Original Research Article

Endoscopic Endonasal DCR with Silicon Stenting

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Abstract

Introduction: Endoscopic DCR is preferred for its scar less, minimally invasive technique. Many modifications including placement of silicon stents has been done over the years to reduce the recurrence. Endonasal endoscopic and External DCR approaches have their own advantages and disadvantages. Endoscopic DCR is one of the several techniques to unblock the nasolacrimal duct.**Aims :** To Study the surgical outcomes of Endoscopic Endonasal Dacryocystorhinostomy (DCR) technique with and without the use of silicon stent intra operatively.**Materials and methods:** This was a retrospective, observational and comparative study to compare the results of ENDODCR with stent and without stent.. The study group consisted of 40 patients of both sex and above 20 years of age with having symptoms and signs suggestive of 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.**Results**: Out of 40 patients 12 patients had associated intranasal pathology corrected. Out of 12 patients 7(17.5%) patients had septoplasty and 5 (12.5%) patients had FESS surgery done simultaneously along with endoscopic DCR. On the 1st follow up visit at 1st week all 20(100%) patients in group B (endo DCR without stenting) had patency on syringing The association between relief of symptoms and Endoscopic DCR with stent at 6th month was highly significant statically ($p<0.01$). Objective analysis after 6 month showed patency of nasolacrimal duct among Group A patients after endo DCR with stent was higher than the Group B patients with Endo DCR without Stent, which was statistically significant.($p<0.01$). Subjective assessment for relief of symptoms at 6 months among Group A patients after endo DCR with stent was statistically ($p<0.01$)higher (95%) than among the Group B patients with endo DCR without stent (75%). Endoscopic endonasal DCR 34 (85%) cases were successful and only 6 (15%) cases were failure.**Conclusion**: Endoscopic DCR is a safe, cast effective alternative for external DCR in patients with nasolacrimal duct obstruction. We found that endoscopic DCR with stent had several advantages over more conventional external approach.

Keywords: Endoscopic Endonasal Dacryocystorhinostomy, Silicon stent, Outcomes

Introduction

Epiphora is a common annoying symptom, embarrassing the patient both socially and functionally and may even endanger the eye. A watery eye is a common complaint among ophthalmic patients. Among patients attending eye clinics, between 3-4% complain of excessive tears. It is in contradiction to lacrimation which occurs due to excessive tear production. Inflammation of the lacrimal sac is known as Dacryocystitis. Dacryocystitis is the most common cause of epiphora (87%). Chronic dacryocystitis (CDC) is the common form of dacryocystitis which arise from nasolacrimal duct occlusion. The occlusion may be caused by congenital abnormality, chronic sinus disease, nasoorbital trauma, involutional stenosis. Involutional 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[1].

Untreated chronic Dacryocystitis never undergoes spontaneous resolution[4].

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The procedure of choice in the management of chronic dacryocystitis is dacryocystorhinostomy (DCR). Dacryocystorhinostomy is the standard treatment for nasolacrimal duct obstruction[5].The function of dacryocystorhinostomy is to divert lacrimal drainage into the nose through an osteotomy at the level of the lacrimal bone. This procedure is performed either through an external/ endonasal approach. By understanding the factors which lead to the failure of endoscopic Dacryocystorhinostomy it results in the enhancement of success of endoscopic dacryocystorhinostomy. Hence the present study evaluates comparative study between with stent insertion and without stent.

Materials and Methods

This was a retrospective, observational and comparative 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 of 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, Koti who were healthy and non-immunocompromised.

Exclusion Criteria: Patients with any intraorbital (or) sinonasal tumours 40 Patients of either sex complaining of epiphora, 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. 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 episodes 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 area where earlier neo-ostium was created; 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 a routine hematological 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 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.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. 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 0^0 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 scalpel 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 until about 10mm over the frontal process of the maxilla following that we make 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. Finally, we make a new horizontal incision, from the unciform apophysis until it meets the vertical incision.Following that, we raise the mucosal flap, keeping it always 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. A kerrinson punch forceps is utilized to start removing the stronger portion of bone in the lacrimal fossa (frontal Process of the maxilla).

