

ORIGINAL RESEARCH**Endoscopic Dacryocystorhinostomy: A Study at a Tertiary Care Hospital in the Eastern Part of Odisha****¹Dr. Monalisa Patsani, ²Dr. Subhalaxmi Rautray, ³Dr. Gaveshani Mantri, ⁴Dr. Subrat Kumar Behera**

¹Assistant Professor, Department of ENT and HNS, SCB Medical College and Hospital, Cuttack, Odisha, India.

²Associate Professor, Department of ENT and HNS, SCB Medical College and Hospital, Cuttack, Odisha, India.

³Senior resident, Department of ENT and HNS, SCB Medical College and Hospital, Cuttack, Odisha, India.

⁴Professor and HOD, Department of ENT and HNS, SCB Medical College and Hospital, Cuttack, Odisha, India.

Corresponding Author: Dr. Monalisa Patsani

Received: 08 June, 2023

Accepted: 03 October, 2023

ABSTRACT

Background: Chronic dacryocystitis is a very common problem in the old age population which is treated with Dacryocystorhinostomy (DCR) surgery. The aim of our study is to analyze the clinical profile of patients suffering from distal nasolacrimal duct obstruction and the outcome of ENDO-DCR surgery without stenting.

Methods: This is an observational study carried out at the Department of ENT, SCB MCH a tertiary care hospital in the eastern part of Odisha from April 2021 to April 2022. This study includes 30 patients who underwent ENDO-DCR surgery at the ENT dept during the above-mentioned period. A detailed examination was done and all records of preoperative, intraoperative, and postoperative findings were analyzed.

Result: The total number of patients included in this study was 30 out of which 26 people had unilateral eye involvement and 4 people had both eye involvement. Among them, 18 were female and 12 were male patients. The most common presenting symptom was epiphora in 70% of cases which was followed by medial canthus swelling in 20% of cases. We have done Endo DCR surgery on all patients under general anesthesia without stenting. Here we used either the Kerrison punch or a powered drill for making a fistula over the medial wall of the lacrimal sac and it has been found that the use of the Kerrison punch reduced the time of surgery significantly as compared to the drill. We have followed the patients for 3 months and found that there was stenosis of the neo-ostium in 3 numbers of cases with a success rate of 91%.

Conclusion: Our observational study showed that patients undergoing EndoDCR surgery have fewer surgery-related complications, more patient satisfaction, and an almost equal success rate to external DCR for the treatment of primary acquired nasolacrimal duct obstruction.

Keywords: Chronic dacryocystitis, Endoscopic DCR (Endo-DCR), Epiphora, Nasolacrimal duct (NLD), External DCR.

INTRODUCTION

Dacryocystitis is a medical condition where there is inflammation and infection of the lacrimal sac usually it is associated with nasolacrimal duct obstruction and subsequent stagnation of tears in the lacrimal sac. Gradually there is inflammation of the lacrimal sac leading to dacryocystitis. Clinically when there is long-standing lacrimal sac inflammation, it will appear as swelling of the medial canthus area. Chronic dacryocystitis occurs after longstanding obstruction of NLD (nasolacrimal duct) due to primary causes or acquired causes. It may be systemic diseases, repeated infection, dacryoliths, and chronic inflammatory debris of the nasolacrimal system. Some common systemic diseases include Wegener's granulomatosis, sarcoidosis, and systemic lupus erythematosus. Trauma, surgeries, medications, and neoplasms affecting NLD are some acquired causes. Among traumatic causes of nasolacrimal obstruction, nasoethmoid fractures seem to be the most common. Chronic dacryocystitis patients present to ophthalmology OPD with complaints of epiphora, discharge, or medial canthal swelling. Some series found these above symptoms of chronic dacryocystitis are approximately 3% of total symptoms presented to ophthalmology OPD[1]. People having DCR may present with pain, redness, swelling, and epiphora which is an overflow of tears. This is very bothersome and irritating to the patients, which could be a social embarrassment. Commonly dacryocystorhinostomy (DCR) surgery is done through an external approach to make a fistula in between the lacrimal sac and nasal cavity with a success rate of 95% and above[2]. However after the invention of the endoscope due to the panoramic view of the endoscope and digital

