our patients. In the last few years, the differences in outcomes between the two techniques have been reduced because of advances in technology, and we affirm that the choice of the type of surgery is currently based on the experience of the surgeon, available resources and the patient preferences.

CONCLUSION

DCR is the treatment of choice for the treatment of nasolacrimal duct obstruction. All studies show similar results in regards to external versus endoscopic surgery.

Both operations have low complication rates. The advantage of endoscopic surgery is that it leaves no scar and preserves the lacrimal pump system, unlike external DCR. An understanding of intranasal anatomy, however, is required for endoscopic surgery, with appropriate endoscopic training. These aspects may be important deciding factors during selection of the type of operation. The patients must also be thoroughly explained the benefits and challenges of all the possible options before the surgery. Endoscopic DCR surgery with its discussed benefits warrants a place in the 21st century as a contender for primary treatment of nasolacrimal duct obstruction.

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