COMPARATIVE STUDY: ENDOSCOPIC DACROCYSTORHINOSTOMY WITH AND WITHOUT STENT

Mariwan Latif Fatah [a]

Submitted: 15/2/2023; Accepted: 20/6/2021; Published: 21/12/2023

ABSTRACT

Background

Dacryocystorhinostomy (DCR) is a commonly performed operation in which a fistulous tract is created between the lacrimal sac and the nasal cavity.

Objective

To evaluate the necessity for silicone tube insertion following endonasal endoscopic dacryocystorhinostomy (EDCR)

Patient and Methods

A prospective interventional comparative study was carried out in the Center of Otorhinolaryngology, Head and Neck Surgery/Al-Sulaymaniyah Teaching Hospital from March 2021 to April 2022. Twenty-two patients (25 eyes) with epiphora were included; an ophthalmologist referred them after diagnosing the cause and site of obstruction of the nasolacrimal duct, 86.4 % of which were female and remaining 13.6 % were male, with ages ranging from 15 to 61. They were randomly assigned to two groups: GroupA 11 patients (12 eyes) underwent EDCR with silicone stent, while GroupB 11 patients (13 eyes) had EDCR without stent. The patients were evaluated in terms of symptom relief and neo-ostium patency.

Results

In the current study, the success rate was (100%) for both groups, with no failures. Additionally, a stent has been associated with granulation tissue formation and patient discomfort. There were no statistically significant differences between the two groups.

Conclusion

Routine nasolacrimal intubation in DCR is unnecessary due to the additional cost and associated complications. Good exposure and marsupialization of the lacrimal sac and regular follow-up are required for a better postoperative outcome and the avoidance of complications.

Keywords: *Endoscopic Dacryocystorhinostomy, Dacryocystorhinostomy, Silicone stent, Epiphora, Chronic dacryocystitis. Comparative study: Endoscopic dacrocystorhinostomy with and without a stent.*

---

[a] College of Medicine, University of Sulaimani, Kurdistan Region, Iraq.
Correspondence: mariwan.fattah@univsul.edu.iq

https://doi.org/10.17656/jsmc.10429

INTRODUCTION

Epiphora is an overflow of tears onto the face due to imperfect drainage of the tear-conducting passages or excess lacrimal production. Probing of the canaliculi in experienced hands is an effective diagnostic tool; medical treatment with nasal steroid spray may be effective, but the majority of obstructed cases will require surgical intervention in the form of (DCR) Probing as a first-line therapy shows 82% successfulness in cases of nasolacrimal duct obstructions [1].

Dacryocystorhinostomy (DCR) is a commonly performed operation in which a fistulous tract is created between the lacrimal sac and the nasal cavity to relieve epiphora due to nasolacrimal duct obstruction. Closure of the rhinostomy opening was considered a major factor for surgical failure in DCR [2, 3].

Toti, in 1904, described the classic treatment of this chronic obstruction as external dacryocystorhinostomy, traditionally performed by the Ophthalmologist [4, 5].

DCR was first done by Caldwell in 1893 using an intranasal approach. In 1989, Donogh et al. described endoscopic endonasal DCR [5].

The major advantage of endoscopic DCR is the avoidance of scars and maintenance of the pump mechanism of the orbicular muscle. Causes of failure of endoscopic DCR are mainly due to stenosis of the neo-ostium as a result of fibrosis at mucosal/submucosal level [6]. Success rates for endoscopic DCR vary from 82% to 95% compared to external DCR, which has a success rate of >90% [7] .

PATIENTS AND METHODS

The prospective interventional comparative study, in the period between March 2021 and April 2022, at Sulaymaniyah Otorhinolaryngology-Head and Neck Surgery Center and Shoresh Hospital. twenty-two patients (25 eyes) underwent DCR, eleven patients (12 eyes) underwent endoscopic DCR with stent labeled group A, and eleven patients (13 eyes) underwent endoscopic DCR without stent labeled group B.