quality imaging, ENDO-DCR has gained its popularity. Endodacryocystorhinostomy (ENDO-DCR) is a surgery that is performed through the nose endoscopically to make a common passage between the lacrimal sac and nasal cavity by making an artificial fistula at the nasolacrimal sac. The intranasal procedure was first introduced by Caldwell in 1893 by creating a fistula through the endonasal trephining procedure[3]. McDonogh and Meiring first used a 30-degree Hopkin Endoscope for visualization of the lacrimal system during transnasal DCR surgery, which they named Endo-DCR[4]. But combined use of endoscope and LASER during DCR surgery was first described by Gonnering et al in 1991, they referred it to as endoscopically laser-assisted lachrymal surgery[5]. Recently LASERs like Holmium YAG LASER, Carbon dioxide LASER, and KTP LASER are used to create a fistula in between the medial wall of the lacrimal sac and the lateral wall of the nose. Our study has been done in a tertiary hospital present in the eastern part of Odisha serving a large population from lower and middle socio-economic status. So, for the cost-effectiveness and unavailability, we have done the surgery without LASER and silicon stent. We have used the conventional Kerrison punch and power drill for making the fistula.

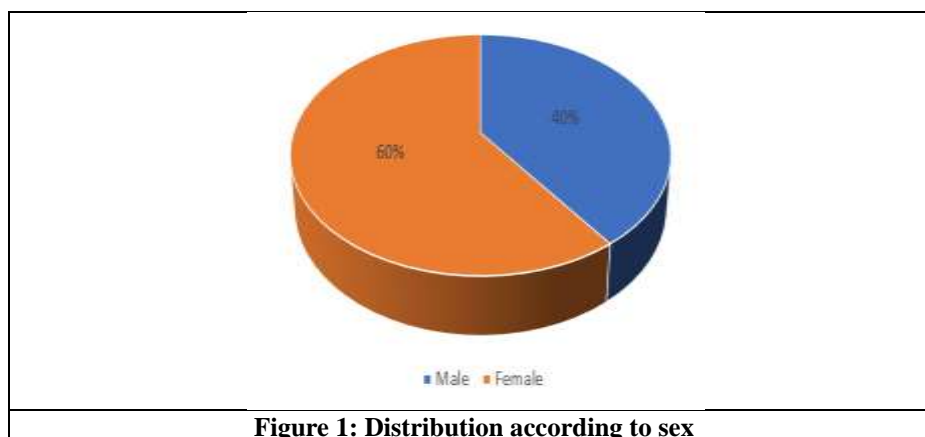
AIM: This is an observational study carried out at the department of ENT SCB MCH, Cuttack, a tertiary care hospital in the eastern part of Odisha. The aim of the study is to analyze the clinical profile of patients suffering from distal nasolacrimal duct obstruction and the outcome of ENDODCR surgery without stenting.

MATERIALS AND METHODS: This observational study was done between April 2021 to April 2022 on the patients who have undergone ENDO-DCR surgery at the ENT department. The total number of operated eyes was 34 out of which 26 people had unilateral and 4 people had bilateral involvement. Total number of patients who underwent surgery were 30. All patients have been examined at the ophthalmology department with pressure over the lacrimal sac for the regurgitation of any fluid from the punctum, syringing, and probing. Informed consent was taken from all the patients.

Inclusion criteria: Those patients having (a) confirmed NLD obstruction; and (b) an age group of more than 18 years were included in this study.

Exclusion criteria: Those patients (a) having obstruction prior to NLD; (b) not willing for endoscopic surgery; (c) unfit for surgery; (d) paediatric cases; were excluded from the study. All patients underwent clinical examination at the Department of Ophthalmology and Otolaryngology. The history was taken and a proper clinical examination was done including anterior, and posterior rhinoscopy and diagnostic nasal endoscopy to rule out any anatomical variations and associated pathology. The patients were explained about the disease pathology and the risks, outcomes, and complications related to the ENDO-DCR surgery. They were prepared for surgery under general anesthesia. They have all routine blood investigations, cardiological investigations, and pulmonary investigations. After general anesthesia, a nasal pack was given with 4% xylocaine with 1:100,000 adrenaline solution, and this pack was kept medial to the middle turbinate and anterior to it for 10 minutes. Then 2% xylocaine with 1:100,000 adrenaline solution was infiltrated around the anterior and superior attachment of the middle turbinate. With the help of 15 number blade incisions given on the mucous membrane 5mm superior and anterior to the upper attachment of the middle turbinate. Posterior based mucosal flap elevated and anterior lacrimal crest and lacrimal bone identified. Then with the help of Kerrison punch bone was removed from that area to expose the lacrimal sac. In the case of hard bone powered drill was used to expose the lacrimal sac. Then stab knife was used to give a vertical incision over the medial wall of the lacrimal sac without injuring the lateral wall. Then two flaps anterior and posterior were created and placed away from each other. The mucosal flap is then divided to make in two halves and then positioned properly to cover superior and inferior exposed bone. Merocele nasal pack placed in the same side nasal cavity which has to be removed after 72 hrs. The patients are usually discharged on day 3 post-op period with the advice of lachrymal sac exercise and to maintain nasal hygiene. They have to be followed up after 15 days, 1 month and 4 months for endoscopic nasal examination.

