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## Comparative study between external and endoscopic Dacryocystorhinostomy

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### Abstract

**Background:** Dacryocystorhinostomy (DCR) consists of creating a lacrimal drainage pathway to the nasal cavity to restore permanent drainage of previously obstructed excreting system.

**Materials and Methods:** Study was conducted for 18 months duration in a teaching hospital with 50 cases of endoscopic and 50 cases of external DCR with a follow-up of minimum 9 months. Data regarding surgical outcome and complications were analysed and compared using  $\chi^2$  test.

**Results:** Total 100 patients were included in the study with six having bilateral involvement, out of which 10 were male and 90 were female. The mean age for endoscopic and external DCR was 33.6 years and 46.0 years, respectively. Right eye (69%) was involved more commonly than left eye (31%). Epiphora was the commonest presenting symptom (81%). Mean duration of surgery was much lengthier in external (mean 90 minutes) than endoscopic (mean 50 minutes) DCR. Most common complication included excessive intraoperative bleeding which was seen in 10(20%) and five cases (10%) of external and endoscopic DCR respectively. Primary surgical success rate was 89% and 97% for endoscopic and external DCR, respectively ( $P = 0.046$ ). Among the endoscopic DCR group, four patients underwent revision surgery giving a total successful surgical outcome of 97% at third month of follow-up. In endoscopic DCR group, out of 50 cases, 45 cases (90%) demonstrated primary surgical success, which is defined as decreased or absent epiphora and adequately patent lacrimal system in 1<sup>st</sup> month of follow-up period. Forty eight (96%) out of 50. cases had patent lacrimal passage and one presented with functional block after 1 month in external DCR group However, at 6 month of follow-up, success rate was 90% for endoscopic DCR and 94% for external DCR. The difference was not statistically significant ( $P = 0.609$ ).

**Conclusion:** External DCR is a simple, moderately invasive, day care procedure and had comparable result with endoscopic DCR.

**Keywords:** Dacryocystorhinostomy, epiphora, moderately

### 1. Introduction

Dacryocystitis is the infection of the lacrimal sac, usually secondary to obstruction of the nasolacrimal duct, lacrimal sac, common canaliculus, superior and inferior canaliculus, or punctum. It may be acute or chronic and is most commonly staphylococcal or streptococcal in origin <sup>[1]</sup>.

Chronic dacryocystitis presents with chronic epiphora, which may be associated with chronic or recurrent unilateral conjunctivitis and rare spontaneous resolution, thus surgical intervention is of utmost necessity in this condition.

Surgical treatment of dacryocystitis stretches back nearly 2000 years. Celsus, in the first century, described a way of creating an artificial passageway into the nose by using hot cautery to puncture through the lacrimal bone <sup>[2]</sup>. A similar procedure was performed by Galen in the second century. Several avenues had been tried by the early part of the 20th century. An interesting approach involved attempts to drain the lacrimal sac into the maxillary sinus. The earliest operation that would resemble a modern external DCR was attempted by Woolhouse in England in the 18th century. He advocated extirpating the sac, perforating the lacrimal bone and placing a drain made of gold, lead or silver. Alternative pathway of DCR by intranasal route was described by Caldwell in as early as 1893 <sup>[3]</sup>.

Although external DCR is still regarded as gold standard, endoscopic DCR is evolving as an equally effective alternative in the recent past.

### Aim and objective

To compare the result and advantages of both endonasal endoscopic and external DCR regarding the patency rate, patient compliance and complications.

### Materials and Methods

#### Study Design

Prospective non-randomized comparative study.

#### Study Duration

18 months

#### Statistical Analysis

- All the data obtained will be entered in a Microsoft Excel sheet, and statistical analysis will be performed using a statistical package for the social sciences (Version 20).
- Results will be presented as Mean  $\pm$ SD, counts and percentages, and diagrams.

For normally distributed continuous variables between two methods will be compared using an Independent t-test. For not normally distributed variables, the Mann-Whitney U test will be used. Categorical variables between the two methods will be compared using the Chi-square test.

- ROC will be used to find cut off values and to find sensitivity and specificity.
- $p < 0.05$  will be taken as statistically significant. All statistical tests will be performed two-tailed.

