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## **A clinical study on the success rate of endoscopic dacryocystorhinostomy**

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**Abstract**--Background: Endoscopic dacryocystorhinostomy (DCR) has advantages like excellent homeostasis, absence of scar, less post operative pain and edema. However, less literature is available on success rate. Aim and objectives: To evaluate the success rate of endoscopic DCR. After 3 months DCR success rate was estimated based on relief perceived by the patient, free flow of saline on syringing through the lower canaliculus and presence of patent stoma visualized on rigid endoscopy. Materials and methods: 25 Epiphora patients underwent anterior rhinoscopy, nasal endoscopy, syringing, CT scan and DCR. They were evaluated for the relief of symptoms at 2 week and 3 month respectively. Results: Mostly 76% females with mean age (females:54.4/Males:59) were present. Symptoms: watering of eyes (100%), swelling (92%) and mucopurulent discharge (68%). Disease on the right side- 40% and left side -56% only 4% were with bilateral disease. On follow up after 3months 96% patients reported symptomatic relief of complaints and 4% had granulations at the neoostium and synechia between nasal and lacrimal mucosa which

were removed and subsequent relief of symptoms and free flow of saline on syringing were seen. Conclusion: Endoscopic DCR is a safe, minimally invasive, surgical procedure with 96% functional success rate.

**Keywords**---dacryocystorhinostomy, epiphora, mucopurulent discharge, nasal endoscopy, syringing.

## Introduction

Epiphora (excessive tearing) is a common complaint, more common with increasing age and shows a female preponderance. External approach dacryocystorhinostomy was the surgical treatment of choice but in recent times intranasal dacryocystorhinostomy is often done as it avoids an external scar and postoperative facial swelling. [1] The success rate of Endoscopic approach dacryocystorhinostomy was increased from 85% (from the year 1904) to 95% (till now) by addition of suturing of the nasal and lacrimal mucosal flaps in order to form an epithelium-lined fistula. This success rate was influenced by duration of intubation, pre-existing sinus abnormalities and previous nasal surgeries. [2-9]The overall success rate of intranasal approach of dacryocystorhinostomy was increased from 60% (from the year 1983) to 90% (till now) by the advancement of technology and introduction of nasal endoscope. Exclusive success rate of endoscopic DCR are reported to range 82% to 98%. There is lot of gaps in the existing literature to understand the success rate and beneficial clinical outcomes of endoscopic DCR over external dacryocystorhinostomy. [10-15]. With this evidence of gap, the current study was designed with an aim know the success rate of endoscopic dacryocystorhinostomy based on the duration of surgery and time required to patient to get relief from postsurgical symptoms.

## Methodology

A prospective observational study was conducted in Department of ENT, Care Hospital, Banjara Hills, Hyderabad. Patients who attended to the ENT OPD with watering of eye were studied. Syringing was done to confirm the site of obstruction. Patients with distal obstruction were included in the study. During 12 months of data collection 25 patients who are qualifying inclusion criteria were taken into this study. Informed consent was obtained.

Inclusion criteria: Patients coming to ENT OPD with watering of eyes in whom syringing will be done. 1. Distal obstruction of nasolacrimal drainage system. 2. Age >15yrs.

Exclusion criteria: 1. Hypersecretion from ocular surface disease 2. Epiphora from lid laxity or malposition 3. Facial nerve weakness 4. Canalicular or punctal stenosis 5. Trauma 6. Tumour or clinical suspicion of tumour 7. Granulomatous disease. 8. Age less than 15years.

## **Study Procedure**

Patients were examined at Out-Patient Department of Otorhinolaryngology, Care Hospitals Banjara Hills. Examination included anterior and posterior rhinoscopy, diagnostic nasal endoscopy, syringing and computed tomography of the paranasal sinuses to rule out any nasal pathology producing nasolacrimal duct obstruction, to assess any deviation of septum obstructing the view of lacrimal sac area and any associated chronic sinusitis / nasal polyps / tumours. Patients who fulfilled the inclusion criteria were selected for the study. All patients will be included following informed consent. A detailed history and clinical examination will be done. A standard preoperative assessment sheet, and post-operative proforma shall be used. All the patients underwent primary endoscopic dacryocystorhinostomy and were evaluated clinically and endoscopically for the subjective and objective relief of symptoms at 2 weeks and 3 months respectively.

