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Original Article

A Comparative Study of Surgical Outcome of Endoscopic Endonasal Dacrocystorhinostomy with and Without Stent

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ABSTRACT

OBJECTIVE: To compare the surgical outcome of endoscopic endonasal dacrocystorhinostomy (DCR) with and without stent in patients with chronic dacrocystitis due to nasolacrimal duct block.
METHODS: This was a prospective study done in Mallareddy institute of medical sciences, suraram involving 60 patients who were diagnosed with chronic dacrocystitis and underwent endonasal DCR between august 2022 to july 2024. Out of 60 patients, 30 were done with stent and other 30 without stent. Follow up was done for 6 months. Evaluation was done on subjective and objective assessment.
RESULTS: The outcome was evaluated at the end of 3 and 6 months using chi square test. . The success rate at the end of six months was 90% with stented patients and 93.3% with non-stented patients (p-value - 0.64); at six months. . The final endoscopy at the end of 6 months showed 93.3% of patients who underwent stenting had a patent rhinostomy opening, and 90% of those who were not stented had a patent opening.
CONCLUSION: Our study showed that patients with chronic dacryocystitis who underwent endonasal DCR with and without stenting had almost similar results. There was no significant difference in the outcome. So, we concluded that generally all the patients should be considered for endonasal DCR without a stent, except in special cases like revision endonasal DCR, lacrimal gland cysts, fistulas, and patients with sinonasal pathology, in whom silicon stents can be preferred.

Keywords: *Surgical, Endoscopic, Dacrocystorhinostomy, chronic dacrocystitis.*

INTRODUCTION

Epiphora is a common annoying symptom that embarrasses the patient, both socially and functionally, and may even endanger the eye. It is in contradiction to lacrimation, caused by the imperfect drainage of tears through lacrimal passage. Lacrimation occurs due to excessive tear production. Dacryocystitis represents acute and chronic inflammation of lacrimal sac. Chronic dacryocystitis is the most common cause of epiphora (87%) [(1)]

Obstruction of the nasolacrimal duct (NLD) can be divided into primary and secondary forms. The primary blockage of NLD is caused by inflammation and fibrosis for no apparent reason [(2,3)]

Secondary NLD block may be due to disease, inflammatory reaction, neoplastic, traumatic, or mechanical obstruction. It has been seen that primary obstruction of the NLD is seen mostly in middle-aged and older women, the reason being that they have a smaller middle NLD and nasolacrimal fossa [(2,4)]

The best curative option for NLD obstruction is dacryocystorhinostomy. It was first described by Toti in 1904 [5,6]. Later, endonasal or endoscopic approaches gained popularity because of the disadvantages of an external approach, like bleeding, increased time during surgery, and an external scar.[7,8]

In 1989, McDonogh and Meiring described endoscopic transnasal DCR . The merits of endonasal dacryocystorhinostomy are no scar, quicker surgery, and minimal blood loss.[9]

The success of endoscopic dacryocystorhinostomy (EnDCR) are revolutionized by the introduction of high resolution endoscopes. [10] EnDCR over the past decade have replaced conventional external DCR in correcting primary and recurrent lacrimal obstruction. [11,12] The aim of DCR surgery is not only to establish a free passage between lacrimal sac and nasal cavity but also to keep this passage patent. The long-term results are good though some failure has been reported that is most commonly attributed to stenosis or closure of rhinostomy. To overcome this, insertion of silicone stent is recommended.

Inspite of several advantages of EnDCR, there are higher failure rate due to the obstruction of neo-ostium by granulation and synechia that forms postoperatively. [13] Neoostium closure was considered a major factor for surgical failure.[10]

