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Otorhinolaryngology

ANALYSING THE OUTCOMES OF ENDONASAL DACROCYSTORHINOSTOMY

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ABSTRACT Dacrocystitis has a very high incidence in india. It can be treated by external by external/ endonasal approaches of dacrocystorhinostomy. In the recent times a lot of emphasis was given upon the endonasal approach. This study throws light upon those factors and determines which amongst the two methods of dacrocystorhinostomy is better.

KEYWORDS : dacrocystitis, external/endonasal approaches , dacrocystorhinostomy

INTRODUCTION

Dacrocystitis is the infection of the lacrimal apparatus, this accounts for 20 in 10,000 people considering India is an overly populated country the incidence is very high[1]. The lacrimal apparatus consists of lacrimal gland, canaliculi, lacrimal sac and nasolacrimal duct. The lacrimal gland is responsible for the tear production which functions to lubricate conjunctiva. It evenly spreads along the convexity of eye by blinking mechanism. The excess fluid is collected near the medial canthus in the eye from where they go into upper and lower canaliculi . These two canaliculi join to form the common canaliculi which opens into lacrimal sac. The lacrimal sac is in continuation with nasolacrimal duct which opens 2mm away from the anterior most part of inferior turbinate.

Pathology occurs when there is obstruction in the lacrimal drainage pathway leading to stasis of the fluid and inturn infection , and that is called as dacrocystitis. To relieve the obstruction and treat the infection is the primary aim of management of dacrocystitis. While the control of infection could be done by antibiotics, the blockage can be removed by external/ endonasal approaches of dacrocystorhinostomy. In the recent times a lot of emphasis was given upon the endonasal approach because of various reasons, one of which being it is a scar less surgery and cosmetically more appealing. In this study we operated upon 109 patients of dacrocytitis and during this process we happen to study lot of factors associated with dacrocystorhinostomy. This study throws light upon those factors and determines which amongst the two methods of dacrocystorhinostomy is better.

AIMS AND OBJECTIVES

To study the technique of endonasal dacrocystorhinostomy.
To analyse the outcome of endonasal dacrocystorhinostomy in terms of success rate, failure and surgical aspects.

MATERIALS AND METHOD

It is a crossectional observational study conducted at MGM medical college and hospital for a period of 2 years from 2020 march to march 2022.

The follow up and subjective assessment of symptoms was done at 1 week , 1 month , 3 months and 6 months post operatively.

Study group – all patients who came to the ENT OPD of MGM Medical College and Hospital satisfying the inclusion criteria in the set study period were enrolled in the study after taking prior informed consent.

The inclusion criterion was
1] patients with complete or partial block with regurgitation from opposite punctum on sac syringing.
2] Patients with pyocele, mucocele , lacrimal fistula and congenital dacrocystitis
3] To achieve the patency of the lacrimal duct prior to the cataract operation.
4] Patient giving consent for endonasal dacrocystorhinostomy.

The exclusion criterion
1. Patients with regurgitation from same punctum on sac syringing.
2. Patients with previous Dacryocystectomy (DCT).
3. Patient non cooperative.
4. Patient with poor follow up.
5. Mentally retarded patients and pregnant patients.
6. Patient not fit for surgery in anaesthetic point of view.
7. Patients not giving consent for endonasal dacrocystorhinostomy.

EVALUATION OF TEARING PATIENTS:

Tearing is a symptom as well as a sign which may result from primary hypersecretion or secondary hypersercretion from ocular surfaces irritation and lacrimal drainage obstruction. All the patients who fit in inclusion criteria coming to ENT department of MGM medical college and hospital during a set period with complaints of tearing were examined. A detailed relevant history of the onset, duration and progression, nature of discharge, exposure to obnoxious substances, associated complaints of allergies, complaints such as redness, photosensitivity, photophobia, blurring or diplopia, ocular irritation or habits such as application of kajal / surma were taken.