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 should be larger, since it will be turned over the remaining bone of the frontal process of the maxilla. This is made possible by making the longitudinal incision of the lacrimal sac a little more posterior in relation to the midline. The posterior flap will remain in direct contact with the initially-made mucosal flap. For this to happen, the mucosal flap is partially resected with a 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 sialastic 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 is essentially the same used in any other endoscopic sinonasal surgery. 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, 3rd month, 6th month. Clots and crusts if present were cleared with the 0^0 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 by irrigation of the lacrimal system and assessment of the flow through the stoma through 0^0 nasal endoscope.

Results

This is a combined 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.

Table 1: Demographic distribution of cases in groups

Age in years	Group-A		Group-B	
Age in years	No. of cases	Percentage	No. of cases	Percentage
20-30	4	20%	7	20%
31-40	15	75%	11	75%
41-50	1	5%	2	5%
51-60	0	0%	0	0%

61-70	0	0%	0	0%
Female	19	95%	15	75%
Male	1	5%	5	25%
Left	12	60%	15	75%
Right	8	40%	5	25%

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%). 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. 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.

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 watch man.

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Table 2: Presenting complaints with regurgitant fluid in present study

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%
Regurgitant Fluid		
Mucopurulent	33	82.5%
Purulent	5	12.5%
Clear Fluid	2	5%

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

In our case study of 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%).

Table 3: Causes of Failure In endo DCR with stent

Causes of failure	No. of cases
Failure in identifying lacrimal sac	0
Inadequate sac opening	0
Insufficient osteotomy and bony spicules	0
Contracture at rhinostomy site	0
Granulation tissue	1
Synechiae	0

Out of 20 cases of post endoscopic endonasal DCR with stent only 1 (5%) case was a failure which was due to granulation tissue formation around the stent

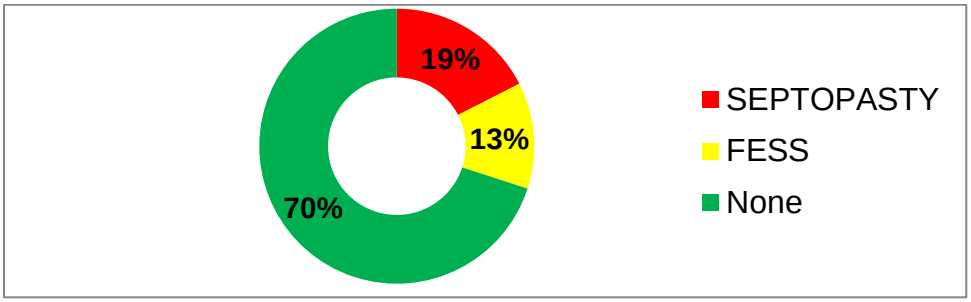


Fig 1: Intranasal pathology correction

Out of 40 patients 12 patients had associated intranasal pathology corrected. Out of 12 patients 7(17.5%) patients had septoplasty and 5 (12.5%) patients had FESS surgery done simultaneously along with endoscopic DCR.

Table 4: Symptomatic relief after ENDO DCR among Cases and Controls

	1st Week		1st month		6th month	
	Group A	Group B	Group A	Group B	Group A	Group B
Relief of symptoms	**20** (100%)	**20** (100%)	**20** (100%)	**16** (80%)	**19** (95%)	**15** (75%)
No relief	0	0	0	**4** (20%)	**1** (5%)	**5** (25%)

During the 1st month in Group A, all patients (100%) reported relief of symptoms. In Group B 16 (80%) patients reported relief of symptoms and 4 (20%) had no relief of symptoms. At 1st month, odds ratio was 1.97, the chi square value was X^2=15.05, P=0.0001 at 95% confidence interval. The association between the relief of symptoms and Endoscopic DCR with stent at 1 month was highly significant statistically (P<0.01).After 6th month in Group A,19 (95%) cases reported relief of symptoms and 1 (5%) case reported no relief of symptoms. In group B 15 (75%) patients reported relief of symptoms and 5 (25%)had no relief of symptoms. At 6th month odds

ratio was 1.98, chi square value was X^2 =12.2, P=0.005 at 95% confidence interval. The association between relief of symptoms and Endoscopic DCR with stent at 6th month was highly significant statically (p<0.01).