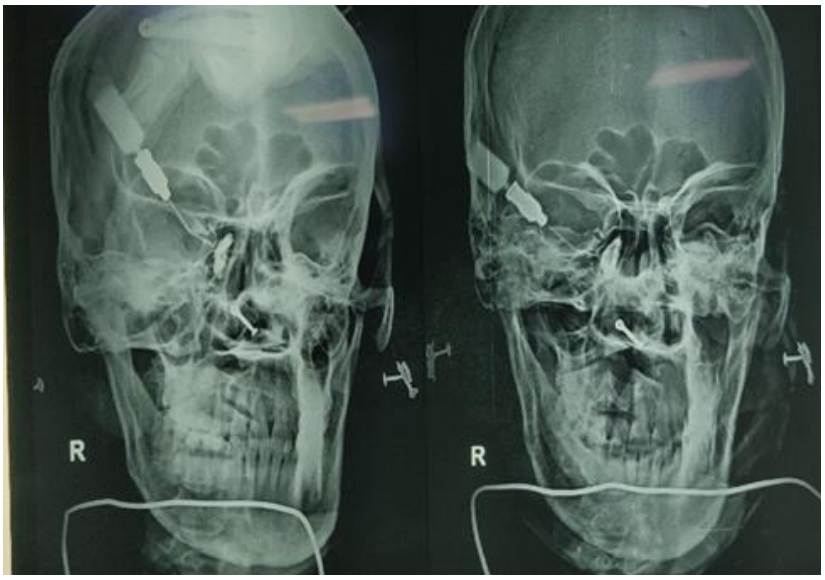
In recent years, there have been a number of modifications to the procedure of endonasal DCR, including the use of silicon stents and the use of lasers like argon, carbon dioxide, potassium titanyl phosphate, and yttrium aluminum garnet (YAG). The latest is a transcanalicular approach with a neodymium-doped YAG laser that has also been described [9,12,14,15,16]

MATERIALS AND METHODS

This was a prospective study done at Mallareddy institute of medical sciences , suraram, hyderabad. It involved 60 patients who were diagnosed with chronic dacryocystitis and underwent endonasal dacryocystorhinostomy between August2022 and July 2024.

Patients of either sex, having symptom and signs suggestive of chronic dacryocystitis, were enrolled in the study. Informed consent was obtained. Detailed evaluation of patient including history and ophthalmic examination including visual acuity and sac syringing was done.

Thorough clinical evaluation of nose and paranasal sinuses (PNS) was done to rule out any nasal and paranasal causes of duct obstruction. Routine blood investigations , X-Ray dacrocystogram and diagnostic nasal endoscopy were done. Systemic evaluation and fitness for surgery was obtained for local anesthesia and general anesthesia.



Many surgeons advocate the use of silicone stent placed as a loop in the superior and inferior canaliculi, through the common canaliculus and lacrimal sac into nose.

Silicon stents may lead to surgical failure by traumatic granulation tissue, punctual erosion or slitting of the canaliculi. [17]

The age of the patients selected between 18 and 60 years. The exclusion criteria included those below the age of 18, any eyelid anomalies, previous dacryocystorhinostomies, and any sinonasal pathology like chronic sinusitis, sinonasal polyposis, etc.

Out of the 60 patients, 30 underwent endonasal DCR with a stent (GROUP A), and 30 of them underwent endonasal DCR without a stent (GROUP B). The patients in group A were explained about the stents. The follow-up duration for these patients was 6 months after the surgery, during which they visited the OPD (outpatient department) at three months, six months. They were assessed on the basis of a modified five-point Likert scale, which is a subjective assessment score.