Patients were interrogated about their prior history of malignant neoplasms, exposure to local radiation, chemotherapy involving head and history of previous injury or surgery of eyelid, face, nose and sinuses. Patients were inspected for any positional abnormalities of eyelid like lower lid retraction, upper and lower lid entropion or lower eyelid ectropion. The tone and eyelid laxity was also evaluated and the possibility of lidlag, lagophthalmos was noted. Thereafter sac syringing was done to establish the presence of blockage in the lacrimal system or lacrimal apparatus. A diagnostic nasal endoscopy of nose was done with 0 and 30 degree rigid endoscopes to rule out endonasal cause of nasolacrimal duct obstruction and note any other nasal pathologies that has to be addressed before performing endonasal dacrocystorhinostomy. All the routine blood investigations were performed along with chest x ray and ECG and after getting fitness from the anesthesia department the patients were taken for the surgery.

All the patients underwent endonasal dacrocystorhinostomy and none of them had any major life threating immediate post op complications. The patients were examined after 1 week , 1month , 3 months and 6 months postoperatively. At each follow-up, the patency of the stoma is determined by subjective resolution of symptoms of the patient and by observing a patent stoma in the lateral wall of the nose, as visualized by nasal endoscopy. During the postoperative follow-up, subjective assessment of symptoms was done at 1 week post-surgery and 1st, 3rd and 6th month post-surgery using the following grades:
0 - same
1 - Slight improvement.
2 - Significant improvement.
3 – Asymptomatic

Overall success rate calculated at the end of 6th month post-surgery after the follow up of patient at 1 month, 3 month and 6 month post-surgery.

Success was defined as:
Subjective resolution of all symptoms of lacrimal obstruction for a minimum period of 6 months post-surgery, the patency of the stoma by lacrimal sac syringing and observing a patent stoma in the lateral wall of the nose, as visualized by nasal endoscopy.

Failure was defined as:
Persistence or recurrence of symptoms during the follow-up period (minimum follow-up period being 6 months) or Closure of the stoma in the lateral nasal wall during the follow-up period due to any cause or the patient who had both closed stoma and persistent recurrent symptoms.

OBSERVATION AND RESULTS

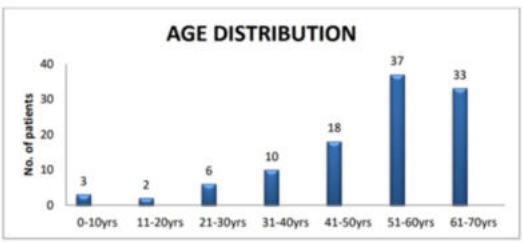
In present study 109 cases of chronic dacrocystitis with or without associated nasal pathology are included, excluding the drop out cases during the follow up period.

AGE DISTRIBUTION

Table: 1

Age group	Number of patients	Percentage (%)
0-10yrs	3	2.75
11-20yrs	2	1.83
21-30yrs	6	5.51
31-40yrs	10	9.18
41-50yrs	18	16.51
51-60yrs	37	33.94
61-70yrs	33	30.28
Total	109	100

Graph: 1



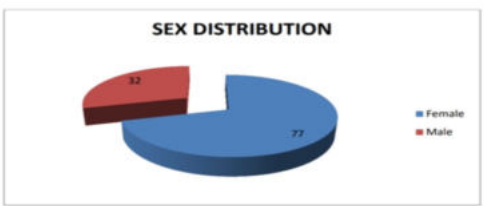
Age distribution of chronic dacrocystitis was analyzed. Maximum number of patient (37) was present in age group 51-60 years. Youngest was 6 years old and oldest was 70 years old.

DISTRIBUTION OF SEX

Table: 2

Sex	Number of patients
Female	77 (70.64%)
Male	32 (29.36%)
Total	109

Graph: 2



In our study female patients outnumbered the male patients. The number of female and male patients was 77 and 32 respectively. The female: male ratio is 2.40:1.

LATERALITY

Table 3: Side involved in patients studied

side	Number of patients	Percentage (%)
Left eye	72	66.05
Right eye	28	25.69
Both eyes	09	8.26
Total	109	100

In our study left eye involved more than the right eye. 72 patients (66.05%) presented with left eye complains and 28 patients (25.69%) presented with right eye complains and in 9 patients (8.26%) both eyes were involved.

SYMPTOMS

All patients were evaluated for the presenting symptoms.