This was a prospective, non-randomized study, conducted in the Department of Ophthalmology, in conjunction of Department of Otorhinolaryngology at a teaching medical centre of Madhya Pradesh, India for duration of 18 months from 1. Before starting the study, institutional ethical committee clearance was obtained. A total 80 patients were included. External DCR was done in 50 eyes whereas endoscopic DCR was done in 50 eyes. All patients were followed up to a minimum of 6 months at 1 month, 3 months 6 months and 9 months interval [4].

Patency of the lacrimal pathway was assessed by both sac syringing and endoscopic inspection of the lacrimal pathway for external DCR and endoscopic DCR. In all cases, medical and ocular history were taken. The preoperative diagnosis for level of blockage was based on syringing test and Dacryocystography by iohexol dye [5].

#### Inclusion criteria:

Patients >18 years of age  
 Patients with chronic dacryocystitis  
 Primary acquired nasolacrimal duct obstructions (PANDO).  
 Secondary acquired nasolacrimal duct obstructions (SALDO)- lacrimal sac pathology: Congenital Dacryocystocele, Dacryocystitis, Dacryolith, Granulomas, Neoplasia

**Nasolacrimal duct obstruction:** Congenital, Involutional, Trauma, Foreign body, Neoplasia

**Nasal disease:** Allergy, polyps, Chronic Sinusitis

#### Exclusion criteria

Patients with acute dacryocystitis

Patients with hypertrophied inferior turbinates  
 Patients with mucocoele  
 Patient with fistula  
 Patients complaining of longstanding epiphora only  
 Meibomian gland dysfunction  
 Ectropion  
 Punctal abnormality

**Canalicular abnormality - Congenital:** Agenesis, Atresia, Supernumerary puncta with canaliculus.

**Acquired:** Canaliculitis, Chronic blepharitis Inflammatory conditions such as SJS Radiation, Topical medications Chemotherapeutic agents, Ectropion

All external DCR operations were done under local anaesthesia whereas all endoscopic DCR done under deep sedation or general anaesthesia depending upon the surgeons choice. External DCR operations were performed by a single ophthalmologist while all the endoscopic DCR operations were performed by a different otorhinolaryngologists. The outcome of external and endoscopic DCR was categorized into complete cure or no improvement according to the degree of symptomatic relief following the operation. Failure was defined as no symptomatic reduction of epiphora, inability to irrigate the lacrimal system postoperatively and/or postoperative nasal endoscopy with scarring in the intranasal osteotomy. Revision surgeries were performed after the first month follow-up in failed cases of endoscopic DCR. Results of these revision surgeries were included in the 6<sup>th</sup> month outcome. Data regarding surgical outcome and complications were analyzed and compared using  $\chi^2$  test. The results were considered statistically significant at  $P < 0.05$ .

#### Results

In this study, total 100 eyes of 100 patients were included. Fifty had undergone endoscopic DCR and 50 had external DCR. Out of the total 50 in endoscopic DCR group, 25 underwent conventional endoscopic surgery, 13 eyes had powered endoscopic surgery and 12 underwent endoscopic DCR with silastic sheet.

Most of the patients in the endoscopic group were in 31-40 years (34.1%), whereas in the external DCR group the majority of cases were in 41-50 years age group (27.3%). The mean age in endoscopic DCR group was 33.6 years. The mean age group in external DCR was much higher i.e., 46 years [Table 1]. The age distribution between the groups was statistically significant.

**Table 1:**

Parameters	Age (in yrs)	
	Endoscopic DCR	External DCR
Mean	33.6	46.0
Standard deviation	$\pm 12.02$	$\pm 13.03$
Minimum	14.0	28.0
Maximum	56.0	75.0
P value	<0.0001 (S)	

In both groups of patients, female preponderance was seen. Male constitute 10 cases (10%) while female constitutes 90 (90%) of total cases. This was a statistically significant finding.

Overall, the eyes operated in different age groups showed preponderance of right eye. The percentage of right eye involvement was 69% and left eye involvement was 31%. This result was not statistically significant with respect to the side of the eyes between the groups.

The commonest indication for DCR was epiphora. Eighty - one eyes (81%) out of 100 presented with symptoms of lacrimation, 14 eyes (14%) had mucocele at the time of presentation along with epiphora, and five patients were diagnosed as having acute dacryocystitis preoperatively based on symptoms and treated medically before operation.

