

## A Comparative Study of Outcomes of Dacryocystorhinostomy with and without Silicone Stenting

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### Abstract

**Background and objectives:** Endoscopic DCR is a surgical procedure to drain the lacrimal sac in instances of Nasolacrimal duct obstruction. The common causes of failure of dacryocystorhinostomy are obstruction of the rhinostomy site and of the common canaliculus. Various methods to prevent the recurrence of obstruction at rhinostomy site following endoscopic dacryocystorhinostomy have been tried such Mitomycin-C, use of silicone stent and steroid nasal sprays. Stenting appears to be cost-beneficial and simple procedure to achieve the above result. So we undertook a study to compare the results of Primary Endoscopic DCR with and without Silicone stenting.

**Methods:** The surgical outcomes of Endoscopic DCR with and without Silicone stent were compared in 20 patients of chronic dacryocystitis who had postsaccular lacrimal obstruction. silicone stent was used in 10 patients and remaining 10 patients were taken as controls. Follow-up was done at 1<sup>st</sup> week, 1 month and every month till 6 months after surgery. Surgical success was evaluated subjectively and objectively after 6 months and results were compared.

**Results:** The success rate was 90% with Silicone stent as compared to 80% without Silicone stent. There was no statistical difference in the results of two groups.

**Interpretation and conclusion:** Silicone stent has no significant beneficial effect in preventing reclosure of the dacryocystorhinostomy stoma after primary endoscopic dacryocystorhinostomy. Meticulous, atraumatic surgical technique is gold standard in achieving a successful surgical result.

**Keywords-**chronic dacryocystitis, endoscopic DCR, Silicone stent

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### I. Introduction

The endonasal approach to the lacrimal sac was first described by Caldwell in 1893[1]. This approach was further modified by West in 1910[2] and Mosher in 1921[3]. This approach did not gain widespread acceptance because of poor visualization of the lacrimal sac endonasally in the absence of nasal endoscopes, further complicated by bleeding. The endonasal approach to the lacrimal sac was revived by Jokinen and Karja in 1974[4] these authors created an inferiorly based flap on the medial sac wall, which was turned downwards and inferiorly. The above authors (Jokinen and Karja) and Heermann and Neues[5] used an operating microscope for endonasal dacryocystorhinostomy, but this technique did not gain popularity. The development of the rigid nasal endoscope and the advent of functional endoscopic sinus surgery revolutionized nasal and sinus surgery, as it provided excellent visualization of endonasal anatomy, which is the most basic prerequisite for successful endoscopic dacryocystorhinostomy surgery. The application of the rigid nasal endoscope for lacrimal sac surgery was first performed by Mc Donogh and Meiring in 1989[6]. During a routine functional sinus operation, the nasolacrimal duct was inadvertently exposed. This accidental occurrence started a train of thought to apply it in patients with obstruction to the lacrimal sac.

Success rates for endoscopic dacryocystorhinostomy varies from 82% to 95% [7, 8] compared to external dacryocystorhinostomy, which has success rate of >90% [9]. But then along with the above mentioned advantages of endoscopic dacryocystorhinostomy if the success rate can also be enhanced beyond of external dacryocystorhinostomy, then endoscopic dacryocystorhinostomy will clearly be the treatment of choice.

In order to address the issue of enhancing the success rate the causes of failure must be studied in depth. Literature on this subject [10] points to reclosure of the stoma as the most frequent cause for failure of dacryocystorhinostomy. Reclosure is due to scarring, adhesions and granulation tissue formation.

Vishwakarma et. al[11]and group performed a prospective study on effect of Silicone stenting in endoscopic dacryocystorhinostomy, on 272 patients reported a higher success rate.

An attempt is made here to determine whether Silicone stent can influence the success rate of endoscopic dacryocystorhinostomy.

## **II. Patients and Methods**

This is a randomized clinical trial done on twenty patients with postsaccal obstruction to the lacrimal pathway, between January 2014 and June 2015. This study was conducted at Kamneni Academy Of Medical Sciences And Research Center, L. B. Nagar, Hyderabad. The subjects chosen after confirmation of obstruction after lacrimal syringing and presence of regurgitation of fluid (mucoid/purulent) on pressing over medial canthus (sac area). The study sample was randomly grouped into two groups, a case(with stent) group and a control(without stent) group. All surgeries were performed under local anaesthesia with sedation after taking informed consent and complete Ophthalmological and nasal evaluation. The follow-up period for patients was done at 1 week, 1 month and every month upto 6 months of post-surgery.

