Original Article

# Comparative Analysis of Laser Assisted Endoscopic and Conventional Endoscopic Dacryocystorhinostomy

Col SS Panwar, SM*, Maj P Lal (Retd)+, Col PS Sukhtankar#

**Abstract**

**Background: Dacryocystorhinostomy (DCR) is the standard surgical treatment for epiphora caused by obstructions distal to the common canaliculus. Endoscopic DCR (EDCR) and laser assisted DCR (LAEDCR) are becoming increasingly popular alternatives.**
**Method: 69 cases of EDCR were compared with 18 cases of LAEDCR. The success rates were noted at 01 week, 01, 03 and 06 months. The operating time required, incidence of adjuvant procedures, complications and post operative morbidity were recorded.**
**Results: At the end of 06 months, 100% and 95% success was achieved with LAEDCR and EDCR respectively. Operating time, complication rates and the incidence of adjuvant procedures required were lesser in the LAEDCR group.**
**Conclusion: In our study both the procedures have comparable success rates, though LAEDCR has an edge over EDCR in terms of decreased duration of surgery, decreased post operative morbidity and lesser complications.**

**MJAFI 2006; 62 : 228-230**

**Key Words : Epiphora; endoscopic dacryocystorhinostomy; laser assisted endoscopic dacryocystorhinostomy**

## Introduction

Dacryocystorhinostomy(DCR) is the surgical treatment of choice for epiphora resulting from obstructions distal to the common canaliculus. Both endonasal and external approaches have been described to perform DCR.

The use of lasers in treatment of nasolacrimal duct obstruction has come into vogue since 1990[1]. Various investigators used a variety of lasers including Carbondioxide, Potassium Titanyl Phosphate (KTP), Argon and Holmium Yttrium Aluminium Garnet (YAG) with good results.

In this report we made an attempt to compare our results of endonasal DCR (EDCR) using conventional instruments with laser assisted endoscopic DCR (LAEDCR).

### Material and Method

This analysis was conducted during the period from 1995 to 2003, when all patients underwent endoscopic DCR and Apr 2003 to 2004,when all patients underwent LAEDCR at the Army Hospital (Referral and Research), Delhi Cantt.

The inclusion criterion was, patients suffering with epiphora from nasolacrimal duct obstruction. Exclusion criteria were, proximal obstruction presaccally in the canaliculi, suspected malignancy of the lacrimal gland, unwillingness for the endoscopic surgery and patients not fit for anaesthesia.

All patients were evaluated to establish the aetiology. Sac syringing and probing of canaliculi was done to diagnose site of obstruction. Thorough clinical evaluation of the nose and paranasal sinuses was done to find out any apparent nasal and paranasal causes of obstruction. The patients with associated nasal pathology were planned for concomitant corrective surgery such as septoplasty, resection of the anterior end of the middle turbinate, clearance of the diseased agar nasi cells. CT scan was performed if there was suspicion of malignancy and in revision cases.

**Surgical technique:** The surgery was performed under local anaesthesia in all patients of both the groups. The nasal cavity was packed with 4% lignocaine with 1:30,000 adrenaline half an hour before the operation. 2% lignocaine with 1:80,000 adrenaline was injected above and below the medial canthal tendon as well as at the site of anterior lacrimal crest. With the help of 0 degree 4mm nasal endoscope the lateral wall of the nasal cavity in the region of the anterior end of the middle turbinate and uncinate process was injected.

The lacrimal puncta was dilated and probed to palpate the sac. The nasal cavity was visualised with a 0 degree nasal endoscope. The intranasal anatomical landmark of the lacrimal sac (i.e. just anteroinferior to the anterior attachment of the middle turbinate) was noted. In the EDCR group the nasal mucosa, lacrimal bone and the thicker frontal process of the maxillary bone in the lacrimal fossa were removed using electrocautery and burr and a curette. A bony opening of approximately 1cm x 0.5cm was created. The medial wall of the sac was tented using a lacrimal cannula inserted in the

*Senior Advisor and HOD, Dept of ENT, Army Hosp (R&R) Delhi Cantt, #Senior Advisor (ENT and Head & Neck Surgery), Army Hosp (R&R) Delhi Cantt, +Ex Graded Specialist (ENT) Army Hosp (R&R) Delhi Cantt.

Received : 19.01.2005; Accepted : 31.08.2005

lacrimal sac. An opening (5.5mm in size) was made in the sac in the posteroinferior aspect using a sickle knife.

