

## A STUDY OF ENDOSCOPIC ENDONASAL DCR WITH SILICONE STENTING

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### ABSTRACT

#### BACKGROUND

Watering of eyes is a troublesome symptom and dacryocystitis is the commonest pathological cause for epiphora. It is treated with dacryocystorhinostomy. It is a common problem. Failure is seen with endonasal DCR. Untreated dacryocystitis never undergoes spontaneous resolution. The procedure of choice is dacryocystorhinostomy.

The aim of the study is to evaluate the surgical outcomes of endoscopic endonasal dacryocystorhinostomy (DCR) technique with and without the use of silicone stent intra operatively.

#### MATERIALS AND METHODS

The study group consists of 40 patients of both sexes and above 20 years of age having symptoms and signs of nasolacrimal duct blockage. Patients with intraorbital tumours were excluded. After history and clinical examination patients were subjected to DNE to identify nasal pathology after investigations subjected to endonasal DCR with stenting to group A and DCR without stenting to group B.

#### RESULTS

Male to female ratio was 1/5.6 with 60% having on left and 40% on the right. 825 patients had mucopurulent discharge, 5% had clear fluid. Out of 20 postop cases with stent, only 1 case was a failure which was due to granulation tissue formation around the stent. 5 cases failed out of 20 postop cases without stent.

#### CONCLUSION

Endoscopic Endonasal DCR with stent is a safe and minimally invasive procedure as it is a direct approach to sac and no other structure needs to be dissected.

#### KEYWORDS

Endoscopic Endonasal DCR, Silicone Stent, Epiphora.

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#### BACKGROUND

Epiphora is a common annoying symptom. A watery eye is a common complaint among ophthalmic patients. Among patients attending eye clinics, between 3-4% complain of excessive tears.<sup>1</sup> It is in contradiction to lacrimation which occurs due to excessive tear production.

Inflation of the lacrimal sac is known as Dacryocystitis (CDC) is the common form of dacryocystitis which arise from nasolacrimal duct occlusion.<sup>2</sup> The occlusion may be caused by congenital abnormality, chronic sinus disease, naso-orbital trauma, involutonal stenosis. Involutonal stenosis is the cause of nasolacrimal duct obstruction, affecting the women twice as frequently as men although the inciting event in this process is unknown.<sup>3</sup>

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Untreated chronic Dacryocystitis never undergoes spontaneous resolution.<sup>4</sup> The procedure of choice in the management of chronic dacryocystitis is dacryocystorhinostomy (DCR). Dacryocystorhinostomy is the standard treatment for nasolacrimal duct obstruction.<sup>5</sup>

Since the first description of the external DCR by Adeo Toti in 1904, and the endoscopic DCR by WEST in 1910, the Dacryocystorhinostomy has progressed from an exclusively Ophthalmologist's to one being performed by a large number of practicing otolaryngologist today.<sup>6,7</sup>

#### Aim

To study the Surgical Outcomes of Endoscopic endonasal Dacryocystorhinostomy (DCR) technique with and without the use of silicone stent intra operatively.

This was a case control study to compare the results of ENDODCR with stent and without stent. The study was conducted in the Department of Otorhinolaryngology, Government ENT Hospital, Osmania Medical College, Hyderabad from August 2015 to October 2017.

The study group consisted of 40 Patients of both sex and above 20 years of age with having symptoms and signs

suggestive or nasolacrimal duct blockage. All the cases and controls were randomly selected and included as the study groups. For each case one control was selected by matching the age, sex, symptoms and signs of nasolacrimal duct blockage.

### Inclusion Criteria

All the New and revision cases of chronic dacryocystitis coming to outpatient department of Government ENT Hospital, Kothi who were healthy and no immune compromised.

### Exclusion Criteria

Patients with any intraorbital (Or) Sino nasal tumours.

## MATERIALS AND METHODS

40 Patients of either sex complaining of epiphora, discharge from the eye, welling in the medial canthus of the eye and obstruction to the flow of water on syringing were taken for evaluation. All the cases fulfilling the inclusion and exclusion criteria were selected for the study. Patients symptomatic for recurrent painful swellings at the medial canthus and epiphora were subjected to an elaborate history taking and thorough clinical examination.

In the history, attention was paid to determining whether the watering of the eye was due to excess tear production (lacrimation) or due to obstructed outflow (epiphora). The history of recurrent episode of painful swelling near the medial canthus of the eye, Previous History of mid facial fractures and nasal surgeries was sought.

Clinical examination included a complete ENT examination with special emphasis on anterior and posterior rhinoscopy to identify any focus of infection, allergic, rhino sinusitis, nasal mass lesions and synechiae. Particular attention was paid to visualize the nasal fossa areas where earlier neo-ostium was crated: whether it was covered with membrane or granulation tissue or thick scar. All patients were subjected to a detailed ophthalmic evaluation to determine any ophthalmic causes of epiphora.

