

# Laser Transcanalicular Endonasal DCR

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## Abstract

Nasolacrimal duct obstruction is a common disorder which clinically manifests as epiphora. Many procedures have been described to bypass this obstruction, for example external dacryocystorhinostomy (DCR), endoscopic DCR with and without stents, Laser endoscopic DCR. Each of these procedures has its own success rates and complications. We did an analysis of all laser assisted endonasal DCR performed in our department from Feb 2006 to July 2009. In all we had operated 237 total cases out of which 203 were with normal endonasal DCR and 34 cases were Laser transcanalicular endonasal DCR (Laser DCR). Over all success rate was 92%(218 cases). In case of Laser assisted endonasal DCR the success rate was 70.3% (19 cases) with failure rate of 29.7% (8 cases) at three months follow-up. This preliminary study reveals that LASER DCR is associated with higher failure rates as compared to the normal endonasal DCR.

**Keywords:** Dacryocystorhinostomy, endonasal, laser, transcanalicular.

## INTRODUCTION

Epiphora occurs because of blockage in the lacrimal drainage system that results in impairment of normal tear channeling into the nose. Dacryocystorhinostomy (DCR) operation involves direct fistulization of the lacrimal sac into the nasal cavity. The operative approach to the sac may be external or endoscopic and endoscopic approach may be with or without laser. Endonasal DCR is now a well-known recognized procedure to treat cases of epiphora due to nasolacrimal duct blockage. It has definite advantages over conventional external DCR. These advantages are no external scar, one-stage procedure to simultaneously correct associated nasal pathology that may be contributory, avoids injury to the medial canthus, preserves the pumping mechanism of the orbicularis oculi muscle, perioperative time is shorter and success rate is comparable to the external approach. Also, active infection of the lacrimal system is not a contraindication to surgery and can be done as a revision surgery for failed external DCR cases. Introduction

of laser in the endonasal DCR has further helped ENT surgeons and also our ophthalmology colleagues to perform surgery in less invasive and simpler way.

## MATERIAL AND METHODS

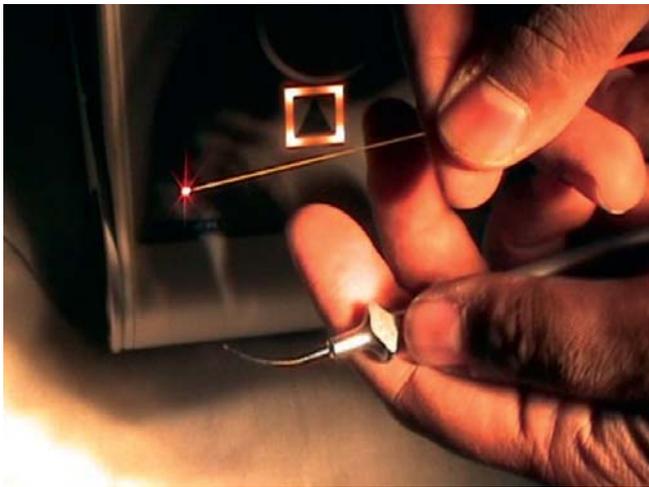
It is a retrospective study of all the cases of Laser assisted DCR operated in Department of ENT and Head and Neck surgery of Maulana Azad Medical College, New Delhi from Feb 2006 to July 2009. These surgeries were performed by consultants and senior residents of the unit. Follow-up was done on routine basis by asking the patients to come to ENT for regular syringing of the canaliculi. Only 27 cases came for long-term follow-up. Rest were lost to follow-up.

## DISCUSSION

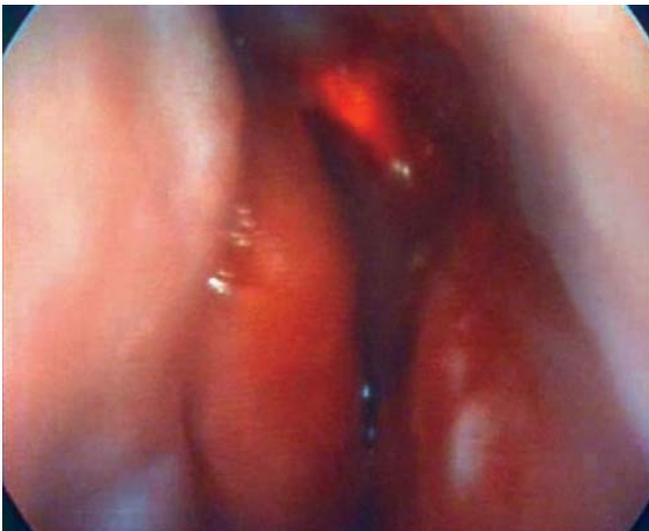
### Procedure (Laser DCR)