In the LAEDCR group, KTP laser was delivered at a setting of 5 watts for mucosa and 10 watts for bone. The mucosa overlying the sac was vaporised. The bone over the lacrimal sac was first vaporised and then curetted out. The osseous opening was made 5mmx10mm in size.

In both the groups, mucosa was inspected, dacryoliths removed and biopsies performed on any suspicious lesion. Syringing the sac with dilute methylene blue solution checked the patency of the lacrimal sac. Stenting was not done as a routine. 1-0 prolene was passed through the superior canaliculus and taken out from the rhinostomy site in the revision cases and kept in place for 4 weeks by tying the two ends together.

Postoperatively all cases were given a broad spectrum oral antibiotic and topical antibiotic eye drops for a week. The time of surgery was noted from dilatation of the puncta to instillation of antibiotic eye drops.

All patients were discharged on the first postoperative day and reviewed at the end of first week, first, third and sixth month following surgery or in between if the patient became symptomatic. All were evaluated for any nasal complications, duration of oedema and discomfort. Success was defined as resolution of symptoms of epiphora and confirmation of patency by endoscopic examination.

## Results

LAEDCR group- There were 18 patients consisting of 13 females and 5 males. 50% of the patients were in the age group 40-60 years (N=9). None were <20years of age and only three patients were >60 years of age (17%). In 12 patients (66.6%) the obstruction was right sided. There were no patients with bilateral involvement. The mode of presentation was chronic dacryocystitis in 13 patients (72%), pyocoele in 2 cases (11%) and epiphora secondary to trauma in 3 patients (17%). The analysis is shown in Table 1.

Three failed cases were subjected to revision surgery by the same procedure and success achieved in all at the end of 6 months. Post operative abscess developed in one patient and two cases developed nasal synechia, a total of three complications.

There were 69 patients in EDCR group consisting of 43 female and 26 male patients. 16 patients were between 20-40 years, 38 between 40-60 years and remaining 15 were more than 60 years of age. Right side was involved in 45 patients and left side in 24 patients. 52 cases were due to chronic dacryocystitis, six post-traumatic, three due to medial maxillectomy and four each were due to total maxillectomy and pyocoele. Primary surgery was done in 63 patients and in remaining six patients it was a secondary procedure after failed external DCR. The analysis is shown in Table 1.

Revision EDCR was done for all the failures and at the end of 6 months, 66 had success. The remaining three patients having mild epiphora with a tiny rhinostomy were above 60 years and refused further surgery. Complications were noted

**Table 1**

**Comparative analysis of EDCR & LAEDCR groups**

| | EDCR | LAEDCR |
|---|---|---|
| Success | | |
| 01 week | 72% (n=50) | 100% (n=18) |
| 01 month | 85% (n=59) | 83% (n=15) |
| 03 months | 85% (n=59) | 83% (n=15) |
| 06 months (incl success achieved after revision surgeries) | 95% (n=66) | 100% (n=18) |
| Adjuvant procedures | 33% (n=23) | 11% (n=2) |
| Time taken (minutes) | 40-60 (mean=50) | 25-40 (mean=30) |
| Post operative problems | | |
| Mucosal oedema (at 01 week) | 25 patients | 02 patients |
| Duration of discomfort | 6-15 days | 4-6 days |
| Complications | 17 patients | 03 patients |

in 17 patients (25%), six had synechia, eight had crusting lasting for a week and remaining three patients had minimal post operative bleeding controlled with local pack and antibiotics.

Limited septoplasty was done in two (11.1%) patients of LAEDCR group and in 14 (20.2%) patients of EDCR group. Partial middle turbinectomy and partial ethmoidectomy were performed for five (7.2%) and four (5.7%) patients respectively in the EDCR group and none in the LAEDCR group. In the LAEDCR group only two patients who underwent septoplasty had mucosal oedema for a week. 25 patients of EDCR group had mucosal oedema at the end of first week and it subsided by the end of first month. Discomfort lasted for 4 to 6 days in the LAEDCR group and 6 to 15 days in the EDCR group of patients.

## Discussion

In recent years EDCR and LAEDCR are gaining popularity in the treatment of epiphora. Both the procedures have the advantage of avoiding a cutaneous scar and interference with the pump mechanism of the orbicularis oculi muscle. They provide direct access to the rhinostomy site thereby decreasing the duration of surgery and post operative morbidity. They permit a thorough visualisation of the intranasal anatomy and any abnormality can be corrected concomitantly. Both the procedures can be performed under local anaesthesia making it possible to perform the surgery in elderly and in medically unfit patients as a day care procedure.