Patients were complaining of epiphora. They were diagnosed with nasolacrimal duct obstruction by an Ophthalmologist, and they detected the cause and site of the obstruction; after failed medical treatment, syringing, and probing, an otolaryngologist assessed all patients for a complete history and examination using rigid nasendoscopy at 0 ° and 30 °.

Inclusion criteria

Patients with chronic dacryocystitis due to nasolacrimal duct obstruction who did not respond to probing and syringing.

Syringing.

Exclusion criteria

Revision cases (endoscopic or external DCR). Patients with severe bony deformity of the lacrimal fossa (post-traumatic), chronic rhinosinusitis, nasal polyposis, and malignancy, tumor of the lacrimal system, and patients unfit for GA.

Preoperative assessment

All patients scheduled for DCR must undergo a complete medical history, general and physical examination, investigations including haematological evaluation for all cases, CXR, ECG, and Echo examination in selected cases, and anaesthetic evaluation to assess the patient's fitness for surgery. They were randomly assigned into groups: Group A (with silicone stenting) and Group B (without stenting). All operations were done under general anaesthesia.

Surgical technique

Patients in a supine position with head elevation, using a 4 mm 0° or 30° nasal endoscope, nasal packing (placement of neuro-patties) soaked in 2% lignocaine with 1:10,000 adrenaline with xylometazoline solution, injection of 2% and 1:100,000 adrenaline to the lateral nasal wall just superior and anterior to the attachment of middle turbinate.

Septoplasty was done in three patients before DCR to facilitate endoscopic endonasal surgery and compromise good access.

Eight 8–10 mm above the axilla of the middle turbinate with 15 blades, a horizontal mucosal incision was made, 2-3 mm posterior to the axilla, and extended 10 mm anterior to the axilla onto the frontal process of the maxilla. Then, turn vertically to about 2/3 of the vertical height of the middle turbinate, just above the insertion of the inferior turbinate into the lateral nasal wall. Then, the horizontal incision was continued posteriorly till the insertion of the uncinate process. Posterior elevation of the mucosal flap was made with a freer elevator, and the thin lacrimal bone- was exposed; a round knife was used to elevate it. The harder frontal process of the maxilla was removed with Kerrison

Rongeur. In some cases, drill burr (diamond) was used. Bone over the sac is removed completely, and the sac will bulge into the nasal cavity. Movement of sac confirmed by pressure over medial canthus.

The lower punctum was dilated, and a lacrimal probe was inserted through the inferior canaliculus and tent the sac against the probe intranasally; the incision of the sac with a sickle knife or blade, the content of the sac escaped to the nasal cavity, the incision was extended till the probe was seen.

The mucosal flap was trimmed and adjusted to cover the bone surrounding the opened sac. The lacrimal sac flaps accurately oppose the nasal mucosa.

Patients in Group A underwent bicanalicular {DCR bodkin Angled ocrawford} silicone stenting. The silicone stent was passed through the upper and lower lacrimal punctum into the lacrimal sac, and the tubes tied together in the nasal cavity. The stent was kept for about 12 weeks duration.

Post-operative care and follow-up

All patients remove the nasal pack and are sent home on the same day post-operative. A broad-spectrum antibiotic (Amoxivlave vial 1.2gx2) was given for three days, and analgesics (Acetaminophen) for three days. Ofloxacin 0.3% eye drops or chloramphenicol 1% eye ointment for five days, nasal saline irrigation or drops are prescribed for six weeks.

The patients' follow-up period was one week, one month, and six months after surgery. The silicone stent was removed at 12 weeks post-surgery. The operated site was visualized endoscopically during each visit, and the crusts were removed gently from the neo-ostium.

At each follow-up, a subjective assessment for symptomatic improvement was done, which was defined as the presence or absence of epiphora and Objective anatomical success by nasal endoscopy observing a patent stoma in the lateral wall of the nose and the presence of a functioning rhinostomy.

