

USE OF ENDOLIGHT FOR LOCALIZATION OF LACRIMAL SAC IN ENDONASAL ENDOSCOPIC DACRYOCYSTORHINOSTOMY

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ABSTRACT

Objective: To evaluate success of vitrectomy endolight for the localization of lacrimal sac in endonasal endoscopic dacryocystorhinostomy performed for the treatment of nasolacrimal duct obstruction.

Study Design: Prospective observational study.

Place and Duration of Study: Study done in department of Ophthalmology and Otorhinolaryngology, Ziauddin University Hospital Kemari and Dr. Ruth K. M. Pfau Civil Hospital Karachi, from Jan 2011 to Jan 2019.

Methodology: Patients with obstruction of nasolacrimal duct causing epiphora and recurrent swelling at medial canthus due to dacryocystitis were included. Written consents were taken. Stryker endolight system was used to perform endoscopic endonasal dacryocystorhinostomy surgery. Surgical success in terms of percentages was calculated.

Results: Endonasal endoscopic dacryocystorhinostomy was performed in 100 patients, mean age was 35.5 ± 10.5 years. Ninety-Five out of 100 patients had a successful result and got relief from epiphora. Five patients had procedure failure in the form of persistent epiphora. So success rate was 95%.

Conclusion: Use of vitrectomy endolight greatly helped in the localization of lacrimal sac in endoscopic dacryocystorhinostomy. It routine use should be encouraged during these procedures.

Keywords: Dacryocystitis, Dacryocystorhinostomy, Endoscopy, Epiphora.

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INTRODUCTION

Dacryocystorhinostomy is a surgical procedure to treat nasolacrimal duct obstruction, it creates a fistula between the lacrimal sac and nasal cavity. It can be performed conventionally from the external route which is performed by ophthalmologists or endoscopically via an intranasal route also called Endoscopic endonasal dacryocystorhinostomy (EEDCR). Toti *et al* first described external dacryocystorhinostomy; it was considered the gold standard for nasolacrimal duct obstruction¹. Caldwell first did transnasal DCR with some success but due to poor visibility of nasal cavity, this procedure did not get popularity². With the advent of high resolution fiberoptic and rigid nasal endoscopy, the endonasal procedure got popularized and Ophthalmologist and Otolaryngologist with their combined efforts

started endoscopic endonasal dacryocystorhinostomy³. Now paradigm has been shifted towards the EEDCR. Use of new techniques like endolight and Mitomycin C made the procedure more successful⁴.

Anatomical variations of the nasal structures and their relation to lacrimal sac make it difficult to localize the exact position of lacrimal sac on the lateral nasal wall from the nasal cavity⁵. Repeated manipulation of instruments for the localization of lacrimal sac causes trauma to the adjacent structures which leads to fibrosis and compromises the surgical outcome. Endolight brought improvement to this procedure and the surgery is directly started at the point of bright spot produced by transillumination of endolight through lacrimal sac on the lateral nasal wall⁶. Initially, endoscopic DCR was performed by using traditional instruments. Use of lasers, power drill, endolight, Mitomycin C to prevent postoperative fibrosis makes this procedure a highly specialized technique⁷⁻⁹.

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METHODOLOGY

This was a prospective study of endonasal endoscopic dacryocystorhinostomy procedure jointly performed by a same ophthalmologist and Otolaryngologist at Ziauddin University Hospital Keamari and data collection was done at both Ziauddin University Hospital and department of Otorhinolaryngology - Head and Neck Surgery, Dr Ruth K.M. Pfau Civil Hospital Karachi of patients suffering from epiphora and dacryocystitis secondary to nasolacrimal duct obstruction from January 2011 to January 2019.

Approval from ethical committee was acquired. Sample size was based on study done by Pakistani researchers Aslam *et al*¹⁰. Sampling technique observed was convenience sampling. The inclusion criteria were obstruction of nasolacrimal duct causing epiphora and the recurrent swelling at medial canthus due to dacryocystitis. The exclusion criteria were absence or obstruction of both upper and lower punctum and obstruction of both upper and lower canaliculus. All the participants gave written consent.

All surgeries were performed by the same Ophthalmologist and Otolaryngologist. Septoplasty was performed in patients with DNS causing narrowing of the nasal cavity on side of surgery before starting dacryocystorhinostomy to create enough space to accommodate the instruments for surgery. After dilatation of both upper and lower punctum, endolight passed through lower canaliculus into the lacrimal sac. After removing the nasal packing bright spot produced by transillumination of lacrimal sac on the lateral wall of the nose was localized with an endoscope. Hopkins Karl Storz zero degree rigid nasal endoscope attached to video camera Stryker endolight system was used to perform endoscopic endonasal dacryocystorhinostomy surgery. Nasal mucosa about the size of 1x1 cm overlying the exact location of the transillumination produced by endolight marked with two parallel vertical incisions by 3.2mm phaco knife. The nasal mucosa and periosteum overlying this area were elevated with periosteum elevator. Kerrisonrongeur was

used to remove bone forming the lacrimal crest, the opening is then enlarged to the size of 1x1 cm using the same Kerrisonrongeur or power drill. The medial wall of the lacrimal sac is then tented with the tip of endolight and a full-thickness vertical incision is made by using 3.2mm phaco knife, endolight will come out of the opening into the lacrimal sac into the nasal cavity. While enlarging the bone opening it was extended inferiorly up to the upper part of the nasolacrimal duct to prevent sump syndrome. Nasal mucosa was removed up to the margins of bony ostium and opening in the medial wall of the lacrimal sac also enlarged up to the margins of the ostium. The nasal wound was packed with a small piece of gel foam to prevent bleeding and light nasal packing was applied for 24 hours.

