

CLINICAL EVALUATION OF FAILED ENDONASAL DCR OPERATIONS AND THEIR MANAGEMENT

Mohammed Naveed Ahmed¹, S. Muneeruddin Ahmed², M. Mahendra Kumar³, Ramakrishna⁴, G. Siva Prasad⁵, Boddikuri Sreekanth⁶

HOW TO CITE THIS ARTICLE:

Mohammed Naveed Ahmed, S. Muneeruddin Ahmed, M. Mahendra Kumar, Ramakrishna, G. Siva Prasad, Boddikuri Sreekanth. "Clinical Evaluation of Failed Endonasal DCR Operations and their Management". Journal of Evolution of Medical and Dental Sciences 2014; Vol. 3, Issue 48, September 29; Page: 11526-11532, DOI: 10.14260/jemds/2014/3510

ABSTRACT: INTRODUCTION: Endoscopic Intra nasal approach to by-pass the obstruction of lacrimal apparatus is a simple and commonly practiced surgery among the ENT Surgeons. Various modifications in the form of usage of micro drill, application of Mitomycin C and preserving the nasal flap to line the opening in the sac to name a few are being used. Recurrence of epiphora and closure of the neo opening is described and observed are labeled as failed endonasal DCR. This study makes an attempt to review retrospectively and prospectively to evaluate the degree of recurrence and causes of failure. **OBJECTIVE OF THE STUDY:** This study also attempts to determine the causes of failure of endonasal DCR and its subsequent management. Thus this study precludes the role of revision DCR. **Materials and Methods:** 50 patients who underwent endonasal DCR surgery at GGH Kurnool and reported with symptoms of returning of epiphora, purulent discharge from the eye were included. A detailed history taking and endoscopic examination done to find the cause of failure. An attempt is made to classify the causes and find suitable remedy. **RESULTS:** 36% of the patients showed tendency to form synechiae, 18.6% of patients presented with thick lacrimal crest, 9% of them showed formation of a 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.

KEYWORDS: Endo nasal DCR, Revision DCR, Neo-ostium, Failed DCR, Syringing lacrimal apparatus, epiphora.

INTRODUCTION: 'Watery eyes' is a common complaint among ophthalmic patients. Among patients attending eye clinics, between 3 to 4% complain of an excessive tears. This annoying symptom occurs either when the volume of tears produced exceeds the normal drainage capacity of the excretory passages (lacrimation) or more commonly, when there is an obstruction to the outflow of tears along the excretory apparatus (epiphora). Tears are produced in the lacrimal gland and provide a protective coating of the ocular surface. The distribution and drainage of the tears depend on normal eyelid anatomy and function. Tears enter the puncta and travel to the lacrimal sac in the canaliculi. The tears drain into the nasal cavity through the nasolacrimal duct. Any mechanical or functional abnormality in the production, distribution, and drainage of tears disrupts this process. The operation of Dacryo-cysto-rhinostomy is designed to affect the drainage of tears and infected secretions from the lacrimal sac into the middle meatus of the nose by-passing the nasolacrimal duct by creating a new passage in the lacrimal bone and nasal mucosa. Dacryo-cysto-rhinostomy relieves the problem of epiphora caused by anatomical or functional block distal to the common canalicular duct and sac.

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Since the first description of the external DCR procedure by² Adeo Toti in 1904, and the endoscopic DCR by West in 1910, the Dacryo-cysto-rhinostomy has progressed from an exclusively ophthalmologist's surgery to one being performed by a large number of practicing otolaryngologists today.² Nearly 100 years of refinement have made Dacryo-cysto-rhinostomy one of the most predictable and successful procedures in surgery.

The success of endonasal DCR varies from author to author. Hence the present study clinically evaluates the causes of failed endonasal DCR in 50 patients and enumerates the various causes for failure and also records the results of revision endonasal Dacryo-cysto-rhinostomy.

AIMS AND OBJECTIVES: To evaluate causes of failed endonasal Dacryo-cysto-rhinostomy in particular to note their incidence. This study also attempts to define the line of subsequent management. Thus this study precludes the role of revision DCR to give improved subjective satisfaction in patients.

INCLUSION CRITERIA: Only those patients who underwent endonasal DCR operation during the period of 2 years and preceding the period, reporting with persistence of symptoms were included in this series; Failure of previous external DCR (revision cases). Patients symptomatic for recurrent painful swellings at the medial canthus and epiphora were subject 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 episodes of painful swelling near the medial canthus of the eye was sought.