The Patients were subjected to DNE to identify any nasal pathology. A CT Scan of the nose and para nasal sinuses was done in necessary cases. Ophthalmic investigations were included syringing of the lacrimal system, to demonstrate the presence of block in the lacrimal drainage system. All patients underwent routine haematological investigations preoperatively. The patients were started on prophylactic antibiotics.

The operative notes of 40 patients who had undergone Endonasal DCR from August 2015 to October 2017 were retrieved from the record room and scrutinized out of which 20 patients were selected for both Endonasal DCR with Stent and without stent.

Evaluation was done for results of syringing preoperatively, associated infection in the nose and PNS, uncorrected deviated nasal septum, associated comorbidity like diabetes mellitus and recently treated tuberculosis, were looked for.

We have divided 40 Patients into two groups, detailed discussion with patient was done and the Patients were

randomly divided into two groups A and B. The procedure of Endonasal DCR with stenting was done in Group A. Endonasal DCR without stenting was done in the Group B.

### Consent

A detailed description of the procedure was given to the patients. Almost all the patients were operated under local anaesthesia and all the patients were followed to a period of 6 months for complication and recurrences.

### Operative Procedure

The nasal cavity is packed with 4% Xylocaine with 1:100,000 Epinephrine half an hour before the start of the procedure. With the help of 4mm nasal endoscope the area of nasal mucosa anterior to the middle turbinate, axilla of middle turbinate and adjacent part of nasal mucosa are infiltrated with 2% lidocaine with 1:100,00 Epinephrine.

Previously unaddressed septal deviation was corrected with septoplasty in 3 (10%) patients. In 2 (6.66%) cases with associated sinusitis, FESS was done, Incision is given on the lateral wall of nasal mucosa with 15 number conventional scalped blade. The first incision is horizontal and made at 8 to 10 mm above the middle concha insertion point, starting about 3mm posterior to the insertion and moving on anteriorly about 10 mm over the frontal process of the maxilla. A vertical incision extending until the 2/3 of the middle concha height stopping above the insertion of the inferior concha on the lateral wall is made. Finally, we made a new horizontal incision, from the unciform apophysis unit it meets the vertical incision.

The mucosal flap is kept in contact with the bone. The thin lacrimal bone which is located anterior to the insertion of the unciform apophysis on the lateral wall is separated from thick bone by sickle knife. The bone is removed as much as possible throughout the entire lacrimal fossa. Pressure is applied over the sac externally and the movement is confirmed internally by endoscope.

After opening the lacrimal sac longitudinally in its entire extension, two flaps are made. The anterior is larger, since it will be turned over the remaining bone of the frontal process of the maxilla. It is made by making a longitudinal incision of the lacrimal sac a little more posterior in relation to the midline. The posterior flap remains in direct contact with the initially made mucosal flap. For this to happen, the mucosal flap is partially resected with cutting forceps, until it gets to the level of the posterior flap of the lacrimal sac. The upper portion of the mucosal flap may be repositioned over the middle concha insertion point in order to cover any portion of the remaining bone at this level. In Group A 20 silicone tubes are passed through superior and inferior canaliculi into the nose via the opening created in the lacrimal sac. The rigid ends protruding into the nasal cavity are then grasped individually with the Blakesley forceps and passed out of the nose. The rigid ends are then cut, and the Silastic tubing is trimmed and tied. Both ends of the tube are fastened with several knots in the nasal cavity. The knot should not be under tension to avoid pressure injury to the canaliculi. The free ends of the tube should be long enough to allow easy access for later tube removal, but short enough

not to protrude outside the nasal cavity. 20 cases were done without stent.

There are no intra and post-operative complications encountered. Postoperative care - Patients are instructed to sleep with high pillows and they must refrain from blowing their noses and doing vigorous physical activities for 10-14 Days.

Nasal douching with saline solution are important, Massage over lacrimal sac area externally daily. Patients are put on oral antibiotics, nasal decongestants, ophthalmological drops with antibiotics and steroids are also prescribed.

Regular follow up of patient if done at 1st Week, 1st Month, 3<sup>rd</sup> Month, 6<sup>th</sup> Month. Clots and Crusts if present were cleared with the 00 Nasal Endoscope in the minor O.T. in the follow up visits.

At the end of 6 months patients were assessed subjectively and objectively, Subjective assessment was by patient reporting relief of Symptoms. Objective assessment was done irrigation of the lacrimal system and assessment of the flow through the stoma through 00 Nasal Endoscope.