No major complications occurred in our study. Synechiae, bleeding, and granulation tissue were the only surgical complications encountered in this study.

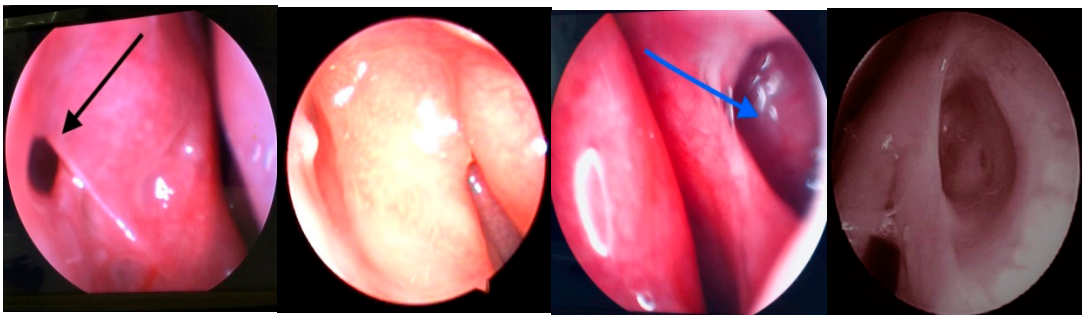

Figure 1. Endoscopic (6 months) follow-up shows neo-ostium in 4 patients.

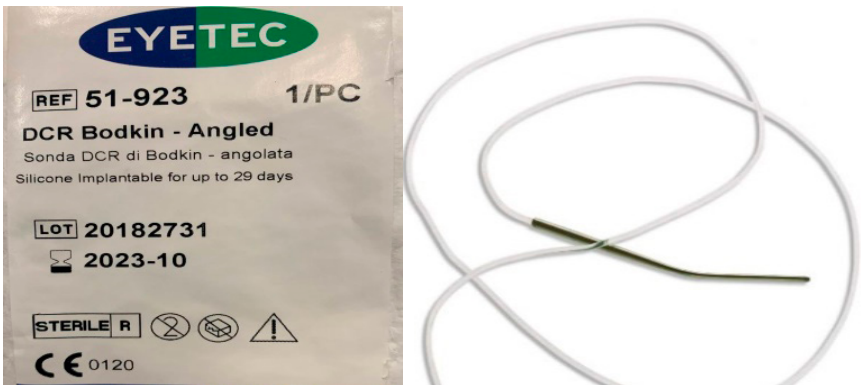

Figure 2. DCR Bodkin-Angled stent.

RESULT

The current study compromised 22 patients with nasolacrimal duct obstruction who underwent endoscopic DCR, 11 of whom received bi-canalicular silicone stents (group A) and 11 who did not get stents (group B).

The mean ± Sd of their age was 42.3 ± 13.01. The patients' ages ranged from 15 to 61. The majority of the cases, nineteen (86.4%), were female, with three (13.6%) instances being male; the majority of the patients were housewives (14 in total) and three teachers, with 12 from Sulaimani and the others from elsewhere in Iraq. Table (1) summarises the socio-demographical characteristics of the patients.

All of the patients presented with epiphora, thirteen (59.1%) of the patients presented with only epiphora; seven (31.8%) with epiphora and discharge from the eye, and two (9.1%) with epiphora, discharge from the eye, and medial canthal area swelling.

Associated nasal symptoms

In Group A, one patient (20%) had nasal obstruction, three patients (60%) had both nasal obstruction and rhinorrhea and one patient (20%) had a history of nasal obstruction and anosmia. Only one patient in Group B had a history of nasal obstruction. There are no statistically significant differences between the two groups regarding the presence of related nasal symptoms.

Side of surgeryg

Ten patients (45.45%) underwent right-sided DCR, nine patients (40.91%) underwent left-sided DCR, and three (13.64) patients had bilateral DCR.

Figure 4 shows the distribution of patients according to the side of the operation.