Table 5: Syringing results

Syringing	1st Week		1st month		6th month	
	Group A	Group B	Group A	Group B	Group A	Group B
Patent	**0** (0%)	**20**(100%)	**20** (100%)	**16** (80%)	**19** (95%)	**15** (75%)
Not patent	**0** (0%)	**0** (0%)	**0** (0%)	**4** (20%)	**1**(5%)	**5** (25%)

At 1st month in group A patients syringing was patent in all 20 (100%) patients. In group B Patients syringing was patent in 16 (80%) patients and not patent in 4 (20%). At 1st month, odds ratio was 1.97, the chi square value was X^2=15.05, P=0.0001 at 95% confidence interval. This shows that the success rate in patients with endo DCR with stent (95%) have a higher success rate than with endo DCR without Stent (75%) which was statistically significant.

At 6th month in group A patients syringing was patent in 19(80%) patients and not patent in 1 (20%) patients. In group B Patients syringing was patent in 15 (75%) patients and not patent in 5 (25%). At 6th month odds ratio was 1.98, chi square value was X^2 =12.2, P=0.005 at 95% confidence interval. The association between relief of symptoms and Endoscopic DCR with stent at 6th month was highly significant statically (p<0.01).

Table 6: Results after 6 months

	Objective analysis		Subjective analysis	
	Patient	**Non Patient**	**Relieved**	**Not Relieved**
Endo DCR with stent	95%	5%	95%	5%
Endo DCR without stent	75%	25%	75%	25%

Overall success rate after 6 months in group A (endo DCR with stenting) and group B(endo DCR without stenting) is 95% and 75% respectively.

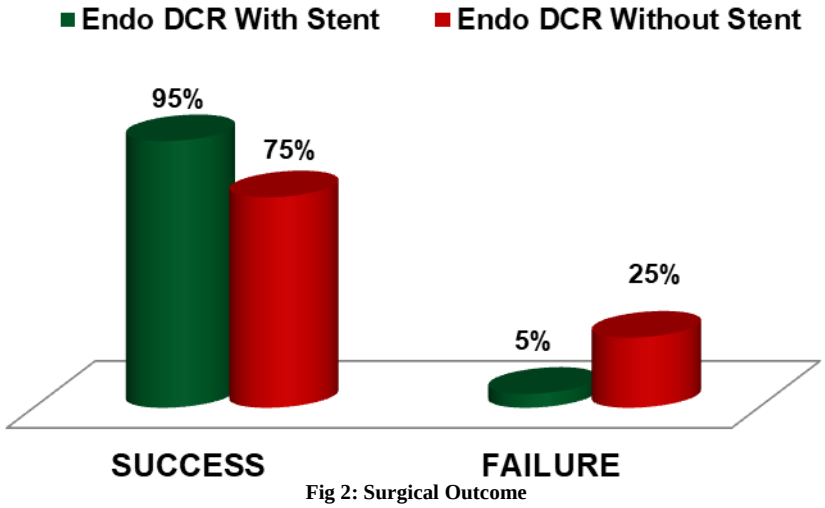
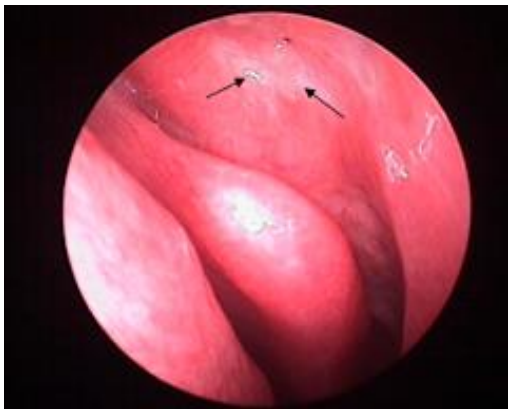
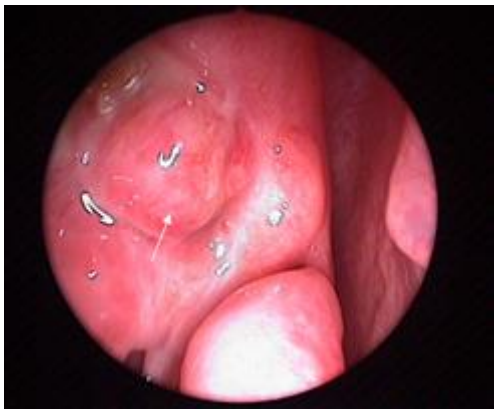