Oral systemic antibiotic and analgesic were given for 05 days after surgery, Moxifloxacin eye drops used topically for four weeks. Nasal packing was removed on the next day and the patient was discharged. Nasal decongestant and normal saline drop used to soften crest formed at the ostium. Regular follow up was performed one week after surgery than on week 2, week 4, 3 months and 6 months. On postoperative follow up the patient was asked for resolution of symptoms, Jones dye test, irrigation of lacrimal passage and examination of the nasal cavity was performed by using flexible Carl Storz endoscope to ensure patency of ostium. Any debris in the ostium was removed if necessary.

All data was recorded and tabulated in SPSS software, presented and compared in terms of frequency and percentages.

RESULTS

There were 100 participants with 32 males and 68 females (table-I). Mean age was 35.52 years (table-II). Youngest participant in our study was 6 years old. Out of these one hundred patients, 89 were for primary endonasal dacryocystorhinostomy and 11 were for revision surgery following failed external dacryocystorhinostomy performed in other centers. Most common complaint was epiphora which was present in all

patients, followed by purulent discharge on regurgitation in 68% of patients (table-III).

Septoplasty was performed in 15 patients to produce enough space for inserting endoscope and other surgical instruments.

At every follow-up, the patient was enquired about the resolution of symptoms. Follow up was performed at one week after surgery, 2nd week, 4th week, 3 months, 6 months and 1 year. Ninety-five patients had a successful outcome in term of

Table-I: Gender distribution of the patients.

Gender	No. of Patients	Percentage
Male	32	32
Female	68	68

Table-II: Age distribution of the patients.

Range	6-65 years
Mean	35.5 ± 10.5 years

Table-III: Clinical presentation of study population.

Symptoms	No. of Patients	Percentage
Epiphora	100	100
Purulent discharge on regurgitation	83	83
Dacryocystitis	15	15

Table-IV: Success rate of procedure performed.

Outcome	No. of Patients	Percentage
Successful outcome	95	95
Unsuccessful outcome	5	5

resolution of symptoms of epiphora and dacryocystitis (recurrent swelling at medial canthus) (table-IV). Five patients persistently complained of epiphora, out of these 3 had ostium closure secondary to fibrosis and 2 had granuloma formation.

Average duration of surgery was 30 minutes after intubation.

DISCUSSION

Endoscopic endonasal dacryocystorhinostomy is now performed as the standard treatment for nasolacrimal duct obstruction and dacryocystitis secondary to nasolacrimal duct obstruction¹¹. This procedure can also be performed in patients suffering from acute dacryocystitis,

which is a contraindication for external DCR until the infection subsides¹².

Anatomic variations can result in chronic sinusitis and nasal pathologies like DNS causing difficulty in endonasal surgery so can be dealt in a single stage surgery in case of endoscopic DCR but not in external DCR^{13,14}. In this study we also performed septoplasty for DNS, followed by DCR to create enough space for introduction of endo-scope and other surgical instruments in a single stage surgery.

We found more tendency of female patients (68%) to have this disease. This finding is consistent with other studies performed by Kumari B and PY Su who found (60%) and (78%) females predilection indicating this is largely an issue of females^{15,16}.

In this study we found endoscopic technique more successful in term of results i.e. relief of symptoms and post-operative complications. Jain *et al* and many others authors have shown success rate in both procedures (90%) or above, but external approach is associated with scar, trauma to medial canthus and greater postoperative pain which makes this an unfavourable approach¹⁷.

Although some authors do not consider the beneficial role of endolight in routine and some authors used it in revision surgery¹⁸. Razavi *et al* described use of endolight as credible option to locate lacrimal sac and mentioned added advantage that if endoscopic equipments are not available still procedure could be done transnasally¹⁹. Kartowitz *et al* described the use of endolight in pediatric cases to localize the lacrimal sac²⁰. We found endolight as a tremendous tool to locate the lacrimal sac on the lateral wall of the nose. We prefer to remove the mucosa of the medial wall of the lacrimal sac to marsupialize in the nasal cavity with the satisfactory outcome. Kingdom *et al* study validates the procedure we adopted²¹.

For a successful DCR surgery the key lies in making a wide ostium and an opening in lacrimal sac in front of the common canaliculus. This can

be achieved by accurate localization by use of an endolight.

Size of the osteotomy decreases due to tissue growth and fibrosis. Inadequate removal of bone and lateral wall of the sac may lead to failure. To prevent the fibrosis Diode laser is also used by some authors to create ostium²². Removal of bone with bone drill produces a large opening and the hard bone can easily be removed with a bone drill, we also used a drill to create ostium, we had five failures, in 3 ostium closure seen secondary to fibrosis and in 2 granuloma formation was the cause of failure.

Many adjunctive procedures like the use of stent and post-operative application of Mitomycin at the margins of the wound are supposed to prevent ostium closure. Use of stent may lead to the formation of granuloma and post-operative infection, Longari study also favoured this concept. So we did not use stent in our study but still had 2 failures due to granuloma formation.

Non-traumatic surgery and good post-operative care in the first 2-3 weeks of surgery leads to early rehabilitation and increases the success rate of surgical outcome.

CONCLUSION

Endolight greatly helps in identifying minor variations in the location of the lacrimal sac, makes the procedure less traumatic. Higher success rates are achieved in procedure. Its use should be encouraged specially in revision surgeries.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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