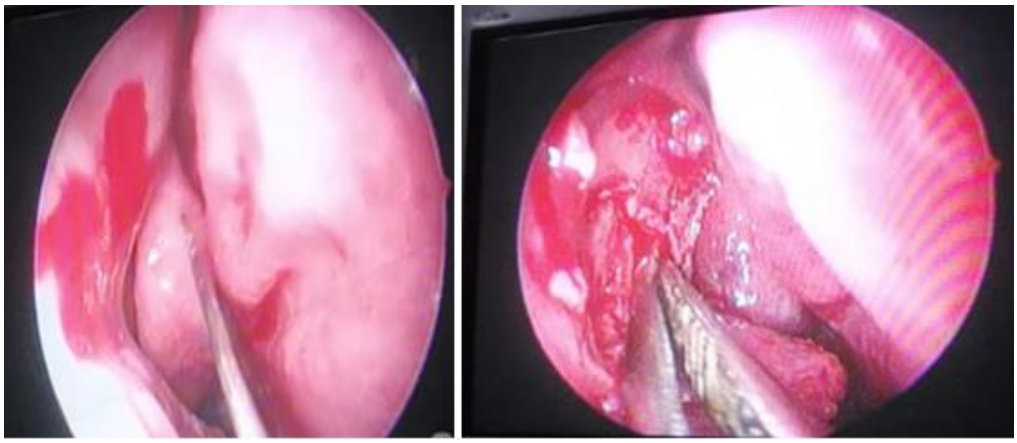
SURGICAL TECHNIQUE

In this study, all the patients underwent endonasal dacryocystorhinostomy under general anesthesia, using zero-degree and 45-degree endoscopes . Part painted and draped under all aseptic precautions. Nasal cavities were decongested with 1:100,000 adrenaline in a 4% xylocaine solution and the lateral wall on the side of the disease.

A "C"-shaped incision, horizontal incision 8mm above the axilla of middle turbinate was made on the lateral nasal wall extended anteriorly to the attachment of the middle turbinate, another horizontal incision parallel to the above and both joined by vertical incision

A posteriorly based mucoperiosteal flap is elevated over the maxillary and lacrimal bones. The respective bones were identified, and the site of the lacrimal sac was located.

The thick bone over the frontal process of the maxilla was removed using Smith-Kerrison punch forceps. The lacrimal sac was identified by passing a probe through lower punctum and tenting.



A linear, vertical incision was made in the sac using a sickle knife, and the sac was opened. The vertical incision was converted into a book-shaped incision. The patency and flow of the dacryocystorhinostomy were confirmed using syringing. The mucosal flap was refashioned and repositioned on the lateral wall.

In patients who were selected for stenting (GROUP A) ,the stent was passed through the lower punctum and pulled into the nose through the neoostium and later the other end was passed through the upper punctum and pulled out into the nose through the same neoostium and 3 to 4 knots were put in the nose . the free ends of the stents were taped externally on the vestibule for easy accessibility postoperatively.

A small gelfoam pack is placed in the exposed sac and the nasal cavity was packed with soframycin ribbon pack and removed after 48 hours.

Postoperatively, patients were prescribed antibiotics, anti-inflammatory drugs, and antihistaminics . after pack removal - nasal saline sprays prescribed. Lacrimal massage was encouraged. The stent was removed after one month of surgery. The results of the surgery were assessed at three months, six months using a **modified five-point Likert scale**

RESULTS

A successful outcome was indicated by either complete resolution (score 1), significant symptomatic improvement (score 2), or slight improvement (score 3). Unsuccessful outcomes included no improvement (score 4) or worsening of symptoms (score 5).The outcome was evaluated at the end of three months, six months, and 12 months for both groups (patients with and without stents) using the Chi-square test

TABLE 1. AGE DISTRIBUTION

AGE (YEARS)	NO. (%)
18-30	5 (8.3%)
18-30	21 (35%)
46-60	34 (56.6%)

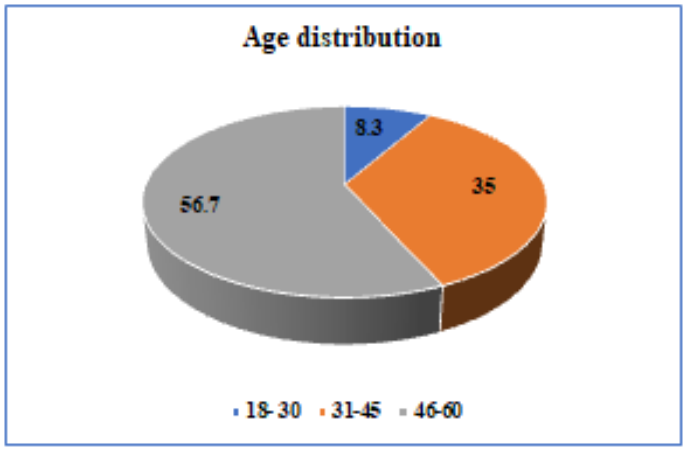


TABLE 2. GENDER DISTRIBUTION

GENDER	NO. (%)
MALE	17 (28.3 %)
FEMALE	43 (71.6 %)