A good endonasal view with clear identification of landmarks is preferred. In case of any obstruction to the view for

example by deviated septum an endoscopic septoplasty can be done. The upper punctum is usually dilated with punctum dilator with gradually increasing sized probes to create a good passage. Then a laser cannula of size 2 mm is inserted from the punctum (Fig. 1). The Laser fiber which is 1mm in diameter is now inserted through the cannula and is maneuvered so that it is in contact with the medial wall of the lacrimal sac. At this point the aiming beam is switched on. This beam is then visualized through the endoscope in the nasal cavity (Fig. 2). It has to be ensured that the aiming beam is at the brightest and is not scattered. Switch off the light source so that the beam is better visualized. Scattered beam means the probe is still in the sac or is not touching the lacrimal bone. Light gets diffused as fiber tip distance is



**Figure 1:** Laser fiber with aiming beam on along with DCR cannula



**Figure 2:** Aiming beam visualized through the endoscope in the nasal cavity

increased from bone. Laser is fired only after confirmation in short pulses with equal gap intervals. One must adequately enlarge the hole by pulling back fiber and angulating the cannula. Osteotomy done in this way should be at least 8 to 10 mm and wide.

## RESULTS

- Thirty-four cases of Laser DCR were performed in the above mentioned period.
- Age group varied from 8 to 58 years.
- Only 27 cases were available for prolonged follow-up. The rest 7 cases could not be traced.
- Out of 27 cases in 19 cases had no problem and the rhinostomy site was patent on syringing.
- Success rate –70.3% (19 cases).
- Seven patients had blocked rhinostomy site; thus the failure rate 29.7% (8 cases).
- All the failure cases underwent revision DCR using Laser with lacrimal intubation using silicon stents in 4 cases.

Findings in failure cases:

1. Granulations at the rhinostomy site – 3 cases
2. Synechiae obstructing the rhinostomy site – 2 cases
3. Rhinostomy site not identifiable in – 3 cases

Metson<sup>1-3</sup> was one of the first to report a study on LASER DCR which included 40 patients with an 85% success rate. Sadiq<sup>4</sup> had a 70% success rate and Szubin<sup>5</sup> showed a 97% success rate. All of these studies used the Holmium-Yag laser. Again, there has only been one prospective randomized study comparing laser and external DCR(Hartikainen).<sup>6,7</sup> They studied 64 patients, and had a 95% success rate with the external approach at one year and 63% success rate with the laser. This was a statistically significant difference. One notable thing is that the duration of the surgery was 23 minutes for the laser procedure vs 78 minutes for the external approach, so the laser approach did have the advantage of saving time.

While reviewing the literature on the use of the laser to perform endoscopic DCR we found that Massaro<sup>8</sup> was the first use an argon laser and had mediocre results. However, recently the Holmium-Yag laser has become very popular. Its advantages are fiberoptic delivery, effective bone ablation, soft tissue coagulation and shallow depth of penetration, which makes it safer. A light pipe is placed through the puncta. The pipe goes through the canaliculus, into the nasolacrimal sac and thus helps in localizing can localize the lacrimal fossa. Endoscopically, you can place the scope and then fire the Laser thus removing the soft tissue and the bone overlying the region of the lacrimal fossa.

Now we can deliver the Laser transcanalicularly though one mm fiber cannulated through the one of the puncta. In our study of laser DCR the success rate was 70.3% (19 cases) with failure rate of 29.7% (8 cases) at three month follow-up. This preliminary study reveals that Laser-assisted endonasal DCR is associated with higher recurrence rate than the normal endoscopic DCR. The follow-up endoscopy suggested that the failure of the Laser assisted endonasal DCR was because of occlusion of rhinostomy site by fibrous tissue/granulations, small opening/inadequate bone removal and formation of synechiae (Fig. 3). This was attributed to smaller opening made with laser fiber, inadequate bony opening, formation of multiple openings in attempt to enlarge the rhinostomy, failure to identify correct rhinostomy site, i.e. instead of making opening in lacrimal bone, the opening is made in frontal process of maxilla which is a much thicker bone and has more chances of closure.



**Figure 3:** Failed case of Laser DCR showing granulations at the rhinostomy site

## CONCLUSION

In our study Laser DCR was associated with higher failure rates than the routine endonasal DCR because of smaller opening made with laser fiber, formation of multiple openings in attempt to enlarge the rhinostomy, failure to identify correct rhinostomy site( inadvertently making an opening in frontal process of maxilla instead of lacrimal bone). In cases of the recurrence, the findings were— occlusion of rhinostomy site because of fibrous tissue/ granulations, small opening/inadequate bone removal, formation of synechiae and incomplete sac opening. There is need for a larger prospective study to confirm the above findings.

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