RESULT: The total number of patients included in this study was 30 out of which 26 people had unilateral eye involvement and 4 people had both eye involvement. Here we found 18 (60%) female patients and 12(40%) male patients (Table 1). In our study, female patients outnumbered male patients with a ratio of F: M = 1.5: 1. The age of the youngest patient in our study was 26 yrs. and the age of the oldest patient was 72 yrs.



In our study 18 people belonged to lower socioeconomic status, 10 people came from upper lower socioeconomic class and the rest 2 belonged to lower middle class (Table 1).

Socio-economic class	Number of Patients
Upper	0
Upper-Middle	0
Lower-middle	2
upper lower	10
lower	18
Total	30

Table 1: Distribution of cases according to socioeconomic class (modified Kuppuswamy classification)

Out of 30 patients 16 (53.33%) people presented with left-side disease, 10 (33.33%) patients presented with right-sided disease, and 4 (13.33%) presented with bilateral disease (Table 2).

Side of complaints	No. of patients
Right	10
Left	16
Bilateral	4
Total	30

Table 2: Distribution of cases according to side of involvement

The most common presenting symptom in our study was watery eye discharge presented by 21 patients (70%), which was followed by the presence of swelling over the medial canthus of the eye in 6 patients (20%). Only 3(10%) patients presented with complaints of swelling over the medial canthus with purulent eye discharge (Table 3).

Chief complaints	No. of patients
watery eye discharge	21
swelling over medial canthus of eye	6
swelling over medial canthus with purulent eye discharge	3

Table 3: Distribution of cases according to chief complaint

Out of 30 patients, 8 patients had hypertension, 6 had diabetes, 2 patients suffered from both hypertension and diabetes and only one had a history of tuberculosis (Table 4).

Systematic diseases	No. of patients
hypertension	8
diabetes	6
Both hypertension and diabetes	2
tuberculosis	1

Table 4: Distribution of cases according to co-existing systemic disease history

We found DNS on the same side in 7 patients and both DNS and Concha bullosa in 2 patients. In Endo-DCR surgery we used conventional Kerrison punch in 18 patients and powered drill in 12 patients. Here we found use of punch caused more reduction in surgery time as compared to the drill. In Kerrison punch, we had taken approximately 60 minutes to 90 minutes, but in drill used patients it took approximately 75 minutes to 120 minutes. (Table 5).

	Kerrison punch	Powered Drill
Number of Patients	18	12
Operating time (Minutes)	60-90 min	75-120 min

Table 5: Operating time according to the equipment of endoscopic DCR

In the case of 25 affected eyes, we found pus coming out of the lacrimal sac after giving an incision over the medial wall of the sac. Samples were collected from the lacrimal sac and sent for bacterial culture and sensitivity to the Department of Microbiology. Out of these 25 samples, we got bacterial growth only in 17 samples. *Staphylococcus aureus* was the most common organism isolated from 9 (52%) affected eyes, *Klebsiella pneumoniae* was found in 4 samples (23.5%), *Pseudomonas aeruginosa* found in 2 samples (11.7%) and another 2 (11.7%) samples were positive for Gram-negative bacilli (Table 6).

Organism In Culture And Sensitivity Report	No. Of Patients
<i>Staphylococcus Aureus</i>	9
<i>Klebsiella Pneumoniae</i>	4
<i>Pseudomonas Aeruginosa</i>	2
Gram Negative Bacilli	2
Total	17

Table 6: Distribution Of Cases According To Organism In Culture And Sensitivity Report

Out of 34 operated eyes, only 3 eyes have shown stenosis of ostium at 3 months follow up, so the success rate of ENDO DCR surgery without stenting in our study was 91%.