Fig 2: Surgical Outcome

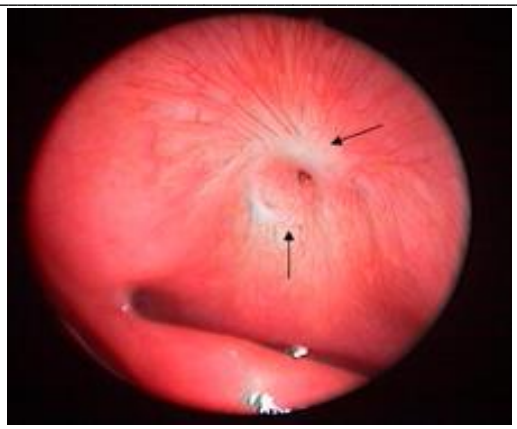
The above table shows that out of 40 cases of Endoscopic endonasal DCR 34 (85%) cases were successful and only 6 (15%) cases were failure.



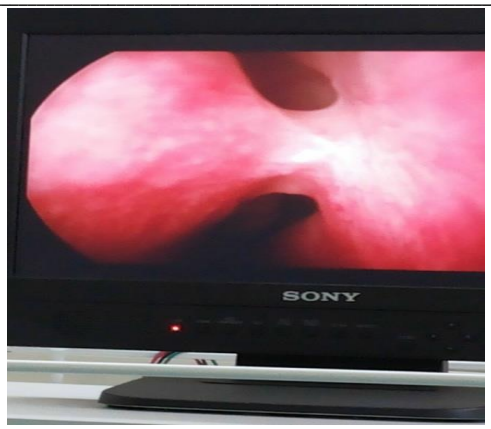
Contracture at rhinostomy



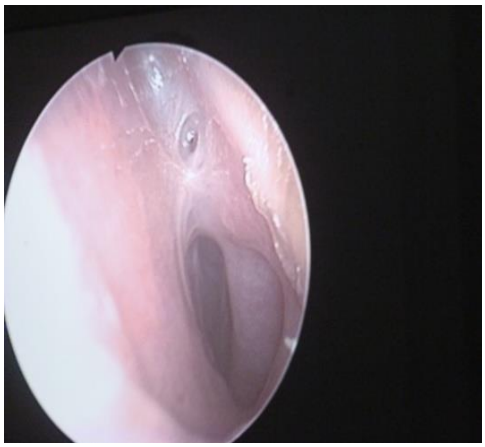
Granulation tissue site



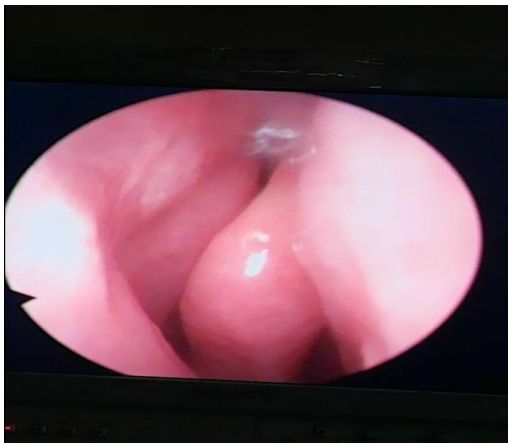
Contracture at rhinostomy site



Synechiae



DNS with synechiae



Contracture at rhinostomysite

Fig 3: Causes of failure of endonasal DCR

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. Chronic dacryocystitis though a common problem of lacrimal drainage system, treated much efficiently in recent years with advances in investigative and operational technique pertaining to solve the problems associated with it, yet we face failure in some cases of endonasal DCR.In the present study, most of the patients were in the age group 31-40 yrs (72.5%). The youngest was 23 years old and the oldest was 62 years old. There was a declining trend towards both extremes of age. This may be due to the fact that the amount of lacrimal secretion is less in extremes of age[2]. In addition to that the specific infection is also more common in this age group[3]. Our study correlates with most of the other studies. Sarda et al[4] noted maximum incidence of chronic dacryocystitis in the third and fourth decade of life. R.Dalgleish[5] stated that 35-40 years was the earliest expected age of onset of acquired idiopathic NLD obstruction. Duke Elder[6] states that the disease preferentially affects adults over middle age, being relatively rare in children and adolescents. The highest incidence quoted by him was in the 4th decade of life. H.Basil Jacobs in his study found the maximum incidence of this condition between 40-55 years of age.In our study female constituted 34 (87.5%) male constituted 6(12.5%) male:female was found to be 1: 5.6. Our study correlates with the study conducted by Kuldeep et al[8] in which female constituted 80% and male constituted 20%.Duke Elder[6] states that while the disease in the newborn affects both the sexes equally, its occurrence among adults is in the ratio of 75 - 80% females to 25-30% males. R.Dalgleish[5] reported a percentage of 54% amongst females. Saxena R.C[9]. has an incidence of 84.6%. H.Basil Jacobs[7] found female to male 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 a narrower bony canal. Long term injudicious use of kaajal and adulterated cosmetics applied on the wrong side of eyelashes can also play important role in obstruction of nasolacrimal system in females. This would explain why lacrimal obstruction most often occurs in elderly women, but it does not explain the cases that occur in men. Females have significantly smaller dimensions in the lower lacrimal fossa and middle nasolacrimal duct. Hormonal changes that bring about a generalized de-epithelization in the body may cause the same within the lacrimal sac and duct. An already narrow lacrimal fossa in women predispose them to obstruction by the sloughed off debris.

In the present study most of the cases present with the disease affected on the left side (27%) compared to right side (13%). Prakash et al[10] (2012) noted Left eye (LE) as most common side of involvement, 50% Left eye (LE), 40% Right eye (RE), 10%Both eyes (BE).Tariq et al (2004) study showed 46.5% cases of dacryocystitis to be on left side and 45% of case to be on right side. 8% of cases were bilateral. H.Basil Jacobs[7] 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[5] stated

there is no difference between right sided and left sided affection, and that the incidence of bilaterality increases with age.