Associated surgery

In Group B, Septoplasty was performed on three patients (27%) to assist endoscopic surgery. In comparison, there was no related nasal surgery in Group A.

Complications and sequelae

Follow-up in a month

In either group, there were no major complications during the operation. During the follow-up period, postoperative complications were recorded.

In Group A, three patients developed granulation tissue; one case had epistaxis (which was managed with nasal packing), one had synechiae between the middle turbinate and the lateral nasal wall (which did not cause rhinostom obstruction), and two had crusting.

In Group B, granulation tissue was identified in two cases, and intranasal crusting was reported in three patients. With a one-month follow-up,

Table (4) demonstrates no statistically significant differences between the two groups in terms of postoperative complications.

In six months, follow up

Within a six-month post-operative follow-up, granulation tissue was found in two patients in Group A, along with one case of synechiae and one case of crusting. In contrast, only two cases of granulation tissue were observed in Group B. With a six-month follow-up,

Table (5) shows that there were no statistically significant differences between the two groups in terms of post-operative complications.

Outcome and success

Patients were evaluated for subjective and objective improvement during the 6-month follow-up period, with subjective improvement defined as the complete resolution of symptoms expressed by patients and objective improvement confirmed by nasal endoscopic assessment of the neo-ostium.

When both subjective and objective outcomes were achieved, the surgery was called a success. There were no failures in either group and no recurrence. There was no statistically significant difference in the surgical outcome between the two groups, as shown in Table (6).

Table 1. Socio-demographical characteristics of the participants.

		Frequency	Percent
Gender	Male	3	13.6
	Female	19	86.4
Address	Urban	12	54.5
	Rural	10	45.5
Occupation	Employee	1	4.5
	Engineer	1	4.5
	Housewife	14	63.6
	Medical staff	1	4.5
	Peshmerga	1	4.5
	Student	1	4.5
	Teacher	3	13.6

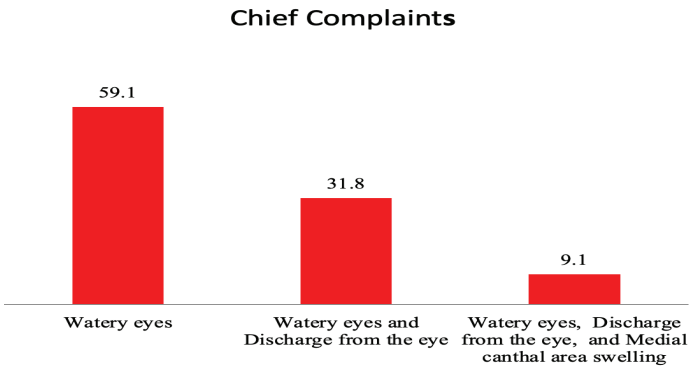

Figure 3. Patients' Chief complaints.

Table 2. Associated nasal symptoms between the two groups.

		Stent		*p*-value
Nasal Symptoms		Yes	No	
	Nasal obstruction	1	1	
		20%	100%	
	Nasal obstruction and rhinorrhea	3	0	0.47
		60%	0.00%	
	Nasal obstruction and Anosmia	1	0	
		20%	0.00%	

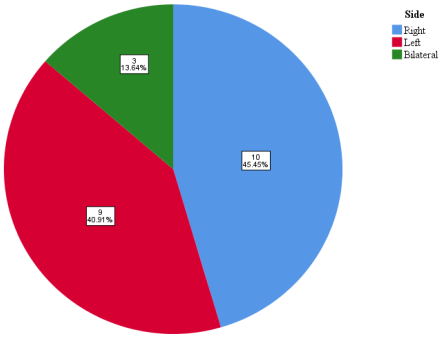

Figure 4. Distribution of patients according to the side of operation.

Table 3. Shows associated nasal surgery in both groups.

Associated surgery	Group A		Group B	
	No.	%	No.	%
Septoplasty	0	0%	3	27%

Table 4. Postoperative complications between the two groups within the first month.