DISCUSSION

Endo DCR is a surgical procedure which is done to make a passage between the nasolacrimal sac and nasal cavity, is a very effective method to tackle symptoms like epiphora and swelling in the medial canthus of eye due to nasolacrimal duct obstruction. This is a scarless surgery as compared to external DCR, where we can manage simultaneously other nasal problems like DNS, hypertrophy of the middle turbinate, concha bullosa and others.

In our study, a total number of 30 patients were included, out of which 26 patients had unilateral eye involvement and 4 patients had bilateral eye involvement. Here, there are 18 (60%) females and 12(40%) males. In our study females were found to be more affected than males which is comparable to other studies like Saha, Kumar [6] found that females outnumbered males. In 2013 the study done by Das, Sarkar [3] also found similar results where 53.7% of females and 46.3% of males were affected[3]. In another study by R Sorathiya et al they also had similar results of females (67%) affected more than males (33%)[7]. Anatomically the NLD system of females shows smaller dimensions in the lower nasolacrimal fossa and the middle NLD. This anatomical variation explains why females are more affected by acquired NLD obstruction than males[8]. Here we have 18 people from lower socioeconomic status, 10 people from upper lower socio-economic class and the remaining 2 belong to lower middle class, which is similar to other studies like Das, Sarkar[3]. In our study out of 30 patients 16 (53.33%) people presented with left-side disease, 10 people presented with right-sided disease (33.33%) and bilateral disease in 4 people (Table 2) which is also in accordance with other studies like Sorathiya. Desai[7]. The involvement of the left eye is more than right eye because the left nasolacrimal duct is narrower than the right side. In our study we found more aged people were affected than the younger population because involutional stenosis of the nasolacrimal duct is more common in aged individuals[9], this affects females twice as much as males. The most common complaint was epiphora presented by 21 patients (70%), which was followed by the presence of swelling over the medial canthus of the eye in 6 patients (20%). Only 3(10%) patients presented (Table 3) with complaints of swelling over the medial canthus with purulent eye discharge which is also similar to others like Sorathiya et al[7]. They found 76% of people presented with epiphora and 20% had swelling in the medial canthus of eye[7]. In our study out of 30 patients 8 patients suffered from hypertension, 6 were associated with diabetes, 2 patients had a history of both hypertension and diabetes, whereas only one had a history of tuberculosis (Table 4). Here we found those who have diabetes had an increased rate of restenosis in their follow-up. Out of our 3 patients who had restenosis of neo-ostium at 3-month follow-up 2 had diabetes. This is in accordance with other studies like Sorathiya. Desai[7], it may be due

to more chances of granulation formation in diabetic people. In our study we got 7 patients had DNS and 2 patients had DNS with Concha bullosa, which has been corrected in the same sitting surgery endoscopically. It has been seen that DNS and concha bullosa are not exactly the cause of NLD block, but the correction of this was required for better surgical intervention and better visualization of NLD surgery. There was no significant difference in the success rate of Endo DCR surgeries by use of either Kerrison punch or drill. However, there was a significant reduction in time for surgery in the Kerrison punch (Table 5). This may be due to thicker bone over the area medial to the lacrimal sac takes a lot of time to drill it slowly. Which is also similar to other studies like Islam, Bawazeer[10]. In their study they found it with the use of a drill the time taken in surgery is approximately 125 min, but in Kerrison's punch, it took approximately 75 min. According to another study by Sheikh, Vaze[11], there was also a similar result of significantly reduced mean operating time by use of the Kerrison punch as compared to the drill. In our study, we have not used silicone stenting in any cases, we found there is no significant change in the success rate of Endo DCR surgery with and without stenting of NLD. This is also similar to other studies like Chin, Lam[12] over stenting and ostium packing. They found mechanical adjuvants were useful only to improve anatomical but not functional success. Other factor like the patient's age and ostium shape, affects the ostium healing process and functional outcome, which is more important than anatomical patency[12]. Out of 30 patients, we found pus in 25 eyes and that was sent for culture sensitivity. Out of these 25 samples, we got bacterial growth only in 17 samples. *Staphylococcus aureus* was the most common organism isolated from 9 affected eyes (52%), *Klebsiella pneumoniae* was found in 4 samples (23.5%), *Pseudomonas aeruginosa* found in 2(11.7%) samples and another 2(11.7%) samples were positive for Gram-negative bacilli (Table7). Other studies like Sorathiya Desai[7] and Shah, Santani[13] also found *Staphylococcus aureus* as the most commonly isolated organism. We followed the patients after 1 month and 3 months. The success rate was established depending on the patency of neo-ostium and the improvement of symptoms like epiphora. In our study out of 30 patients with 34 eyes affected there is only failure in 3 cases in both 1-month and 3 month follow up. The failure has been established after syringing, and found to have regurgitation of fluid. This was due to the formation of granulation tissue at the neo-ostium area. Out of 3 failure patients, 2 had diabetes. In a study done by S Keren et al, the success rate was 94.7%. They had correlated failure significantly with the coexistence of diabetes mellitus ($P=0.037$), allergy to medications ($P=0.034$), and prior ocular surgery ($P=0.043$)[14]. The success rate in our study is 91.17%. Other studies like Sorathiya Desai[7] also found 94% success in primary cases. We have not found any hazardous complications like orbital hematoma, subcutaneous emphysema, retrobulbar hemorrhage, medial rectus paralysis, or orbital fat herniation in any of our cases during surgery. Patient satisfaction is high in Endo DCR surgery as compared to external DCR as it is a scarless surgery and hospital stay is less with less time to return to work. Also, have fewer follow-up visits as it is sutureless surgery.