It 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. 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.In our series of study majority of the coolies, 21(52.5%) were effected, 40% housewives. 5% of the cases belonged to the students and 2.5% were watchman, which shows that majority of the patients belonged to poor and low middle class families who lack in their cleanliness and scrupulousness in maintaining their eyes clean. CDC is less common among people of urban areas with middle class to rich class, who take maximum hygienic measures to maintain their eyes clean.In our study of 40 cases, 20 (50%) cases belongs to epiphora, 6 (15%) cases epiphora with swelling. 7 (17.5%) cases epiphora with discharge, 7 (17.5%) cases with epiphora and swelling had been noted. Our results, not tallied with N.N.Sood[11] study who had figures of 80% and 75% of patients presenting with complaints of combined epiphora and epiphora discharge respectively.In our case study of 40 patients, the highest number of patients with mucopurulent discharge were 33 (82.5%), followed by clear fluid were 2 (5%) and purulent were 5(12.5%).In this study of 40 cases the cause of failure in Group A was only in 1 case was due to granulation tissue formation around the stent. The cause of failure in Group B was due to failure in locating lacrimal sac was in 1 case, inadequate sac opening in 1 case, granulation tissue formation was in 2, synechiae was in 1 case. The present study correlates with the results of Guptha N[12] in which the causes of failure in a total of 60 failed Endo DCR cases are improper selection of cases 2(3.3%), low rhinostomy 30(50%), inadequate sac opening17(38.3%) contracture at rhinostomy site 6 (10%),associated laser canaliculitis 2(3.3%)laxity of lids and atonic sac 2(3.3%) associated pre existing canaliculitis 2 (3.3%).According to Onerci et al[13] the causes of failure in a total of 21 failed endoDCR cases done by inexperienced surgeons are failure to identify lacrimal sac 6cases(28.5%), bony spicules causing obstruction 5 cases(23.80%), synechiae 2 cases(9.52%), granulation tissue 2cases(9.52%), fenestration anterior to sac 2cases(9.52%),no reason found in 4cases(19.04%).The cause of failure in a total of 6 failed Endo DCR cases done by experienced surgeons are granulation tissue 4 cases (66.66%) atonic sac 1 case(16.66%) inadequate osteotomy 1case(16.66%). He noticed False localization of the lacrimal sac, granulation tissue formation, retained bony spicules, inadequate removal of the medial wall of the sac and the synechiae between the lateral wall and the middle turbinate are the most common causes of failure.Hull S et al[14] (2013) in their study of 19 revision DCR surgeries found, most common cause for failed DCR was a blocked ostium due to membranous scarring (74%). Multiple causes for failure were found in 9 of 19 cases. Adjunctive procedures during revision surgery included partial middle turbinectomy (53%) and anterior ethmoidectomy (21%).Ali MJ et al [15](2014) in their study noticed the most common cause of failure was from cicatricial closure of ostium in 55.5% (10/18) of the cases. Kominek P et al[16] (2011) in their study of 44 revision DCRs have noticed structural anomalies as the cause of failure. They are high DNS, hypertrophied middle turbinate, insufficient osteotomy, fibrosed rhinostomy site.Ralph Metson[17], 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. Welham and Wulc et al[1] found that problems with the size and location of the intranasal ostium were the cause of failure in 52% of cases. McLachlan[18] et al also found that obstruction of the intranasal ostium was the commonest cause of failure. Other causes included enlarged ethmoidal air cells obstructing lacrimal flow, and excessive scarring around the rhinostomy site.