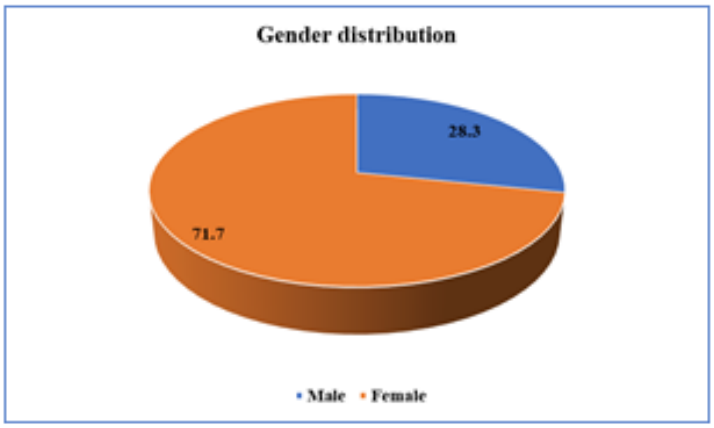


TABLE 3. SUBJECTIVE ASSESSMENT AFTER 3 MONTHS

MODIFIED LIKERT SCALE	WITH STENT (N=30)	WITHOUT STENT (N=30)
No symptoms	22	26
Significant improvement	4	2
Slight improvement	3	2
No improvement	1	0
Worsening of symptoms	0	0
RESULTS	26 (86.6 %)	28 (93.3 %)

TABLE 4. SUBJECTIVE ASSESSMENT AFTER 6 MONTHS

MODIFIED LIKERT SCALE	WITH STENT(N=30)	WITHOUT STENT(N=30)
No symptoms	22	26
Significant improvement	4	2
Slight improvement	3	2
No improvement	1	0
Worsening of symptoms	0	0
RESULTS	26 (86.6%)	28 (93.3 %)

Chi-square=2.2, p=0.532 (Not significant) Both groups had similarly high success rates—86.7 % with stent vs. 93.3 % without—while "no improvement" was rare and no one worsened. The difference is not statistically significant ($\chi^2 = 2.2$, $p = 0.532$), indicating stenting does not impact patient-reported outcomes.

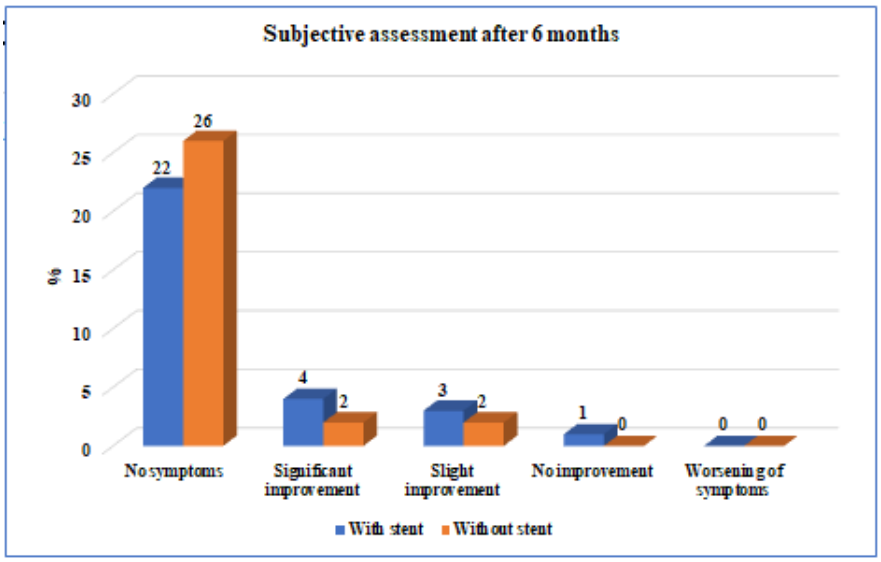


TABLE 5. SYRINGING RESULTS AFTER 3 MONTHS

	WITH STENT (N=30)	WITHOUT STENT (N= 30)
PATENT	23	26
PARTIALLY PATENT	5	4
BLOCKED	2	0
RESULTS	23(76.6%)	26 (86.6.%)

Chi-square=2.29, p=0.318 (Not significant) Both groups achieved similar anatomical patency—76.7 % patent with stent vs. 86.7 % without, with only 2 blockages in the stent arm—and the distribution of outcomes did not differ significantly ($\chi^2 = 2.29$, $p = 0.318$).