		Group A	Group B	*p*-value
Complications and sequelae till one month	Bleeding	1	0	0.33
		14.30%	0.00%	
	Crusting	2	3	
		28.60%	60.00%	
	Granulation tissue	3	2	
		42.90%	40.00%	
	Synechiae	1	0	
		14.30%	0.00%	

Table 5. Shows postoperative complications between the two groups within six months.

	Stent		
Complications and sequelae in 6 months	**With stent**	**Without stent**	***p*-value**
Crusting	1	0	0.54
	25.00%	0.00%	
Granulation tissue	2	2	
	50.00%	100.00%	
Synechiae	1	0	
	25.00%	0.00%	

Table 6. Surgical outcome between the two groups.

Surgical outcome	Stent	non-stent
Success	12 Eyes (11 Patients) 100%	13 Eyes (11 Patients) 100%

DISCUSSION

Patients with silicon stents had a higher success rate, according to both Al Qahtani [8] and Shah [9]. However, both authors noted that the statistical difference between the two groups is insignificant. Naik [10] and Kakkar [11] concluded that patients without stenting had a higher success rate. Pittore et al [12] . report a 94% success rate without using stents, and the follow-up period is the longest of any trial (37 months). Martimore et al [13]. performed the first case series analysis study. He performed endoscopic DCR without a stent and reported an 87 percent success rate. His study only comprised a few patients; the average follow-up time was eight months. Smirnov [14,15] first reported a better success rate with NL stenting; he then corrected his findings after two years and revealed that NL silicone stenting is unnecessary, as his success rate with or without silicone tube was 78 and 100%, respectively. Similar results were found by Unlu et al [16]. 84.2 percent with stenting and 94.7 percent without 36 stentings).

Furthermore, Kakkar [11] had similar results and did not find a significant difference in surgical success between DCR done with and without stents. In a prospective analysis of 272 patients, Vishwakarma et al. [17] found that patients with DCR who had silicon stents had a greater success rate. However, in 1989, Allen and Berlin [18] found that silicone intubation during DCR was associated with a statistically significant increase in the primary DCR failure rate. They suggested that routine use of silicone tubing in DCR should be avoided unless a specific canalicular obstruction was observed after reviewing 242 consecutive DCRs with stents.

The current prospective study included 22 patients presenting with epiphora due to NLD obstruction who were operated on for endonasal DCR. EnDCR with silicon stenting was performed in 50% of randomly selected patients (GROUP A) and without stenting in the remaining 50% of cases (GROUP B).

The purpose of our study is to compare the results of EnDCR with and without silicon stenting. Demographic distribution of patients: In our study, chronic dacryocystitis was reported to be substantially more frequent in females (86.4%) than males (13.6%). Females have a higher incidence of dacryocystitis than males, according to Sing et al [19] and Naik et al [10]. Chronic dacryocystitis has been reported to be more common among lower socioeconomic females due to poor personal habits, prolonged exposure to smoking in the kitchen, and dust exposure. Congenital and anatomical narrowing of the NLD in females may also contribute to the higher incidence among women [10]. In our study near to the Kadhim AJ et al [1], the female was (65%), and the male was (35%). The mean ± Sd of their ages in this study was (42.3±13.01).

The patients' ages ranged from (15 to 61), which agrees with the findings of Shah-Sharma et al. [9], who found that the average age was (40.44), and the age range was (16-78).

Moreover, the age range for Kadhim AJ et al. [1] was (18 to 65). Furthermore, Gurdeep et al. [20] observed that the mean age (45.54y); age range was (18-74y). 34 Most of the patients in this study had epiphora, with 59.1% having just epiphora, seven (31.8%) having epiphora and discharge from the eye, and two (9.1%) having epiphora, discharge from the eye, and medial canthal region swelling.