Sprekelson and Barberan stated that the main cause of failure in DCR surgery is fibrosis of the intranasal ostium. 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 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[17].

Several prognostic factors may affect the outcome of primary ENDO-DCR. Önerci and co-workers demonstrated that Endo DCR is a relatively infrequent operation, with obvious learning curve. Thus, experience plays an important role in the success of the procedure.. Therefore, less experienced surgeons performing the procedure infrequently and alone increase the risk of failure.

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.In the present study the success rate was defined by an anatomically patent nasolacrimal system and by patient having relief of symptoms. Out of all 20 cases with endo DCR with stent, anatomic success was ascertained by irrigation at 6months after surgery in 19 cases which was 95%. Out of 20 patients in Group B without stent the anatomic success was 75% .In endo DCR with stenting the success rate is 95%. Out of 20 patients in Group A relief of symptoms was seen as 19 (95%) and in Group B the relief of symptoms was seen in 15 patients (75%) Failure rate was 5%(1) 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 the results were 95.7% respectively in cases of endoDCR with stent. The overall success rate of revision Endonasal DCR in our study was 76.66% at 6 months after surgery which is similar to other studies conducted by Kominek P which showed 84% respectively. Berryhill BH, Dorenbusch A 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 yielding a success rate of 92% in revision DCR.The success rate calculated on the basis of one or two attempts was 80% (37/46). Hesman Ali lbrahim, 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 success. In another study by Boush GA, Lemke BN, Dortzbach RK a total of 46 endonasal laser-assisted DCR 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 dacryocystorhinostomy Of these, five were successful [18-23].

Limitations of the Study:

1. The number of patients in the present study was not extensive, as has been the case in most other studies concerning the failure of endonasal DCR. This probably results from the relatively small number of failure cases in endonasal DCR.
2. The factors related to the wound healing and probably affecting the final ostium of DCR need to be analyzed.

Recommmendations for Further Study:

1. Bigger study should be undertaken to evaluate the factors for failure of endonasal DCR.
2. Factors related to wound healing need to be evaluated at molecular level.

Conclusion

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. Endoscopic Endonasal DCR with stent has the potential to reduce patient morbidity through greater utilization of local anaesthesia, shorter hospitalization period. .Endoscopic DCR with stent is a low complication technique that yields good esthetical-functional results. Endoscopic DCR requires formal training and steep learning curve. Endoscopic Endonasal DCR with stent is an effective treatment for patients who have failed primary endoscopic DCR. The use of endoscopic instrumentation provides excellent visualization for identification and treatment of the common causes of failure of the primary procedure. Most common causes of failure of endonasal DCR with stent are granulation tissue formation, synechiae formation, failure to identify the lacrimal sac. 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. Regular follow-up is necessary in the post operative period.

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