TABLE 6. SYRINGING RESULTS AFTER 6 MONTHS

	WITH STENT (N=30)	WITHOUT STENT (N=30)
PATENT	23	27
PARTIALLY PATENT	6	3
BLOCKED	1	0
RESULTS	23 (76.6 %)	27 (90%)

Chi-square=2.32, p=0.313 (Not significant) Patent rates were high in both arms (76.7 % with stent vs. 90 % without), partial patency occurred in 20 % vs. 10 %, and complete blockage was rare (3.3 % vs. 0 %). These differences are not statistically significant ($\chi^2 = 2.32$, $p = 0.313$).

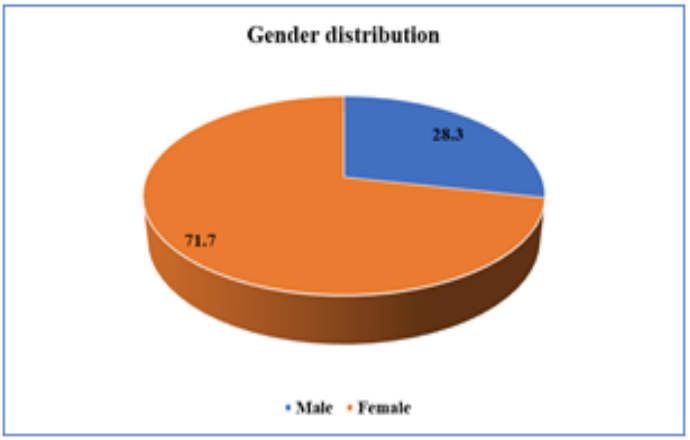
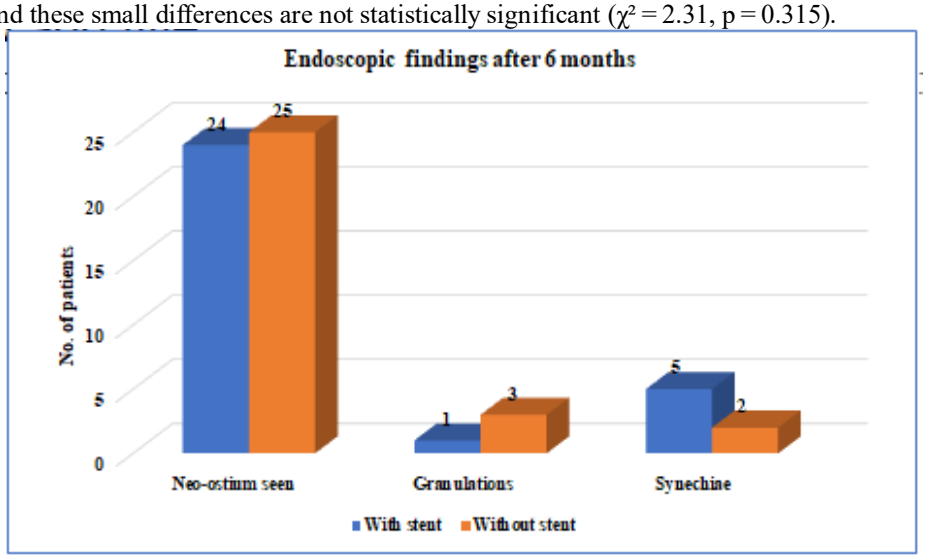


TABLE 7. ENDOSCOPIC FINDINGS AFTER 6 MONTHS

FINDINGS	WITH STENT	WITHOUT STENT
NEO-OSTIUM SEEN	24	25
GRANULATIONS	1	3
SYNECHIAE	5	2
RESULTS	24 (80 %)	25 (83.3 %)

Chi-square=2.31, p=0.315 (Not significant)
Neo-ostium visibility was high in both groups (80 % vs. 83 %), with few granulations (3 % vs. 10 %) and synechiae (17 % vs. 7 %), and these small differences are not statistically significant ($\chi^2 = 2.31$, $p = 0.315$).