Table 4: Symptoms

symptom	Number of patients	Percentage (%)
Watering of the eye	109	100
Swelling at corner of eye	43	39.45
Pain	18	16.51

The commonest symptom was watering of the eye in all 109 patients (100%), followed by swelling at the corner of the eye in 43 patients (39.45%). 18 patients (16.51%) had pain in the swollen lacrimal sac.

LACRIMAL SYRINGING TEST

Table 5:

Regurgitation from opposite punctum on syringing	Number of patients	Percentage (%)
Complete Block with Clear regurgitation	66	60.55
Complete Block with Mucopurulent regurgitation	43	39.45
Total	**109**	**100**

In our study 66 patients (60.55%) showed complete block with clear regurgitation from opposite punctum on lacrimal syringing test and 43 patients (39.45%) showed complete block with mucopurulent regurgitation from opposite punctum on lacrimal syringing test.

FOLLOW UP OF POSTOPERATIVE PATIENTS BY SAC SYRINGING

Table 8:

	NLD patent	Percentage (%)	NLD Blocked	Percentage (%)
1 week	109	100	0	0
1 month	101	92.66	8	7.34
3month	94	86.24	15	13.76
6month	94	86.24	15	13.76

In our study preoperative nasal endoscopy was done to look for the associated nasal pathology. 11 patients (10.09%) had deviated nasal

septum towards side to be operated. The septal deviation was interfering with surgical access to the lateral nasal wall. They underwent preliminary septoplasty to gain access to the surgical area. 8 patients (7.35%) had a hypertrophied inferior turbinate, which did not hinder surgery. 5 patients (4.59%) was having a concha bullosa interfering with surgical access to the lateral nasal wall. They underwent preliminary conchoplasty to gain access to the surgical area. 6 patients (5.50%) had congested nasal mucosa which did not hinder surgery. 3 patients (2.75%) had paradoxical middle turbinate which did not hinder surgery. In our study none of the patient had nasal polyp, nasal mass, nasal granuloma, rhinolith and nasal maggots as preoperative nasal endoscopic finding.

FOLLOW-UP

All patients in the study underwent an endonasal dacrocystorhinostomy. The patients were followed up at 1st week, 1 month, 3 month and 6 months post-surgery. The patients were subjectively assessed by relief of symptoms they had after the surgery. They were also assessed objectively by performing sac syringing and nasal endoscopy of each patient who came for follow up.

FOLLOW UP OF POSTOPERATIVE PATIENTS BY SAC SYRINGING

Table 8:

	NLD patent	Percentage (%)	NLD Blocked	Percentage (%)
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1 month	101	92.66	8	7.34
3month	94	86.24	15	13.76
6month	94	86.24	15	13.76

Follow up of postoperative patients by sac syringing is done at 1 week, 1 month, 3 month and 6 month post-surgery.

At the end of 1 week all patients were having patent nasolacrimal duct (NLD).

At the end of 1st month, 101 patients (92.66%) were having patent nasolacrimal duct and 8 patients (7.34%) were having blocked nasolacrimal duct.

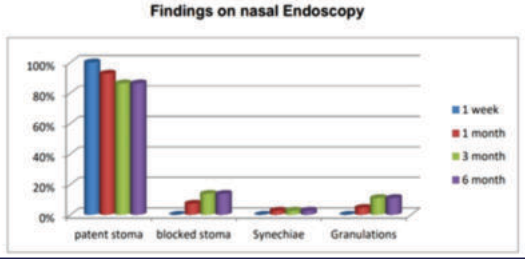
Results of sac syringing at the end of 3rd and 6th month were same. 94 patients (86.24%) were having patent nasolacrimal duct and 15 patients (13.76%) were having blocked nasolacrimal duct.