Endonasal DCR's may lead to patency rates of 83-96% [4,5]. Mannor et al [6] reported a success rate of 80% with EDCR's done on normal or enlarged sacs and a 75-97% success rate was achieved by Hartikainen et al [7].

Metson et al reported a success rate of 86% after performing 40 LAEDCR's [8]. Boush et al reported 70-80% patency with argon lasers[9]. Reifler achieved a rate of 68-81% using KTP lasers[10]. Woog et al [11]

achieved a success of 82% at an average of 12 months. Sadiq et al [2] reported 70% patency in a study of 50 cases.

In our study the success achieved with both the procedures is comparable with previous studies (83% with LAEDCR and 85% with EDCR at the end of 03 months and 100% with LAEDCR and 95.6% with EDCR at the end of 6 months). However we admit that the two groups in our analysis were not proportionate.

The requirement of adjuvant procedures such as septoplasty, partial turbinectomy and ethmoidectomy was 33% in EDCR and 11% in LAEDCR. This is because in EDCR there is a greater need for space for the use of relatively bulky equipment like the drill. The decreased requirement for adjuvant procedures with lasers helped in cutting down the duration of surgery. The lasers offered excellent haemostasis in a highly vascular field further decreasing the duration of surgery.

Postoperatively the patients of LAEDCR group had a faster recovery. Mucosal oedema at 01 week was present in 11% cases in the LAEDCR group while it was present in 36% of the patients in EDCR group because lasers seal lymphatics producing less oedema and less adjuvant procedures are required to be done in LAEDCR group. The average duration of discomfort was also less (5 days) with lasers as compared to (10 days) the EDCR group.

Lasers have some distinct disadvantages in that it requires greater surgical expertise besides being a expensive modality of treatment.

In our analysis we found that the success achieved with both EDCR and LAEDCR was comparable. Besides the duration of surgery, the postoperative morbidity and the incidence of complications was also less with the use of lasers. However, a prospective randomised control trial comparing external DCR, EDCR and LAEDCR is required.

## Conflicts of Interest

None identified

## References

1. Massaro BM, Gonnering RS, Harris GJ. Endonasal laser DCR. A new approach to nasolacrimal duct obstruction. Arch Ophthalmol 1990; 108: 1172-6.
2. Mantynen J, Yoshitsugu M, Rauticunen M. Results of DCR in 96 patients: Acta Otolaryngol 1997; 529 : 187-9.
3. Patrick Watt, A Raghuram, Ranjit Nair, HUW Williams. Comparison of external DCR and 5 FU augmented endonasal laser DCR. Indian Journal Ophthalmol 2001; 49 : 169-72.
4. Mangal Singh, Vimal Jain, SC Gupta, SP Singh. Intranasal endoscopic DCR in cases of Dacryocystitis. Indian Journal of Otolaryngology and Head and Neck surgery 2004; 56 : 177-84.
5. Durvasula VSP, Gatland DJ. Endoscopic dacryocystorhinostomy: long term results and evolution of surgical technique. The Journal of Laryngology and Otology 2004; 118 : 628-32.
6. Mannor GE, Millman AL. The prognostic value of preoperative dacryocystography in endoscopic intranasal dacryocystorhinostomy: Am J Ophthalmol 1992; 113 : 134-7.
7. Hartikainen J, Antila J, Varpula M, Puukka P, Seppa H, Grenman R. Prospective randomised comparison of endonasal endoscopic dacryocystorhinostomy and external dacryocystorhinostomy. The Laryngoscope 1998; 108 : 1861-6.
8. Metson R, Woog JJ, Puliafito CA. Endoscopic laser DCR. Laryngoscope 1994; 104: 269-74.
9. Boush GA, Bradley N, Lemke BN, Dortzhach RK. Results of endonasal laser assisted DCR. Ophthalmology 1994; 101: 955-9.
10. Reifler DM. Results of endoscopic KTP laser assisted DCR. Ophthalmic Plast Reconstr Surg; 9: 231-6.
11. Woog JJ, Metson R, Puliaflito CA. Holmium YAG endonasal laser DCR. Am J Ophthalmol 1993; 116:1-10.
12. Sadiq SA, Hugkulstone CE, Jones NS, Downes RN. Endoscopic Holmium Yag laser DCR. Eye 1996; 10: 43-6.