This finding is consistent with Shashidhar et al. [21], who found epiphora in all patients, discharge from the eye in 28%, and medial canthal swelling in 17.5 percent. In the current study, nearly half of the cases had right-side DCR (45.45%) rather than left-side DCR (40.91%), and (13.64%) of the patients had bilateral DCR; this is also similar to Saeed [22], who operated on the right side (57.14%) and the left side (42.86%). Our findings differ from those of Ruiz-Coello et al. [23], with 51.3 percent left against 48.7% right. Dogan et al [24] studied 58 patients who were left and 30 right patients.

Our findings contradict those of Gurdeep et al.[20], who reported that 13 patients underwent left-sided DCR, seven right-sided DCR, and two bilateral DCR. In the present study, concomitant septoplasty was performed on three patients (13.63 %) to assist with endoscopic endonasal surgery; this is close to Hasan's [24] study, which found that 18% of patients required septal surgery. Concurrent septoplasty was performed in six cases by Kadhim AJ et al. A [1] d Six patients required septoplasty during the DCR operation, according to Gurdeep et al. [20] .

Overall, the results of the current study were satisfactory in both groups (with and without stent) had the same success and no failure or recurrence. There were no serious complications during the operation, such as a CSF leak or orbital damage. Three patients in Group A developed granulation tissue (which was removed endoscopically in the 35 OPD and responded to treatment in some cases), one had epistaxis (which was managed with nasal packing), one case had synechiae between the middle turbinate and the lateral nasal wall (which did not cause rhinostom obstruction), and two had crusting during the first month of follow-up. Granulation tissue was found in two cases in Group B, and intranasal crusting was noted in three individuals. Granulation tissue was still identified in two patients in Group A, along with one case of synechiae and one case of crusting six months after surgery. However, only two occurrences of granulation tissue were found in Group B. According to Unlu et al.[16], six of the patients with silicone tubing (42.9%) had granulation tissue, whereas one of the patients without tubing (6.3%) had granulation tissue

In conclusion, we believe that routine silicone intubation in primary DCR without complication is not necessary due to the additional cost effect,duration of surgery,patients discomfort,associated complications and prolonge post-operative follow-up for the patients. Good exposure and marsupialization of the lacrimal sac, and also regular follow-up is required for a better post-operative outcome and the avoidance of complications. So, ultimately, the use of a stent in DCR is determined by the surgeon's preference and level of experience.

REFERENCES

1. Kadhim AJ, Muhammed NK. Comparative study to evaluate silicone stent in endoscopic DCR. Diyala Journal of Medicine. 2017;13(2):7-10.

2. Önerci M, Orhan M, Öğretmenoğlu O, İrkeç M. Long-term results and reasons for failure of intranasal endoscopic dacryocystorhinostomy. Acta oto-laryngologica. 2000 Jan 1;120(2):319-22.

3. Rice DH. Endoscopic intranasal dacryocystorhinostomy results in four patients. Archives of Otolaryngology–Head & Neck Surgery. 1990 Sep 1;116(9):1061-.

4. Okuyucu S, Gorur H, Oksuz H, Akoglu E. Endoscopic dacryocystorhinostomy with silicone, polypropylene, and T-tube stents; randomized controlled trial of efficacy and safety. American journal of rhinology & allergy. 2015 Jan;29(1):63-8.

5. Kumar A, Porwal PK, Dubey KP, Singh H. Endoscopic DCR with and without prolene stent in rural area: a prospective randomized study. International Journal of Otorhinolaryngology and Head and Neck Surgery. 2018 Jul;4(4):1081.

6. Reddy YJ, Reddy YM, Kiran M, Reddy YG, Kumar S. A comparative study of outcomes of dacryocystorhinostomy with and without silicone stenting. IOSR J Dent Med Sci. 2015 Jul;14(7):82-5.

7. Raghav MG, Naga R, Raghavan D. A comparative study of the results of endoscopic dacryocystorhinostomy with and without stent placement. Journal of Marine Medical Society. 2018 Jul 1;20(2):135.