POST OPERATIVE NASOENDOSCOPY

Table: 9

Findings on nasal Endoscopy	1 week	1 month	3 months	6 months
Patent stoma	109 (100%)	101 (92.66%)	94 (86.24%)	94 (86.24%)
Blocked stoma	0	8 (7.34%)	15 (13.76%)	15 (13.76%)
Synechiae	0	3 (2.75%)	3 (2.75%)	3 (2.75%)
Granulations	0	5 (4.59%)	12 (11.01%)	12 (11.01%)

Graph 7:



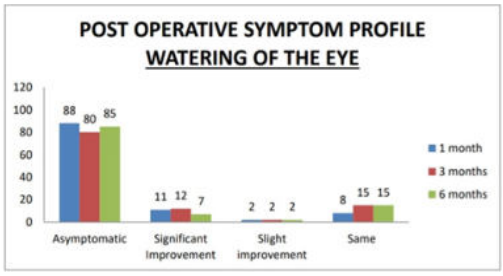
Post-operative follow up nasal endoscopy was done at the interval of 1 week, 1 month, 3 months and 6 months. At the end of first week post-surgery all 109 patients (100%) were having patent stoma, in the lateral nasal wall, which was well epithelialized. A free flow of tears was present, when the patient blinked. None of the patients were having blocked stoma, synechiae and granulations. At the end of 1 month post-surgery 101 patients (92.66%) were having patent stoma, in the lateral nasal wall, which was well epithelialized. A free flow of tears was present, when the patient blinked. In 8 patients (7.34%), stomal patency was not maintained. In 3 patients blocked stoma was because of synechiae between the stomal site and middle turbinate. In remaining 5 patients blocked stoma was because of extensive granulations around stomal site. Findings on nasal endoscopy were same at the end of 3 months and 6 months post-surgery. 94 patients (86.24%) were having patent stoma, in the lateral nasal wall, which was well epithelialized. A free flow of tears was present, when the patient blinked. In 15 patients (13.76%), stomal patency was not maintained. In 3 patients blocked stoma was because of synechiae between the stomal site and middle turbinate. In remaining 12 patients blocked stoma was because of extensive granulations around stomal site.

POST OPERATIVE SYMPTOM PROFILE: WATERING OF THE EYE

Table: 10

Watering of the eye	score	1 month	3 month	6 month
Asymptomatic	3	88	80	85
Significant improvement	2	11	12	7
Slight improvement	1	2	2	2
Same	0	8	15	15
Total		109	109	109

Graph 8:



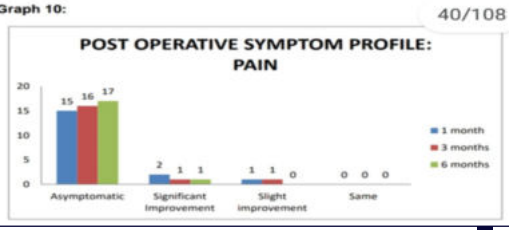
At the end of 6 months, in 15 patients complain of watering of the eye persists, 2 patients had slight improvement in watering of eye but had the intermittent epiphora after the surgical procedure, out of which 1 patient had the allergic conjunctivitis and another one had the laxity of orbicularis oculi muscle. 7 patients had significant improvement whereas 85 patients were asymptomatic. At the end of 6 months 84.40% of patients showed improvement.

POST OPERATIVE SYMPTOM PROFILE: PAIN

Table: 12

pain	score	1 month	3 month	6 month
Asymptomatic	3	15	16	17
Significant improvement	2	2	1	1
Slight improvement	1	1	1	0
Same	0	0	0	0
Total		18	18	18

Graph 10:



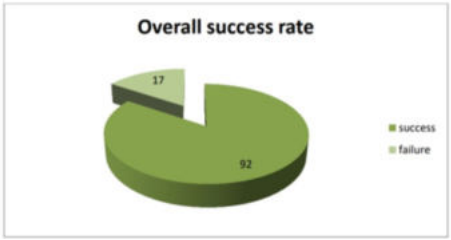
At the end of 6 months, no patients had complains of pain, no patients had slight improvement and 1 patients had significant improvement whereas 17 patients were asymptomatic. At the end of 6 months all patients (100%) showed improvement.

OVERALL SUCCESS RATE

Table: 13

Result	Number of patients	Percentage (%)
Success	92	84.40
Failure	17	15.60
Total	109	100

Graph: 11



After 6 months follow up period patients were declared surgical success when all symptoms of lacrimal obstruction were resolved surgically and patent stoma with free flow of tear was present in lateral nasal wall.