## **Operative technique**

At our institution endonasal dacryocystorhinostomy is performed under both local and general anesthesia: Nasal cavity is shriveled with mixture of 4% Xylocaine 30 ml and 1:1000 adrenaline 0.5 cc. With premedication of 1 cc fortwin and 2 cc Phenergan Local infiltration of 1% Xylocaine with 1:200000 epinephrine is given over (a) Lacrimal sac area using 5cc syringe with 26 G needle. (b) Lower edge of the anterior lacrimal crest just above attachment of inferior turbinate. (c) Anterior border, superior and inferior attachments of uncinata.

## **General anaesthesia**

Using Thiopentone, IV induction was done followed by succinylcholine. Orotracheal intubation done with throat pack and anaesthesia maintained with volatile agent halothane or isoflourane Nasal packing is done with 4%xylocaine 30ml and 1:1000 adrenaline 0.5cc. Local infiltration given with 1%xylocaine with 1:200000 epinephrine. Procedure Under the above anesthesia with patient in supine position with head end elevated 10°, local infiltration given and nose packed with mixture of 4% xylocaine and adrenaline. 0° and 30° 4mm Hopkins rod endoscopes are used. The incision is made in the mucosa overlying the anterior lacrimal crest, which is identified as a white vertical ridge of bone immediately anterior to the middle turbinate. A posteriorly based mucoperichondrial flap is elevated. Anterior lacrimal crest and lacrimal bone is removed using a punch exposing the lacrimal sac, which is dark red in colour and firmer than nasal mucosa. The sac is divided with a cruciate incision. It is then confirmed by syringing by free flow of saline. These flaps of the lacrimal sac mucosa are then placed in continuity with mucosa of the nasal wall. Nasal packing is done if required and removed after 24hrs. Office cleaning done after 1 week, fortnightly for two months and monthly for next 3 months

## **Observations**

Patients fulfilling the inclusion criteria and who have undergone Endoscopic Dacryocystorhinostomy are observed for symptomatic relief of complaints. Free flow of saline when syringing is done through the lower canaliculus. Presence of

patent stoma seen in rigid nasoendoscopy. Patients are followed up at 2 weeks and 3 months. Patient satisfaction was assessed by feedback form

### **Statistical methods**

Descriptive statistical analysis was done. Results on continuous measurements are presented as mean, ratio, tables and various representative charts. Results on categorical measurements are presented as percentages.

### **Results**

In our study which was prospective consisted of 25 patients with chronic dacryocystitis treated with endonasal endoscopic dacryocystorhinostomy. Patients were followed upto 3 months.

### **Demographics**

Six patients were males and nineteen were females. The patients' ages ranged from 40 to 70 years with a mean age of 59 years in males and 54.4 years in females. Ten involved the right side and fourteen involved the left side and bilateral involvement in one case. The patients' ages ranged from 40 to 70 years with a mean age of 55.5 years. 6 patients were males and 19 were females. In 14 cases left side was involved and in 10 patients right side was involved and bilateral involvement in one case. The operative time ranged from 45 min to 60 min with an average of 50 min.