Previous history of mid-facial fractures and nasal surgeries and previous history of facial nerve palsy was elicited. 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 synechia.

Particular attention was paid to visualize the nasal fossa area where earlier neo-ostium was created; whether it is covered with membrane or granulation tissue or thick scar. External pumping action in the lacrimal sac area is used to locate the neo-ostium. All patients were subjected to a detailed ophthalmic evaluation to determine any ophthalmic cause of epiphora. A CT scan of the nose and Para-nasal sinuses was done in necessary cases.

Ophthalmic investigations included syringing of the lacrimal system to demonstrate the presence of block in the lacrimal drainage system. All patients underwent routine hematological investigations preoperatively. The patients were admitted and a pre-anesthetic workup performed. The patients were started on prophylactic antibiotics.

Depending upon the given situation appropriate surgical procedure adopted like excising the granulation tissue, scar tissue, veil like membrane and enlarging the bony ostium after elevating nasal mucosal flaps. All the patients were followed for a period of 18 months.

MATERIALS AND METHODS: This is a combined retrospective and prospective study to evaluate the different causes of recurrence of epiphora and closure of neo-ostium developed during the endonasal DCR operation. 50 patients who underwent endonasal DCR operation for blockage in the Naso-lacrimal duct and reported back with complaints of epiphora, nasal obstruction, and purulent

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discharge from the eye, swelling in the medial canthus of the eye and obstruction to the flow of water on syringing were taken for evaluation.

The operative notes of 32 patients who had undergone endonasal DCR prior to August 2009 were retrieved from the record room and scrutinized. 18 patients who underwent endonasal DCR but presented with recurrence between August 2009 and July 2011 were included in the study.

Evaluation was done to pin point the surgical difficulty encountered, results of syringing pre-operatively, associated infection in the nose and PNS, uncorrected deviated nasal septum, associated co-morbidity like diabetes mellitus and recently treated tuberculosis, were looked for.

In 18 patients a proforma was prepared. It was found that in 3 patients (6%) there was a failure to make neo-ostium in the attempt of endonasal DCR due to thick sac and not identifiable with ease. 6 patients (12%) showed presence of hard lacrimal crest leading to compromised removal of bone. In 6 patients (12%) Silastic lacrimal stent was not used. In 2 patient (4%) early removal of stent was recorded which might be the cause for failure.

Post operatively 10 patients (20%) patients failed to attend regular follow up, nasal douching, periodical post-operative syringing and failure to do pumping massage over the sac area externally. 2 patients (4%) had facial trauma prior to endonasal DCR. 2 patients (4%) had diabetes mellitus. 6 patients (12%) patients presented with synechiae in the nose. 3 patients (6%) who had deviated nasal septum were not addressed with Septal correction prior to endonasal DCR surgery.

On DNE closure of neo-ostium with granulations was seen in 6 patients (12%). 2 patients were found to have developed a thin veil like mucosa over the neo-ostium. 4 patients showed white thick scar formation in the area of neo-ostium.

The present study was conducted in the Department of ENT & Head and Neck Surgery at Government General Hospital attached to the Kurnool Medical College, Kurnool during the period from 2009 August to 2011 July, for a period of two years. The patients of Endoscopic DCR were aged between 7 to 60 years. Among them 30 were females and 20 males. The mean follow up was 18 months.

Revision Endoscopic dacryo-cysto-rhinostomy: Of the 50 patients who underwent Trans-nasal Endoscopic DCR, 22 underwent surgery on the right and 28 on the left. 3 patients (6%) underwent nasal (Septoplasty) surgery along with the endoscopic DCR. 38 of 50 patients underwent the surgery under local anesthesia, the remaining were operated under general anesthesia. All patients were followed up, the follow up period ranging between 1 to 18 months.

OBSERVATIONS & RESULTS OF STUDY: This is a combined prospective and retrospective study of failed Endoscopic Trans nasal DCR done in Department of ENT & Head and Neck Surgery, at Govt. General Hospital Kurnool in a group of 50 patients during the period of two years from August 2009 to July 2011.

Type of nasolacrimal duct obstruction : (46%) 23 patients had total nasolacrimal duct obstruction. (54%) 27 patients had lacrimal syringing positive, but complained of epiphora and purulent discharge from the eyes.

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SEX DISTRIBUTION: 20 of the 50 patients of Endoscopic DCR were males (40%) and 30 were females (60%) in the ratio of 1:1.5.