Surgical failure was declared after 6 month of follow up period when there was persistence or recurrence of symptoms or stoma had closed in lateral nasal wall or the patient who had both closed stoma and persistent/ recurrent symptoms. In present study 94 patients (86.24%) had patent stoma in lateral nasal wall, out of which 2 patients had intermittent epiphora even after patent stoma in lateral wall of nose due to allergic conjunctivitis in one patient and laxity of orbicularis oculi muscle in other patient. 15 patients (13.76%) had the blocked stoma in lateral nasal wall. In present study after the 6 months of follow up post-surgery, overall success rate with both patency and symptoms free was 84.60% (92 out of 109 patients) and 17 patients (15.60%) were declared surgical failure because in them 15 patients had both closed stoma and persistent or recurrent symptoms and 2 patients had intermittent epiphora even after patent stoma in lateral nasal wall due to allergic conjunctivitis in one patient and laxity of orbicularis oculi muscle in other patient.

CAUSES OF FAILURE

In a present study 17 patients (15.60%) were declared surgical failure after the 6 months of follow up post-surgery. Out of 17 patients, in 15 patients stomal patency was not maintained and 2 patients had intermittent epiphora even after the patent stoma due to allergic conjunctivitis in one patient and laxity of orbicularis oculi muscle in other patient. In these 15 patients in whom stomal patency was not maintained, 3 patients had blocked stoma because of synechiae between the stomal site and middle turbinate and in remaining 12 patients blocked stoma was because of extensive granulations around stomal site.

The causes of failure were as follows:

Table 14:

Causes of failure	Number of patients
Extensive Granulations around stoma that blocked the stoma	12
Synechiae between stomal site and middle turbinate that blocked the stoma	3
Intermittent epiphora due to allergic conjunctivitis even with patent stoma	1
Intermittent epiphora due to laxity of orbicularis oculi muscle even with patent stoma	1
Total	17

COMPLICATIONS

Table: 15

Complications	No. of operated cases
Bleeding during surgery	8 (7.34%)
Cellulitis of lower lid	3 (2.75%)
Granulations around the stoma	12 (11.01%)
Synechiae	3 (2.75%)

There were no major complications in any patient in present study. Bleeding during the surgery occurred in 8 patients (7.34%), cellulitis of lower lid occurred in 3 patients (2.75%) in immediate postoperative period, Granulations around the stomal site occurred in 12 patients (11.01%) at the end of 6 months and synechiae was present in 3 patients (2.75%) at the end of 6 months.

DISCUSSION

Endonasal dacrocystorhinostomy is the surgical procedure implied for the treatment of dacrocystitis which refers to the inflammation of the lacrimal apparatus. The above study conducted over 109 patients through light upon various aspects of the disease and its management. It not only tells us about the success rate about endonasal dacrocystorhinostomy, but also focuses upon various aspects such as age distribution, sex distribution, laterality of the disease, positive factors and proposes some other modalities by which the efficacy of this procedure could be improved. This study when compared with the previous studies have given us a good comparative data, which forms a strong base for us to authenticate our results.

Majority of the patients in our study were in the age group of 51-60 yrs which is of 5th decade of life, the youngest being 6yrs old and oldest being 70yrs old. This data was quite different from the studies of similar sort conducted by Dr. R. Bhanumuthy et al which showed majority of patients being from 3rd decade of life[2]. Other such studies conducted by Dr. Nirupama et al showed the majority of patients being from 21-30yrs of age . Therefore the occurrence of this disease happens to be more in 2nd and 4th decade of life.[3] It is interesting to note that there was a declining trend to extreme of ages due to the fact that lacrimal secretions is less in extreme of ages.[4]

We also noted that females were more commonly affected by chronic dacrocystitis which may be due to poor hygiene, exposure to smoke, dust, use of kajal which transmits infection and presence of congenital narrowing of nasolacrimal drainage system in females.

Upon carefully studying the data it was also noted that 72 patients had left sided disease while only 9 patients had isolated right sided disease. This finding clearly correlated with the claims of Arist who said that the left side was more involved than the right side because of the greater angle formed by the nasolacrimal duct and the lacrimal fossa on right side.[5] Other reason of this peculiar laterality could also be that more people were right handed and use their left hand to clean and wipe the eye while at work. There is also congenital narrowing of nasolacrimal duct on left side.