Here, we have done a study on patients who needed endonasal dacryocystorhinostomies to compare the success rate of the use of stents in them

We evaluated 60 patients, of whom 30 underwent endonasal DCR without a stent and 30 with a stent. The stent was removed after one month of surgery.

The outcome was evaluated at the end of three months, six months, for both groups (patients with and without stents) using the Chi-square test.

The success rate at the end of 3 months was 86.6% with stented patients and 93.3 % with non-stented patients (p-value=0.532); at six months, The final endoscopy at the end of 6 months showed that 80% of patients who underwent stenting had a patent rhinostomy opening, and 83.3% of those who were not stented had a patent opening.

There have been cases with a primary success rate of 86.6 % for endoscopic DCR with a stent, and in 20 % of cases, the rhinostomy opening was found to be obstructed by granulations or synechia formation . Some cases also report a success rate of 93.3% for endoscopic DCR without a stent, with no patients with major complications reported.

DISCUSSION
In cases of chronic dacryocystitis in which the patient presents with epiphora due to nasolacrimal duct obstruction, endonasal dacryocystorhinostomy is an effective surgery to cause relief of symptoms. Here, not only can we avoid an external incision but also find out causes of DCR failure like synechiae, an enlarged middle turbinate, and ethmoid sinus disease. [18]

Stenting of the canal, i.e., endocanalicular stenting after a dacryocystorhinostomy, is basically to maintain the openings of the punctum and the patency of the canaliculi during the postoperative period. On the other hand, in some cases, granulation tissue formation in the canaliculi has been seen during the postoperative period due to the use of stents along with punctual erosion [19,20]. Some studies have shown dacryocystorhinostomy without a stent has a short operative period, no complications associated with a stent, and avoids the trouble caused to patients for stent removal.

Some authors recommend the application of Mitomycin at the rhinostomy site to reduce post-operative fibrosis and discourage stomal closure. [22] Silicone stent has also been used successfully to keep the neo-ostium patent, however, various researchers have reported no statistically significant benefit on using a silicone stent in a primary DCR.1 [21,23]

Chronic dacryocystitis is more common in women of low socioeconomic group due to their bad personal habits, long duration of exposure to smoke in kitchen, and dust in the external environment. Other possible causes are congenital and anatomical narrowing of nasolacrimal drainage system in females as compared with males. [24]

The size of the bony ostium and the extent of the sac exposure are important factors in determining postoperative patency of the newly created ostium. [25,26]Inadequate removal of bone is the commonest cause of postoperative stromal stenosis.[27]

Approximately two-third of the lacrimal sac is above the axilla of the middle turbinate which means, in order to accomplish complete sac exposure, a large amount of thick bone over the axilla of the middle turbinate and the lateral wall of the agar nasi has to be removed.Removal of this thick bone is best achieved with a 3 mm bone punch as it allows meticulous bone removal without damaging the sac lining and other nasal structures.The U-shaped flap fashioned at the end of the procedure allows for primary intention healing to occur. [25]

Harvinder et al in their 24 cases series have shown that EnDCR with wide neo-ostium, and primary healing with mucosal flaps and without stents documented 91.66% success which was comparable to results with stents and far better than external DCR.