CONCLUSION

Our observational study showed that patients undergoing EndoDCR surgery have fewer surgery-related complications, more patient satisfaction, and an almost equal success rate to external DCR. So all patients should be considered for Endo DCR surgery without stenting except for special cases like revision surgery or any distorted anatomy of the nasolacrimal system.

REFERENCES

1. Raslan, O.A., et al., A Comprehensive Review of Cross-Sectional Imaging of the Nasolacrimal Drainage Apparatus: What Radiologists Need to Know. American Journal of Roentgenology, 2019. 213(6): p. 1331-1340.
2. Chandler, P.A., Dacryocystorhinostomy. Trans Am Ophthalmol Soc, 1936. 34: p. 240-63.
3. Das, S.K., et al., Endoscopic Dacryocystorhinostomy: A Study at IPGMER, Kolkata. Indian Journal of Otolaryngology and Head & Neck Surgery, 2013. 65: p. S366-S370.
4. McDonogh, M. and J.H. Meiring, Endoscopic transnasal dacryocystorhinostomy. J LaryngolOtol, 1989. 103(6): p. 585-7.
5. Gonnering, R.S., D.B. Lyon, and J.C. Fisher, Endoscopic laser-assisted lacrimal surgery. Am J Ophthalmol, 1991. 111(2): p. 152-7.
6. Saha, R., et al., Endoscopic V/s External Approach DCR: A comparative Analysis. Infection, 2015. 49: p. 61-20.
7. Sorathiya, R., et al., A study of clinical profile of patients undergoing endonasal endoscopic dacryocystorhinostomy without stenting in a teaching hospital of Western Gujarat. International Journal of Otorhinolaryngology and Head and Neck Surgery, 2022. 8(2): p. 115.
8. Groessl, S.A., B.S. Sires, and B.N. Lemke, An anatomical basis for primary acquired nasolacrimal duct obstruction. Arch Ophthalmol, 1997. 115(1): p. 71-4.
9. Jawaheer, L., C.J. MacEwen, and D. Anijeet, Endonasal versus external dacryocystorhinostomy for nasolacrimal duct obstruction. Cochrane Database Syst Rev, 2017. 2(2): p. CD007097.
10. Islam, H.A., et al., Endoscopic Dacryocystorhinostomy (DCR): a comparative study between powered and non-powered technique. Journal of Otolaryngology-Head & Neck Surgery, 2015. 44.
11. Sheikh, S., V. Vaze, and A. Bajaj, Merits of Kerrisons punch over powered drill in endonasal DCR. Int J Otorhinolaryngol Head Neck Surg, 2019. 5(2): p. 387.

12. Chin, J., et al., Comparative study of stenting and ostium packing in Endoscopic Dacryocystorhinostomy for Primary Acquired Nasolacrimal Duct Obstruction. *Sci Rep*, 2020. 10(1): p. 46.
13. Shah, C.P. and D. Santani, A comparative bacteriological profile and antibiogram of dacryocystitis. *Nepal J Ophthalmol*, 2011. 3(2): p. 134-9.
14. Keren, S., A. Abergel, and A. Manor, Endoscopic dacryocystorhinostomy: reasons for failure. *Eye (Lond)* 34: 948–953. 2020.