The mean duration of symptoms in endoscopic group was  $1.5 \pm 0.698$  years and in external DCR group was  $1.46 \pm 0.74$  years ( $P = 0.837$ ). There was no statistical significance between the groups with respect to the duration of symptoms.

The average duration for endoscopic DCR surgery was 49 minutes and 119.6 minutes for external DCR ( $P < 0.001$ ). The minimum time taken for endoscopic surgery in all groups was 30 minutes and maximum was 60 minutes. The minimum and maximum time for external DCR was 90 minutes and 150 minutes, respectively. The difference in duration of surgery between the groups was statistically significant.

Complication rate was low in both types of surgery. Complication included excessive intraoperative bleeding which was seen in 10(20%) and five cases (10%) of external and endoscopic DCR respectively.

The average follow up period was 6.1 months. In endoscopic DCR group, out of 50 cases, 45 cases (90%) demonstrated primary surgical success, which is defined as decreased or absent epiphora and adequately patent lacrimal system in 1<sup>st</sup> month of follow-up period. Forty eight (96%) out of 50 cases had patent lacrimal passage and one presented with functional block after 1 month in external DCR group. The difference was statistically significant ( $P = 0.046$ ).

## Discussions

External DCR surgery at the turn of the century was regarded as the gold standard in treatment for nasolacrimal duct obstruction<sup>[9]</sup>. This procedure has got advantages of direct visualization of the anatomical structures surrounding the lacrimal sac compared to endoscopic DCR.<sup>[6]</sup> Disadvantages of this procedure includes cutaneous scar and the potential for injury to medial canthal structures, cerebrospinal fluid rhinorrhoea and functional interference with the physiological action of lacrimal pump<sup>[10]</sup>.

However, endoscopic DCR is getting popularity among patients due to equal promising results and especially due to lack of external scar. Endoscopic DCR allows direct inspection of lacrimal sac for underlying pathology. Assessment of failure can also be viewed endoscopically, so mistakes can be corrected immediately. Again it can be converted to external DCR in difficult cases or those with lacrimal sac tumours<sup>[11]</sup>.

The mean age of the patients who underwent endoscopic DCR was 33.6 years compared to external DCR group, which was 46 years. This indicates that acquired nasolacrimal duct obstruction is more common in middle age group. There is a declining trend towards both extremes of age. This may be due to the fact that amount of lacrimal secretion is less in extremes of ages. Similar data was found by many previous workers<sup>[6, 14, 15, 16]</sup>. However, few workers

found that the mean age group is slightly more than our findings<sup>[5, 9, 13, 17]</sup>.

In present study, 63.7% of the cases presented with disease on right side. This does not correlate with previous studies<sup>[14, 18]</sup>. However Nichlani *et al.*, found right eye involvement more than left eye, which corroborates with our study<sup>[19]</sup>. In our study, the exact cause of right eye involvement in dacryocystitis was not known.

In our study, epiphora was the commonest presenting symptom as found in similar studies<sup>[9, 19, 20]</sup>. Lacrimal irrigation and Jone's dye test were done in patients presented with epiphora to determine the level of obstruction. Eighty percent eyes presented with epiphora and mucocele had lacrimal sac and nasolacrimal duct obstruction; and remaining cases had canalicular obstruction.

In a study in Bangladesh, the duration of surgery in endoscopic DCR was  $59.7 \pm 8.8$  minutes which was significantly higher than for external DCR group which was  $54.3 \pm 5.6$  minutes<sup>[6]</sup>. Muscatello *et al.*, showed that mean time for endonasal endoscopic DCR was 30 minutes, range 15-110 minutes and time progressively decreased with increasing surgical experience<sup>[21]</sup>. Hartikainen *et al.*, concluded that average duration for endoscopic DCR was 38 minutes and 78 minutes for external DCR<sup>[22]</sup>. We found that average time required for endoscopic DCR was 49 minutes as compared to external DCR was 119.6 minutes. In our study, we found that surgical times are closely related to the surgical experience of the surgeon and intraoperative bleeding. As most of the surgery in our study was done by residents who lack surgical experience, time taken was more.