Sharma found a success rate of 88.5% in his 165 patients study with silicon tube stents. [19]

Kakkar reported 85 to 90% success with stent and nearly the same success without silicon stents.[10]

Jin reported primary success rate of 83% with EnDCR with stent and in 17% cases rhinostomy opening was found to be obstructed by granulation or synechiae.[19]

Sprekelson reported success with EnDCR with stent in 85% patients. [28]

Unlu et al reported 85.7% success rate in patients with use of silicon stents and 87.5% in patients without stents. [29]

Durvasula has reported good results with use of stents after 3 months. [30]

Zilelioglu reported lacerations of puncta due to probing and bicanalicular silicon intubation. [31]
Kim et al reported decreased long-term patency with stents with a success rates dropping from 90 to 77%.Also a major factor negatively affecting patency after stent removal was contraction of the lacrimal sac at the time of stent removal.[32]

CONCLUSION

Our study showed that patients with chronic dacryocystitis who underwent endonasal dacryocystorhinostomy with and without stenting had almost similar results. There was no significant difference in the outcome.

The patients who underwent endonasal dacryocystorhinostomy without a stent did equally well clinically and functionally as those who underwent the same with a nasolacrimal silicon stent.

So, as per our observation, we concluded that generally all the patients should be considered for endonasal DCR without a stent, except in special cases like revision endonasal DCR, lacrimal gland cyst, fistula, and patients with sinonasal pathology, in whom silicon stents can be preferred, so that there is a less invasive intervention dealing with the canaliculi and puncta of the eye, granting better results and fewer complications.

REFERENCES

1. Jacobs HB. Symptomatic epiphora. Br J Ophthalmol 1959 Jul;43(7):415-434
2. Mohamad SH, Khan I, Shakeel M, Nandapalan V: Long-term results of endonasal dacryocystorhinostomy with and without stenting. Ann R Coll Surg Engl. 2013, 95:196-9. 10.1308/003588413X13511609957939
3. Linberg JV, McCormick SA: Primary acquired nasolacrimal duct obstruction. A clinicopathologic report and biopsy technique. Ophthalmology. 1986, 1:055-1. 10.1016/s0161-6420(86)33620-0
4. Groessl SA, Sires BS, Lemke BN: An anatomical basis for primary acquired nasolacrimal duct obstruction . Arch Ophthalmol. 1997, 115:71-4. 10.1001/archopht.1997.01100150073012
5. Leong SC, Macewen CJ, White PS: A systematic review of outcomes after dacryocystorhinostomy in adults . Am J Rhinol Allergy. 2010, 24:81-90. 10.2500/ajra.2010.24.3393
6. Griffiths JD: Nasal catheter use in dacryocystorhinostomy . Ophthalmic Plast Reconstr Surg. 1991, 7:177-86. 10.1097/00002341-199109000-00005
7. Jawaheer L, MacEwen CJ, Anijeet D: Endonasal versus external dacryocystorhinostomy for nasolacrimal duct obstruction. Cochrane Database Syst Rev. 2017, 2:CD007097. 10.1002/14651858.CD007097.pub3