AGE DISTRIBUTION: The patients of Endoscopic DCR were aged between 7 to 60 years. The mean age is 38.5 ± 4.36 patients belong to the age group of 21-40 yrs 7 patients belong to age group of 40-60 yrs, 7 patients belong to age group 0-20.22 out of 50 (44%) patients underwent surgery on the right side and 28 (58%) patient on left side.

TYPE OF SURGERY: 30 patients (60%) underwent revision surgery, among them excision of granulation tissue was done in 6 patients (12%). Excision of the thick pale scar was done in 4 patients (12%). Removal of the thin veil like membrane with the help of raising mucosal flap and identifying the neo-ostium was done in 2 patients (4%). In 6 patients (12%) of patients after mucosal flap elevation bony edges are identified and enlarged suitably.

Previously un- addressed septal deviation was corrected with Septoplasty in 3 patients (6%).

In 8 patients stenting was done. In 18 patients (36%) patients Mitomycin C was applied to minimize the scar formation and granulation tissue. All the patients were followed for 18 months and the recurrence rate is 14%. Remaining patients 86% gave subjective satisfaction and relieved of epiphora. Post-operative DNE showed in these patients a patent Neo-ostium.

ANESTHESIA FOR DCR: 12 of 50 patients underwent the surgery under general anesthesia, the remaining were operated under local anesthesia.

FOLLOW UP: All patients were followed up, the follow up period ranging between 1 to 18 months (mean: 7 months). The most consistent symptom in the study group was epiphora (100% of cases) in both the groups. Other symptoms included nasal obstruction in 24% cases, nasal discharge in 14% cases.

INVESTIGATIONS: All patients in the study group were subject to investigations-specific and nonspecific-prior to undergoing surgery.

OBJECTIVE ASSESSMENT: Objective assessment of each patient's status was done by performing syringing of the lacrimal drainage system and observing for the flow of saline through the intranasal ostium. In our study, four patients had a definite flow of saline to confirm patency of the ostium. Patency was established after removal of synechiae occluding the ostium. The objectively assessed success rate was 92%.

DISCUSSION: 50 patients who underwent endonasal Dacryo-cysto-rhinostomy reporting with epiphora are included in the present study. Failed DCR is defined as "persistence of epiphora and on examination closure of the neo-ostium" post endonasal DCR surgery. The purpose of the study is to evaluate the causes of failed endonasal DCR, and revise the surgery to improve the drainage of lacrimal apparatus. The authors agree with the opinion of R.A. Welham¹ the reasons for failures were usually apparent on reoperation. The surgical technique is described. A second dacryo-cysto-

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rhinostomy is a highly successful technique that spares both patient and surgeon the lifelong commitment to a bypass tube.

³Shrestha et al in their study found the failure rate of endonasal DCR is 15.5% when compared to external DCR operation. In a similar study by² Tae Soo Lee, it was found that the causes of surgical failure were membranous obstruction (83 eyes), granuloma (22 eyes), synechia (11 eyes), common canalicular obstruction (11 eyes), functional block (7 eyes), and canalicular obstruction (1 eye). The revision surgeries undertaken were silicone tube intubation after granuloma removal, synechiolysis and membranectomy using Nd: YAG laser and trephination of canalicular obstruction, and endonasal conjunctivo-dacryo-cysto-rhinostomy (CDCR) for the parts of functional block and the canalicular obstruction.¹ The overall success rates of the revision surgeries were 83.3% (95/114 eyes). In the present study the incidence of all the causes for failure similarly noted and coinciding with the incidence.

Most of the cases in present study are in 21 to 40 years of age 72%, youngest was 7yrs, eldest was 60years old. The mean age is 38.4 ±4. Our data correlate well with studies of ^{4,5,6} Yung and Hardman 1989, Heikkiseppa 1994, and Heshman Ali 2001.

⁷According to Dutton 1994; there is decreasing trend towards both extremes of age. This may be due to the fact that amount of lacrimal secretions is less in extremes of age. The present study shows Male: Female ratio is 4:1 and our data correlates well with the studies of ⁵ Heikki Seppa 1994,⁴ Yung and Hardman 1998 and⁶ Heshman Ali 2001, Male: Female ratio is 1:2 in some studies⁸ Mantynen 1997.⁹ In their study Nowinski TS, noted that Dacryo-cysto-rhinostomy (DCR) often has uncertain results in the pediatric age group. Poorly defined and rapidly changing anatomy, along with a tendency toward vigorous growth of scar tissue, may alter surgical results. In the present study in the 0 to 20 years age group 7 patients had failed DCR. In the present study most of the cases presented with disease on left side (56%).