Complication rate was low in both types of surgery. Complication of excessive intraoperative bleeding occurred in external and endoscopic DCR was 10 (20%) and five (10%) cases, respectively. This finding corroborates with study done by Moras *et al.*<sup>[14]</sup> Again, in a study of 79 external DCRs, 14 patients had postoperative haemorrhage compared to 0 out of 51 patients in the endoscopic DCR group<sup>[23]</sup>. However, some studies show that bleeding is more common in endoscopic DCR surgeries. In the study by Khan *et al.*, they found that there was moderate bleeding in 13.3% cases of external DCR and 20% cases of endoscopic DCR<sup>[6]</sup>. Karim *et al.*, found no serious complication in their study, except only three patients (one in external DCR group and two in endoscopic DCR group) with postoperative haemorrhage requiring conservative treatment<sup>[9]</sup>. Other complications included lacrimal sac flap loss during separation of sac from lacrimal fossa and loss of nasal mucosa during cutting in external DCR. There were no such complications noted in endoscopic DCR surgery. However, there were no episodes of orbital hematoma, diplopia and cerebrospinal fluid (CSF) leakage in both groups in our study.

The average follow up period was 6.1 months in our study. The primary surgical success rate in endoscopic DCR group was 90% and 96% in external DCR group after 1<sup>st</sup> month of follow-up period. In endoscopic DCR group, all five (10%) of patients with persistent obstruction of neo-ostium subsequently underwent revision procedures. At 6 month of follow-up, 46 (92%) out of 50 cases ultimately had a successful surgical outcome in external DCR compared to endoscopic DCR which showed 43 (86%) out of 50 cases a successful outcome. This difference was not statistically significant ( $P = 0.609$ ).

The success rate for endoscopic DCR appears to be comparable to the “gold standard” external approach, with success rate ranging from 78% to 97% [24, 25]. Our success rate in both group is comparable to various studies. Khan *et al.*, showed that success rate was 73.3% with endoscopic approach and 80% with external approach [6]. Karim *et al.*, has found similar success rate in both approaches (endoscopic DCR 82.4% versus external DCR 81.6%;  $P = 0.895$ ) [9]. In the study, Gupta *et al.*, found that success rate endonasal DCR was 90% after a single procedure and 95% after revision procedure, which was equal to external approach, which is comparable to our study [15].

### Conclusion

DCR is the treatment of choice for nasolacrimal duct obstruction. It can be performed by external or endoscopic approach. Both these approaches have minimal complications and comparable surgical outcome. This indicates that these two DCR techniques are acceptable alternatives. So it can be concluded that external DCR is an easy, economic and effective surgery, that can be performed by even new ophthalmologists without any need of high end machinery. Endoscopic DCR is a safe, minimally invasive effective day care technique with a good aesthetic result, also it ought to be performed by only skilled and experienced ENT surgeons and the choice of surgery should depend upon patient's preference, availability of resources and surgeon's expertise.