**RESULTS**

This is a combine retrospective and prospective study to evaluate the different causes of recurrence of epiphora in a case of endonasal DCR operation. The study was conducted at government ENT Hospital, Osmania Medical College, Hyderabad from September 2016 to September 2017 in which 40 Patients were taken for study.

**Age Distribution**

Age in Years	No. of Cases	Percentage
20-30	4	20%
31-40	15	75%
41-50	1	5%
51-60	0	0%
61-70	0	0%

**Table 1. Age Distribution of Cases in Group A**

In the present study 40 Patients were enrolled as study population. Among all study population, the youngest age was 23 years and oldest was 50 years. In the present study, 20 patients were included as cases in Group A 75% (15) of the cases were in the age group of 31-40 Years.

Age in Years	No. of Cases	Percentage
20-30	7	20%
31-40	11	75%
41-50	2	5%
51-60	0	0%
61-70	0	0%

**Table 2. Age Distribution of Control in Group B**

In this study, 20 patients were included as controls in Group B. Most of the patients were in the age group of 31-40 Years (75%).

**Gender Distribution**

Sex	No. of Cases (n=20)	Percentage (%)
Female	19	95%
Male	1	5%
<b>Total</b>	<b>20</b>	<b>100%</b>

**Table 3. Sex Distribution of Cases (Group -A)**

In our study of 40 patients, 34 (85%) were females and 6 (15%) were male patients of total 40 (100%) patients. Ratio of male: Female is 1:5, 6.

Among the cases 19 (95%) were female and 1 (5%) was a male patient.

Sex	No. of Cases (n=20)	Percentage (%)
Female	15	75%
Male	5	25%
<b>Total</b>	<b>20</b>	<b>100%</b>

**Table 4. Sex Distribution of Controls (Group - B)**

Among the controls 15 (75%) were females and 5 (25%) were males.

Side Affected	No. of Cases (n=20)	Percentage (%)
Female	12	60%
Male	8	40%
<b>Total</b>	<b>20</b>	<b>100%</b>

**Table 5. Side Affected in Cases**

In the study out of 20 cases left, side was affected in 12 (60%) patients and right side was affected among 8 (40%) cases. This shows that left side was more affected than the right side.

Occupation	No. of Patients (n=40)	Percentage
Coolie	21	52.5%
Housewife	16	40%
Student	2	5%
Watchman	1	2.5%

**Table 6. Occupation of All Patients**

In the present study 21 (52.5%) of the patients were working as coolie, 16 (40%) were housewives, 2 (5%) cases were students and 1 was a Watchman.

According to the Kuppaswamy Socio economic classification most of the patients belonged to lower (Class V) and Upper Lower (Class IV) Families who lack in their cleanliness and scrupulousness in maintaining their eyes clean.

Clinical Feature	No. of Cases	Percentage
Epiphora	20	50%
Epiphora with Swelling	6	15%
Epiphora with Discharge	7	17.5%
Epiphora with Swelling and Discharge	7	17.5%
Total	40	100%

**Table 7. Presenting Complaints**

In our study of 40 Cases, 20 (50%) cases belongs to epiphora, 6 (15%) Epiphora with swelling, 7 (17.5%) epiphora with discharge, 7 (17.5%) with epiphora and swelling had been noted. 50% (20) of patients presented early in the course of the disease.

Regurgitant Fluid	No. of Patients (n=40)	Percentage
Mucopurulent	33	82.5%
Purulent	5	12.5%
Clear Fluid	2	5%
Total	40	100%

**Table 8. Nature of Regurgitant Fluid**

In our case study 40 Patients, the highest number of patients with mucopurulent discharge were 33 (82.5%), followed by purulent discharge 5 (12.5%) and clear fluid was seen among 2 (5%).

## DISCUSSION

Watering of eye (epiphora) is a troublesome symptom for both patients and doctors. Even though various causes produce epiphora, dacryocystitis is the commonest pathological cause for epiphora. Chronic dacryocystitis is treated with dacryocystorhinostomy.

The purpose of study was to compare between endo DCR with stent and endo DCR without stent, and revise the surgery to improve the drainage of lacrimal apparatus. R.A. Welhem<sup>1</sup> observed the reasons for failures were usually apparent randomly and evaluated for the cause of failure of endoscopic DCR and to evaluate the long-term comparative success rate of Endonasal DCR with and without silicone stent placements at Govt. ENT Hospital, Hyderabad between August 2015 to October 2017.

## Age Distribution

The Youngest patient included was 23 years old and the oldest was 62 Years Old.

The Highest incidence quoted by him was in the 4th Decade of life. H Basil Jacobs<sup>2</sup> in his study found the maximum incidence of this condition between 40-55 years of age.