Watering from the eye was considered as one of the most important signs f/b swelling at the medial canthus of eye and pain. Therefore relief from epiphora and watering from the eye was considered as one of the most important signs of improvement and success of the operation. Patients were usually followed up at 1week, 1month, 3 month and 6 month post surgery. One could always question the need for multiple follow ups , answer of which lies in the study conducted by Bosh et al which showed that maximum surgical failures occurred within 3-4 months,[6] and probably that is the reason the royal college of ophthalmologist in their 1999 suggested that freedom from epiphora 3-4 months post surgery could be termed as the success of the operation.[7] Overall the critical period of follow up and chances of failure are between the period of 7-13 weeks after endoscopic surgery.
The absence of epiphora is the major indicator for the success of operation for the patient, for us the patency of stoma was the main indicator. This was because epiphora could occur due to allergic rhinitis and laxity of orbicularis oculi muscle as seen in 2 patients during the study. The other reasons of epiphora could be exposure keratopathy, poor lacrimal functioning, altered transmembrane absorption, small lacrimal punctum etc [8]. The success rate was about 84.60 % that was 92 patients amongst 109 had no complaints at the end of 6 months with complete relief from all the symptoms. While 17 patients had a failure of endonasal dacrocystorhinostomy mainly due to presence of granulation tissue by the end of 6 months which led to loss of patency of stoma. This was present in around 15 patients while 2 of them had epiphora due to allergic rhinitis and laxity of orbicularis oculi muscle respectively.[9]

Upon studying the various reasons for the failure of endonasal dacrocystorhinostomy it was found that apart from granulation tissue other causes could be poor postoperative follow up and care, small bony ostium , rough handling of nasal mucosa and damage to lateral wall of lacrimal sac, small fibrosed sac, retained bony specules.

Therefore upon contemplating we found that the success rate of dacrocystorhinostomy could be improved by the use of powered endonasal dacrocystorhinostomy instruments, which allows extensive and adequate osteotomies which inturn allows full exposure of lacrimal sac. Creating a large fistula causes lesser chances of granulation and synechiae. Use of mitomycin- c could prevent adhesions and scarring and use of tissue glues for the flaps, avoids the hindrance of the flap with the stoma and maintains the patency.

When compared with the other studies, the results endonasal dacrocystirhinostomy were almost similar to external dacrocystorhinostomy with extra advantage being the following:

It is a daycare surgery and there is no external scar involved in it.

It can be done in elderly and unfit patients who are contraindicated for external dacrocystorhinostomy.

Simultaneously nasal and paranasal sinuses pathology can be treated.

Regular evaluation and care of postoperative site is possible with the help of endoscopy.

It is more physiological as it preserves the lacrimal pump mechanism.

CONCLUSION

Endonasal dacrocystorhinostomy is cosmetic, less invasive procedure which maintains the normal anatomical and physiological lacrimal pump mechanism, with less bleeding and high success rate in terms of patient satisfaction. Endonasal dacrocystorhinostomy is surgery of choice for nasolacrimal duct obstruction. This procedure is also a safe and effective surgical procedure for children with the congenital nasolacrimal duct obstruction resistant to probing, irrigations and intubations. Primary endonasal dacrocystorhinostomy has proven highly successful as a procedure of choice for acute dacryocystitis with abscess preventing further episodes of abscess formation. An understanding of intranasal anatomy however is required for endoscopic surgery with appropriate endoscopic training. This procedure has fewer complications and is a day care procedure with high success rate. An associated nasal pathology like DNS, turbinate hypertrophy and concha bullosa can be corrected at same time of surgery of endonasal dacrocystorhinostomy. In this procedure there is minimum damage to anatomical structures and is a scar less surgery. Tearing is multifactorial and even patients with patent ostia may have tearing due to exposure keratopathy, poor lacrimal function or altered transmembrane absorption. Mutual efforts by Ophthalmologists and Otorhinologists made endonasal dacrocystorhinostomy a good alternative to external dacrocystorhinostomy. Regular follow ups are required to evaluate the process of wound healing and early detection of complications leading to failure of the procedure.

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