### **Study outcome**

Disease is common in middle age. Most common in 46-60 years of age group. 2) Females are affected more than males. In the present study 76% affected were females and 24% who were affected were males. 3) Commonest presenting symptom is Epiphora which was present in all patients (100%). 4) Commonest sign of disease is regurgitation of purulent material on compression of sac which was present in 68% of patients. 5) Correction of septal deviation for facilitating better visualization and hence improving the results of the surgery. In our study 40% of patients underwent septal correction along with endoscopic DCR. Treating the concurrent nasal disease appropriately prior to the lacrimal surgery improves the outcome. 6) In our study one patient had bilateral disease and underwent endoscopic dacryocystorhinostomy on left side. 7) Common postoperative problems were granulation and synechiae at the neo ostium which was present in one patient. 8) 96% (24 patients) had complete relief of symptoms and free flow of saline on syringing

### **Discussion**

Total 25 patients, Female-19 (76%) and 6-male (24%) with chronic dacryocystitis treated with endonasal endoscopic dacryocystorhinostomy. Patients were followed up to 3 month. Ten involved the right side and fourteen involved the left side and bilateral involvement in one case. Idiopathic obstruction becomes more common with increasing age and shows female preponderance. [16] The incidence of

nasolacrimal obstruction is estimated to involve approximately 10% at 40 years increasing to 35-40% at 90 years of age. Out of twenty five patients, nineteen were females. Nasolacrimal duct obstruction was more common in females than in males. (Table-1)

All the patients presented with watering of eyes. Epiphora is the commonest symptom. Twenty three patients among them had swelling below the medial canthus of eye. On compressing the lacrimal sac over the bone seventeen patients had mucopurulent discharge, and eight had watery discharge. (Table-2) Patient with long history of epiphora had purulent discharge and with less duration of disease had non purulent, watery discharge. Consistency and nature of discharge correlates well with the duration of the disease. Along with epiphora six patients came with pain over the lacrimal sac region and one patient presented with fever. Two patients had associated nasal obstruction because of deviated nasal septum in which septoplasty was done along with endoscopic dacryocystorhinostomy. (Table 3)

Among twenty five patients ten had septal deviation towards the side of chronic dacryocystitis and underwent septal correction along with endoscopic DCR. For all the ten patients who had undergone septoplasty along with endonasal DCR, nasal packing was done with ointment soaked ribbon gauge, which was removed on 1st postoperative day. Septal deviation per se is not responsible for chronic dacryocystitis. Septal deviations which are anterior and obscuring the lacrimal sac are dealt surgically to improve space between the septum and lacrimal sac area which is helpful in elevating the flap, avoiding preoperative mucosal injury and adhesion, post operative suction clearance and maintainance of patency of nasal cavity and neo ostium.

In the present study 40% of patients underwent septal correction before DCR to improve the success rate of the surgery. Karpishchenko SA et al [19] also reported that 8.2% patients required a septoplasty along with simultaneous dacryocystorhinostomy. Tsirbas et al [17] also reported 46% of the patient underwent septal correction for the better results of the surgery. So even though the septal deviation do not produce any nasal symptoms septal correction is done to make the nasal cavity roomy which helps in good flap elevation and making good ostium and also less postoperative adhesions and failure of surgery. Two patients had acute sinusitis as evidenced by clinical signs and diagnostic nasal endoscopy.

All the patients had maximal medical therapy for three weeks and then underwent endoscopic dacryocystorhinostomy. One patient presented with acute dacryocystitis with fever, pain and swelling and was treated medically before surgery. Among twenty five patients ten had Endo- DCR on right side; fifteen had surgery on the left side. One patient with bilateral chronic dacryocystitis wished to have surgery on left side. Seventeen patients had very thick frontal process of maxilla and the same removed using the Kerrison's punch. In eight patients it was thin and relatively easy to remove. KN Jha et al [21] also reported an difficulty in dealing with thick bone especially in young population undergoing endoscopic DCR. We felt that in our technique removal of bone was difficult and time consuming with punches whereas powered instruments as mentioned in

literature would have made bone removal easier and less time consuming. In this study the operative time ranged from 45 min to 60 min with an average of 50 min. (Table 4)