## Sex Distribution

In our study female constituted 34 (87.5%) make constituted 6 (12.5%) male female was found to be 1:5.6. H. Basil Jacobs<sup>2</sup> found female to make ratio of 3:1 in his series of patients. He claimed that females were more affected by chronic dacryocystitis as they had a higher vascular congestive factor and narrower bony canal.

H. Basil Jacobs<sup>2</sup> in his study showed that right side affected 53 times and the left side 37 times in 90 unilateral cases and only 14 cases were bilateral. Dalgleish<sup>8</sup> stated there is no difference between right sided and left sided affection, and that the incidence of bilaterality increases with age.

Metson et al stated that scarring of the ostium and errors in location of lacrimal sac are the major causes of surgical failure Vishwakarma et al<sup>9</sup> stated that the failure of endonasal dacryocystorhinostomy especially in cases where no stent is used, were due to granulations, scarring near stoma, technical error in locating the sac, intra operative bleeding hampering the vision, small obliterated lacrimal sac and impaired canalicular function.

In the present study, all of the patients, had unilateral block. Almost all the eyes were operated under local Anaesthesia. There are no intra and postoperative complications. Almost all the patients stayed overnight in the hospital and were discharged on the first post-operative day.

Out of all 20 Cases with endo DCR with stent, anatomic success was ascertained by irrigation at 6 months after surgery in 19 cases which was 95%. Out of 20 Patients in Group B without Stent the anatomic success was 75%.<sup>8</sup>

Failure rate was 5%<sup>1</sup> in Group A Patients by endo DCR with Stent and 25% failure rate was seen in Group B Patients by endo DCR without Stent.

In Studies done by P.J Wormald,<sup>10</sup> Bambule and Chamero the results were 95.7% and 91.7% respectively in cases of Endo DCR with Stent.

The technique was modified by West and Halle<sup>11,12</sup> in 1940, who introduced the idea of a window osteotomy by removal of lacrimal bone and the superior maxilla to access the nasolacrimal duct. In 1990, Massaro, Gonnering and Harris first described an endonasal dacryocystorhinostomy technique using laser for creating the opening between the nasal cavity and the lacrimal sac.<sup>11</sup>

Guptha. N et al<sup>13</sup> in 2011 conducted a study on improving results in cases. It was found that the improper selection of cases accounted for 3.3% of total failed cases; low rhinostomy accounted for 28.3% cases, inadequate sac opening for 38.3% cases, preexisting canaliculitis for 1.6% of cases, contracture at the rhinostomy site in 10% cases, laxity of the lids and atonic sac was responsible for failure on 3.3% cases. Most of the above factors are secondary to the false localization of the sac, too much of mucosa removal leading to synechiae formation at the surgical site and inability to detect any additional block with NLD Block.

Chat W<sup>14</sup> in 2013 conducted a study on Ostium Shrinkage after endoscopic DCR. They included 161 patients after endonasal DCR. They notice the final ostium size on average is 35% of the Original at 12 months postoperatively.

Maximum shrinkage of the ostium occurs in the first month after the surgery.

Md. Naveed Ahmed et al<sup>15</sup> in 2014 conducted a study in 50 failed DCR Patients to determine the causes of failure of endonasal DCR and its subsequent management. They observed 36% of the patients had synechiae. 18.6% of patients presented with thick lacrimal crest, 9% of them had thin veil like membrane over the neo-ostium. All the patients were subjected to revision surgery and subjective improvement in 92% of the patients reported at the time of reporting of the study.

Sprekelson MB<sup>16</sup> in 1990 conducted a study on 133 patients in whom 152 dacryocystorhinostomies were performed to determine their liability of the endoscopic endonasal approach. They concluded that the intranasal approach is a safe alternative to the external approach, especially for a revision procedure.

### CONCLUSION

1. Endoscopic Endonasal DCR with stent is a safe and minimally invasive procedure as it is a direct approach to the sac and no other structure is to be dissected.
2. Endoscopic Endonasal DCR with stent has the potential to reduce patient morbidity through greater utilization of local anaesthesia, shorter hospitalization period.
3. Endoscopic DCR with stent is a low complication technique that yields good aesthetic and functional results.
4. Endoscopic DCR requires formal training and steep learning curve.
5. Endoscopic Endonasal DCR with stent is an effective treatment for patients who have failed primary endoscopic DCR.
6. The use of endoscopic instrumentation provides excellent visualization for identification and treatment of the common causes of failure of the primary procedure.
7. Most common causes of failure of endonasal DCR with stent are granulation tissue formation, synechiae formation, failure to identify the lacrimal sac.
8. Under endoscopic guidance, nasal anatomy is understood directly, managed accordingly, sac is approached directly under vision and so at the time of surgery result is known.
9. Regular follow up is necessary in the Post-Operative Period.

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