¹⁰It is observed that nasolacrimal duct and lacrimal sac formed a greater angle on right side than left side. It increases the chances of stasis and obstruction of nasolacrimal duct and sac on left side quoted as Arisi 1960. Other explanation is that most people are right handed, hence their left hand is free and used for cleaning the eye or mopping the tears that increase the chances of infection in left eye. Another possibility could be congenital, anatomical narrowing of nasolacrimal duct on left side. This point could be elucidated by further research work on measuring the transverse diameter of nasolacrimal duct in CT scan or in cadaver skulls.

¹¹Anne Louise Bach Christensen, Pernille Oversø Hansen, suggest that endonasal DCR for both distal and proximal stenosis of the lacrimal system as the obstruction level seems to have no influence on the success rates. In the present study the inconclusive pre-operative syringing tests observed in 12 (24%) of the failed endonasal DCR patients need not be considered as cause of failed endonasal DCR.

¹²Ralph Metson, 1990 in a study on revision DCR surgery on 5 patients found closed intranasal Ostia in all the cases. In the present study in addition to closed Ostia other causes were found be playing a role in failure of endonasal DCR.¹³ Welham and Wulc 1980 found that problems with the size and location of the intranasal ostium were the cause of failure in 52% of cases.¹⁴ McLachlan et al also found that obstruction of the intranasal ostium was the commonest cause of failure.¹⁵ Other causes included enlarged ethmoidal air cells obstructing lacrimal flow, and excessive scarring around the rhinostomy site. Nayak et al, 1999.

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¹⁶In a study by Berryhill BH, Dorenbusch AA; they found that in their series, Two hundred and eighty-four primary operations were performed with an 89% success. Of 29 failures, 25 were re-operated on with only 2 failures. In our study the success rate of revision endonasal DCR performed in 50 failed DCR surgeries is 92%, and is significant.

¹⁷In another study by Boush GA, Lemke BN, Dortzbach RK a total of 46 endonasal laser-assisted dacryo-cysto-rhinostomy procedures were performed. Of these, 32 were successful and 14 failed after a single attempt, yielding a success rate of 70% (32/46). Of the 14 patients with failed procedures, 6 underwent a second endonasal laser-assisted dacryo-cysto-rhinostomy. Of these, five were successful.

¹⁸The success rate calculated on the basis of one or two attempts was 80% (37/46). Hesman Ali Ibrahim, Joan Laura, Mark presented an eighty-three percent primary success rate, without any serious complications. Obstruction of the neo-ostium with granulation tissue was observed in eight cases, among which six underwent revision with success in all cases. Overall, 44 (96%) of 46 cases experienced surgical successes.

CONCLUSION: The incidence of failed endonasal DCR is 10 to 15% in primary endonasal DCR surgeries and 8 to 10% in revision cases. The common causes are granulation tissue formation, synechia, thick scar, velvety mucus membrane formation, Osteo- neo genesis, especially in pediatric ages, early removal of stent and lastly failure on the part of the patient to follow instructions. Revision is possible in most the cases and suitable corrective measure should be used depending on the cause. Overall success rate in revised endonasal DCR is 92%.

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AUTHORS:

1. Mohammed Naveed Ahmed
2. S. Muneeruddin Ahmed
3. M. Mahendra Kumar
4. Ramakrishna
5. G. Siva Prasad
6. Boddikuri Sreekanth

PARTICULARS OF CONTRIBUTORS:

1. Professor, Department of ENT, Gandhi Medical College, Secunderabad.
2. Professor and HOD, Department of ENT, Viswabharathi Medical College, Kurnool.
3. Assistant Professor, Department of ENT, Kurnool Medical College, Kurnool.
4. Assistant Professor, Department of ENT, Bhaskara Medical College, Hyderabad.
5. Assistant Professor, Department of ENT, Kurnool Medical College, Kurnool.

6. Assistant Professor, Department of Ophthalmology, Kurnool Medical College, Kurnool.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Mohammed Naveed Ahmed,
Professor, Department of ENT,
Gandhi Medical College, Secunderabad,
10-5-8-9/1/1A, Sriramanagar Colony,
Opposite Ultra Care Service Center,
1sr Lancer Road, Masab Tank,
Hyderabad-500028.
Email: naveedahamed60@gmail.com

Date of Submission: 18/07/2014.
Date of Peer Review: 19/07/2014.
Date of Acceptance: 30/07/2014.
Date of Publishing: 26/08/2014.