8. Al-Qahtani AS. Primary endoscopic dacryocystorhinostomy with or without silicone tubing: a prospective randomized study. American journal of rhinology & allergy. 2012 Jul;26(4):332-4.

9. Shah H, Sharma S, Suri N, Patel A. Comparison of surgical outcome in endoscopic dacrocystorhinostomy with and without silicon stent placement. Nat J Med Res. 2013 Jan;3(1):34-7.

10. Naik SM, Appaji MK, Ravishankara S, Mushannavar AS, Naik SS. Endonasal DCR with silicon tube stents: a better management for acute lacrimal abscesses. Indian Journal of Otolaryngology and Head & Neck Surgery. 2013 Aug;65(2):343-9.

11. Kakkar V, Chugh JP, Sachdeva S, Sharma N. Endoscopic dacryocystorhinostomy with and without silicone stent: a comparative study. Internet J Otorhinolaryngol. 2009;9:1.

12. Mortimore S, Banhegy GY, Lancaster JL, Karkanevatos A. Endoscopic dacryocystorhinostomy without silicone stenting. Journal of the Royal College of Surgeons of Edinburgh. 1999 Dec 1;44(6):371-

13. Mortimore S, Banhegy GY, Lancaster JL, Karkanevatos A. Endoscopic dacryocystorhinostomy without silicone stenting. Journal of the Royal College of Surgeons of Edinburgh. 1999 Dec 1;44(6):371-3.

14. Smirnov G, Tuomilehto H, Teräsvirta M, Nuutinen J, Seppä J. Silicone tubing after endoscopic dacryocystorhinostomy: is it necessary?. American journal of rhinology. 2006 Nov;20(6):600-2.

15. Smirnov G, Tuomilehto H, Terasvirta M, Nuutinen J, Seppa J. Silicone tubing is not necessary after primary endoscopic dacryocystorhinostomy: a prospective randomized study. American journal of rhinology. 2008 Mar;22(2):214-7.

16. Unlu HH, Gunhan K, Baser EF, Songu M. Long-term results in endoscopic dacryocystorhinostomy: is intubation really required?. Otolaryngology—Head and Neck Surgery. 2009 Apr;140(4):589-95.

17. Vishwakarma R, Ghosh R. A study of 272 cases of endoscopic dacryocystorhinostomy. Indian Journal of Otolaryngology and Head and Neck Surgery. 2004 Oct;56(4):259-61.

18. Allen K, Berlin AJ. Dacryocystorhinostomy failure: association with nasolacrimal silicone intubation. Ophthalmic Surgery, Lasers and Imaging Retina. 1989 Jul 1;20(7):486-9.

19. Singh M, Jain V,Gupta SC, Singh SP. Intranasal endoscopic DCR in cases of dacryocystitis. Indian Journal of Otolaryngology and Head and Neck surgery. 2004 Jul;56(3):177 83

20. Gurdeep S. Powered endoscopic dacryocystorhinostomy with mucosal flaps without stenting. Med J Malaysia. 2008 Aug;63(3):237.

21. Shashidhar K, Nagalotimath U, Dixit D. Endoscopic dacryocystorhinostomy with and without silicone stenting: a comparative study. trauma. 2014;3:0.

22. Saeed B. Endoscopic DCR without stents: clinical guidelines and procedure. European Archives of Oto-Rhino-Laryngology. 2012 Feb;269(2):545-9.

23. Ruiz-Coello AM, Rodríguez BA, González CM, Gómez de Salazar CL-C, Ortega DL, García-Berrocal JR, et al. Results of 12 years of endoscopic dacryocystorhinostomy. Acta Otorrinolaringol (English Ed 2011;62(1):20–4

24. Dogan R, Meric A, Ozsütcü M, Yenigun A. Diode laser-assisted endoscopic dacryocystorhinostomy: A comparison of three different combinations of adjunctive procedures. Eur Arch Oto-Rhino-Laryngology 2013;270(8):2255–61.