Results were evaluated at the end of 2 weeks and 3 months by means of symptomatic relief of symptoms, free flow of saline when syringing was done through lower canaliculus and by the presence of patent stoma. After 2 weeks of time, symptomatic relief of complaints was seen in twenty five patients. Free flow of saline when syringing is done through lower canaliculus was seen in twenty five patients and patent ostium was seen in twenty five patients. (Table 5) After 3 months of time, symptomatic relief of symptoms was seen in twenty four patients. Free flow of saline when syringing was done through lower canaliculus was seen in twenty four patients. Patent ostium was seen in twenty four patients. (Table 6)

After 3 months on nasal endoscopy granulation was seen at the mouth of the neo ostium and synechiae between lacrimal and nasal mucosa in one patient. The same was removed endoscopically and regular postoperative syringing through the lower canaliculus every week was done along with nasal douching. In this study we estimated 96% of participants were successfully improved from their symptoms within 3 weeks after surgery (Table 7,8) with 100% patient satisfaction on patient's feedback.

Erfanian Salim R [18] reported a success rate of 97.7% with regard to anatomical patency in endoscopic dacryocystorhinostomy. These investigators performed bicanalicular silicone tube insertion after creating a neo ostium which was removed after 8-10 weeks. Ostial fibrosis was reported as the cause of failure. This major shift in the success rate is due to the reorientation of the anatomy. Initially it was perceived that lacrimal sac was lying anterior and inferior to the root of attachment of the middle turbinate. However according to Lindberg et al, [22] Millman et al [23], the sac is lying lateral to the axilla of the middle turbinate superiorly and antero inferior part lies under the frontal process of the maxilla. This requires a wider margin of the flap superiorly hence this changed the technique of exposing the medial wall of the lacrimal sac all the way up to the axilla of the middle turbinate and marsupialization of entire sac is possible with less post operative synechiae and blockage of common canaliculus.

## **Conclusion**

We concluded that appropriate selection of patients for endoscopic DCR, careful evaluation of patients, detection and management of any intranasal pathology before endoscopic DCR improved the success rate of endoscopic DCR.

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Table: 1 Mean age and Gender distribution of participant's in different studies

Sl.no.	Author	Study year	Mean Age (yrs)	Males (%)	Female (%)
1	Tsirbas et al [17]	2003	59	35	65
2	Erfanian salim R etal [18]	2015	50.6	38.3	61.7
3	Karpischenko et al [19]	2018	58	7.5	92.5
4	Yung et al [20]	2002	67	32	68
5	Present study	2018	55.5	24	76

Table 2: Type of discharge

Type	Number	Percentage
Mucopurulent	17	68
Watery	8	32

Table 3: Distribution of symptomatology

Sl.no.	Symptoms	Number	Percentage
1.	Epiphora	25	100
2.	Swelling	23	92
3.	Mucopurulent discharge	17	68
4.	Nasal obstruction	2	8
5.	Pain	6	24
6.	Fever	1	4

Table 4: Duration of surgery

Duration in minutes	Number of patients
0-45	8
45-60	11
>60	6

Table 5: Review of patients at the end of 2<sup>nd</sup> week

At 2 weeks	Number
Symptomatic relief of symptoms	25
Free flow of saline when syringing is done through lower canaliculus	25
Presence of patent stoma	25

Table 6: Review of patients at the end of 2<sup>nd</sup> week

At 3 months	Number
Symptomatic relief of symptoms	24
Free flow of saline when syringing is done through lower	24

canaliculus	
Presence of patent stoma	24

Table 7: Total success rate of this study

Outcome	Number	Percentage
Improved	24	96
Restenosed	1	4

Table 8: Comparison of results with previous studies

Sl.No.	Study	Success Rate (%)	Failure Rate (%)	Cause of failure
1	Tsirbas et al <sup>[17]</sup>	95	5	Preopcanalicular obstruction
2	Erfanian salim r et Al <sup>[18]</sup>	97.7	2.3	Osteal fibrosis
3	Karpischenko et al <sup>[19]</sup>	93	7	Canalicular obstruction
4	Yung et al <sup>[20]</sup>	93	7	Canalicular obstruction
5	Present study	96	4	Granulations at neo osteum

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