### References

- Hughes SM. The history of lacrimal surgery. *Adv Ophthalmic Plast Reconstr Surg.* 1986;5:139-68. [PubMed] [Google Scholar]
- Caldwell GW. Two new operations for obstruction of the nasal duct, with preservation of the canaliculi, and with an incidental description of a new lacrimal probe. *Am J Ophthalmol.* 1893;10:189-93. [Google Scholar]
- West J. A window resection of the nasal duct in cases of stenosis. *Trans Am Ophthalmol Soc.* 1910;12:654-8. [PMC free article] [PubMed] [Google Scholar]
- McDonogh M, Meiring H. Endoscopic transnasal dacryocystorhinostomy. *J Laryngol Otol.* 1989;103:585-7. [PubMed] [Google Scholar]
- Wormald PJ. Powered endoscopic dacryocystorhinostomy. *Laryngoscope.* 2002;112:69-72. [PubMed] [Google Scholar]
- Khan MK, Hossain MA, Hossain MJ, Al-Masud A, Rahman MZ. Comparative study of external and endoscopic endonasal dacryocystorhinostomy for the treatment of chronic dacryocystitis. *JAFMC Bangladesh.* 2011;7:15-7. [Google Scholar]
- Tarbet KJ, Custer PL. External dacryocystorhinostomy. Surgical success, patient satisfaction, and economic cost. *Ophthalmology.* 1995;102:1065-70. [PubMed] [Google Scholar]
- Durvasula V, Gatland DJ. Endoscopic dacryocystorhinostomy: Long-term results and evolution of surgical technique. *J Laryngol Otol.* 2004;118:628-32. [PubMed] [Google Scholar]
- Karim R, Ghabrial R, Lynch TF, Tang B. A comparison of external and endoscopic endonasal dacryocystorhinostomy for acquired nasolacrimal duct obstruction. *Clin Ophthalmol.* 2011;5:979-89. [PMC free article] [PubMed] [Google Scholar]
- Shun-Shin GA, Thurairajan G. External dacryocystorhinostomy-an end of an era? *Br J Ophthalmol.* 1997;81:716-7. [PMC free article] [PubMed] [Google Scholar]
- Zhou W, Zhou M, Li Z, Wang T. Endoscopic intranasal dacryocystorhinostomy in forty-five patients. *Chin Med J (Engl).* 1996;109:747-8. [PubMed] [Google Scholar]
- Hurwitz JJ, Rutherford S. Computerized survey of lacrimal surgery patients. *Ophthalmology.* 1986;93:14-9. [PubMed] [Google Scholar]
- Tan NC, Rajapaksa SP, Gaynor J, Nair SB. Mechanical endonasal dacryocystorhinostomy-a reproducible technique. *Rhinology.* 2009;47:310-5. [PubMed] [Google Scholar]
- Moras K, Bhat M, Shreyas CS, Mendonca N, Pinto G. External dacryocystorhinostomy versus endoscopic dacryocystorhinostomy: A comparison. *J Clin Diagn Res.* 2011;5:182-6. [Google Scholar]
- Gupta S, Goyal R, Thakur AS, Singh H. Conventional dacryocystorhinostomy versus endonasal dacryocystorhinostomy A comparative study. *Peoples J Sci Res.* 2008;1:1-4. [Google Scholar]
- Küpper DS, Demarco RC, Resend R, Anselmo-Lima WT, Valera FC, Moribe I. Endoscopic nasal dacryocystorhinostomy: Results and advantages over the external approach. *Braz J Otorhinolaryngol.* 2005;71:356-60. [PMC free article] [PubMed] [Google Scholar]
- Ben Simon GJ, Joseph J, Lee S, Schwarcz RM, McCann JD, Goldberg RA. External versus endoscopic dacryocystorhinostomy for acquired nasolacrimal duct obstruction in a tertiary referral center. *Ophthalmology.* 2005;112:1463-8. [PubMed] [Google Scholar]
- Vishwakarma R, Singh N, Ghosh R. A study of 272 cases of endoscopic dacryocystorhinostomy. *Indian J Otolaryngol Head Neck Surg.* 2004;56:259-61. [PMC free article] [PubMed] [Google Scholar]
- Nichlani SS, Jagade MV, Ganeshan A. A comparative study between endoscopic and external approach dacryocystorhinostomy. *Bombay Hosp J.* 2010;52:189-96. [Google Scholar]
- Aslam S, Awan AH, Tayyab M. Endoscopic dacryocystorhinostomy: A Pakistani experience. *Pak J Ophthalmol.* 2010;26:2-6. [Google Scholar]
- Muscattello L, Giudice M, Spriano G, Tondini L. Endoscopic dacryocystorhinostomy: Personal experience. *Acta Otorhinolaryngol Ital.* 2005;25:209-13. [PMC free article] [PubMed] [Google Scholar]
- Hartikainen J, Antila J, Varpula M, Puukka P, Sepp H, Grénman R. Prospective randomized comparison of endonasal endoscopic dacryocystorhinostomy and external dacryocystorhinostomy. *Laryngoscope.* 1998;108:1861-6. [PubMed] [Google Scholar]
- Cokkeser Y, Evereklioglu C, Er H. Comparative external versus endoscopic dacryocystorhinostomy: Result in 115 patients (130 eyes) *Otolaryngol Head Neck Surg.* 2000;123:488-91. [PubMed] [Google Scholar]
- Smith W, Merkonidis C, Draper M, Yung M. Endoscopic dacryocystorhinostomy in warfarinized

- patients. Am J Otolaryngol. 2006;27:327-9. [PubMed] [Google Scholar]
25. Jin HR, Yeon JY, Choi MY. Endoscopic dacryocystorhinostomy: Creation of a large marsupialized lacrimal sac. J Korean Med Sci. 2006;21:719-23. [PMC free article] [PubMed] [Google Scholar]