8. Lin GC, Brook CD, Hatton MP, Metson R: Causes of dacryocystorhinostomy failure: external versus endoscopic approach. Am J Rhinol Allergy. 2017, 31:181-5. 10.2500/ajra.2017.31.4425
9. McDonogh M, Meiring JH: Endoscopic transnasal dacryocystorhinostomy . J Laryngol Otol. 1989, 103:585-7. 10.1017/s0022215100109405
10. Kakkar V, Chugh JP, Sachdeva S, Sharma N, Ramesh. Endoscopic dacryocystorhinostomy with and without silicone stent: A comparative study. Int J Otorhinolaryng 2009;9(1).
11. Benger R, Forer M. Endonasal dacryocystorhinostomy: Primary and secondary. Aust NZJ Ophthalmol 1993;21(3):441-42.
12. Metson R. The endoscopic approach for revision dacryocystorhinostomy. Laryngoscope 1990;100(12):1344-47.
13. Hehar SS, Jones NS, Sadiq A, Downes RN. Endoscopic holmium: YAG Laser dacryocystorhinostomy is safe and effective as a day care procedure. J Laryngol Otol 1997;111: 1056-59
14. Massaro BM, Gonnering RS, Harris GJ: Endonasal laser dacryocystorhinostomy. A new approach to nasolacrimal duct obstruction. Arch Ophthalmol. 1990, 108:1172-6. 10.1001/archopht.1990.01070100128048
15. Gonnering RS, Lyon DB, Fisher JC: Endoscopic laser-assisted lacrimal surgery. Am J Ophthalmol. 1991, 111:152-7.
16. Patel BC, Phillips B, McLeish WM, et al.: Transcanalicular neodymium: YAG laser for revision of dacryocystorhinostomy. Ophthalmology. 1997, 1:191-1.
17. Tripathi A, Lesser J, O Donnel NP. Local anaesthetic EnDCR: Analysis of patient acceptability and various factors affecting the success of the procedure. Eye 2002;16:146-49
18. Renato Roithmann, Ian Witterick, Philip Cole, Michael Hawke : Sinuisitis in Adults . Diseases of the Sinuses: A Comprehensive Textbook of Diagnosis and Treatment. Christopher C. Chang (ed): Springer nature, 2014. https://link.springer.com/book/10.1007/978-1-4612-0225-7:513-26
19. Sharma BR: Non endoscopic endonasal dacryocystorhinostomy versus external dacryocystorhinostomy . Kathmandu Univ Med J (KUMJ). 2008, 6:437-42. 10.3126/kumj.v6i4.1731
20. Zílelíoğlu G, Tekeli O, Uğurba SH, Akiner M, Aktürk T, Anadolu Y: Results of endoscopic endonasal nonlaser dacryocystorhinostomy. Doc Ophthalmol. 2002, 105:57-62. 10.1023/a:1015702902769
21. Mortimore S, Banhegy GY, Lancaster JL, Karkanevatos A. Endoscopic dacryocystorhinostomy without silicone stenting. J Royal Coll Surg Edinburgh. 1999;44(6):371-3.
22. Cheng S-M, Feng Y-F, Xu L, Li Y, Huang J-H. Efficacy of Mitomycin C in Endoscopic Dacryocystorhinostomy: A Systematic Review and MetaAnalysis. PLoS ONE. 2013;8(5):e62737.
23. Fayet B, Bernard JA, Assouline M, Benabderrazik S, Pouliquen Y. Bicanalicular versus monocanalicular silicone intubation for nasolacrimal duct impatency in children: A comparative study. Orbit. 1993;12(3):149-56
24. Singh M, Jain V, Gupta SC, Singh SP. Intranasal endoscopic DCR (END-DCR) in cases of dacryocystitis. Indian J Otolaryngol Head Neck Surg 2004 Jul;56(3):177-183.
25. Wormald PJ. Powered endonasal dacryocystorhinostomy. Laryngoscope 2002 Jan;112(1):69-72.
26. Mann BS, Wormald PJ. Endoscopic assessment of the dacryocystorhinostomy ostium after endoscopic surgery. Laryngoscope 2006 Jul;116(7):1172-1174
27. Yung MW, Hardman-Lea S. Endoscopic interior dacryocystorhinostomy. Clin Otolaryngol Allied Sci 1998 Apr;23(2):152-157.
28. Sprekelson MB. Endoscopic dacryocystorhinostomy—surgical techniques and results. Laryngoscope 1996;106:187-89
29. Unlu HH, Toprak B. Comparison of surgical outcomes in primary endoscopic dacryocystorhinostomy: With or without silicon intubation. Ann Otol Rhinol Laryngol 2002;111(8): 704-09.
30. Durvasula VSP,Gatland DJ. Endoscopic dacryocystorhinostomy: Long-term techniques and evolution of surgical techniques. J Laryngol Otol 2004;118:628-32
31. Zilelioglu G, Tekeli O, Ugurba SH. Results of endoscopic endonasal non-laser dacryocystorhinostomy. Doc Ophthalmol 2002;105(1):57-62.28. Kim JH, Shin JH, Song HY, et al. Long-term results and factors affecting patency after removal of nasolacrimal stents. J Vasc Interv Radiol 2006;17(7):1125-30
32. Kim JH, Shin JH, Song HY, et al. Long-term results and factors affecting patency after removal of nasolacrimal stents. J Vasc Interv Radiol 2006;17(7):1125-30