### **2.1. Surgical technique**

All cases were operated under local anesthesia. Topical anesthesia and shrinkage of the nasal mucous membrane is achieved by packing the nasal cavity with strips of cotton pledgets soaked in topical 4% lignocaine with 1:30,000 adrenaline for fifteen minutes prior to surgery. Local anesthetic soaked cotton strips which were inserted earlier are removed. The lateral nasal wall anterior to the middle turbinate is infiltrated(Fig. 1) with 2% lignocaine with 1:1, 00,000 adrenaline to provide adequate anesthesia and vasoconstriction and hence a relatively bloodless field during surgery. The anterior end of the middle turbinate and adjacent septum is also infiltrated with the anesthetic agent. After 10 min 1cm<sup>2</sup> normal mucosa just in front of middle turbinate is removed using a Blakesley's forceps and bone over the lacrimal sac exposed from nasal side. Now with straight and upturned Kerrison's punches placed in a groove just in front of uncinate process and lacrimal sac is exposed. This is confirmed by seeing movement of sac on pressure over medial canthus. Then remaining bone over the sac is removed keeping in mind that upper end of lacrimal sac usually does not cross the attachment of middle turbinate to lateral nasal wall. Punch cannot be engaged in certain cases, in them bone was removed by chisel and Hammer or by drilling.

After satisfactory exposure of sac the anterior portion of it is incised (Fig. 2) with sharp sickle knife or a 12 no. Blade and removing the medial wall of it with Blakesley's forceps. At this time lacrimal syringing is done to irrigate and remove all purulent material and confirm the free passage for the tears. In patients grouped as cases, a silicone stent is palced (Fig.4) and later removed after 6 weeks. A light nasal packing with ribbon gauze impregnated with Neosporin - H eye ointment was done on the operated nasal cavity.

### **2.2 Post-operative care and follow-up**

The patient is shifted to the ward and is nursed in a semi recumbent position. A broad spectrum antibiotic was given for five days. Systemic decongestants and analgesics are prescribed for three days. The anterior nasal pack is removed after 24 hours and patient is sent home. Topical nasal decongestants applied for 4 times per day for next one week. Antibiotic steroid eye drops one drop every 2 hrs into lower conjunctiva for next 2weeks. Crusts and debris in the nasal cavity are removed after 48 hours and the patient is discharged from hospital. The patient is instructed to report back to the operating surgeon after a week for review. During this review, the operated site is endoscopically visualized and any debris or crusts are gently removed atraumatically. The patient is re- examined after one month and every month upto 6 months. The silicone stent is removed at 6weeks post surgery. 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 (Fig. 5).



Figure 1: Infiltration of local anesthesia



Figure 2: Incision along the sac wall



Figure 3: Bowman's probe seen through lacrimal sac opening



**Figure 4: Bicanalicular Silicone Stent placed**



**Figure 5: Patent stoma seen during follow-up**

There were no major complications in any patient in our study. Synechiae were the only complication of surgery encountered in this study. A total of 3 patients developed synechiae between the lateral nasal wall and anterior end of middle turbinate or nasal septum.

**Table 1: Complications**

Complications	Case group (n=10)	Control group (n=10)
Synechiae	1 (10%)	2 (10%)

### III. Results

After performing endoscopic dacryocystorhinostomy in both the case and control group and following up the patients, the following results were inferred.

Patients were declared a surgical success when there is subjective resolution of all symptoms of lacrimal obstruction and a patent stoma in the lateral nasal wall from which tears are seen to flow with blinking visualized during follow-up endoscopy.

Patients were termed surgical failure when there was persistence or recurrence of symptoms during the follow-up period. The surgically created stoma in the lateral nasal wall had closed during the follow-up period of six months.

The results of our study are shown in Table 2.

**Table 2: Results**

	Surgical success	Surgical failure
Case group (n=20)	9 (90%)	1 (10%)
Control group (n=20)	8 (80%)	2 (20%)

In the group where Silicone stent was applied to the stoma after endoscopic dacryocystorhinostomy (case group), the surgical rate of success following a minimum follow-up period of 6 months was 90%. The surgical success rate in the control group after a minimum follow-up period of 6 months was 80%.

**Table 3: Statistical Analysis Of Results**

Category	RESULTS		Total	X <sup>2</sup> , p value	CI	Odds ratio
	Surgical Success	Surgical Failure				
Cases	9	1	10	X <sup>2</sup> = 0.784 p=0.376	0.362 - 13.971	2.250
Control	8	2	10			

These results were subjected to statistical analysis, on applying Chi-square test, X<sup>2</sup>= 0.784. 'p' value of greater than 0.05 (p > 0.05) was obtained. Therefore the difference in the results of the case group and control group was not statistically significant. Hence these results indicate that there is no significant benefit in using Silicone stent as an adjunct to prevent stomal closure in endoscopic dacryocystorhinostomy.

#### IV. Discussion

The results of endoscopic dacryocystorhinostomy are similar to that of external dacryocystorhinostomy [7, 8] but endoscopic dacryocystorhinostomy has certain distinct advantages such as avoidance of a facial scar, noninterference with the lacrimal pump mechanism, preservation of the medial canthal ligament and simultaneous correction of any intranasal pathology contributing to nasolacrimal duct obstruction.

Failures in endoscopic dacryocystorhinostomy are due to reclosure of the stoma. Over the past three decades it has become common practice for surgeons to place stents at the time of DCR. It has been assumed and propagated that they increase the success rate of the procedure by maintaining the patency of the fistula during the post operative healing period. Silicone intubation simultaneous with DCR was first described by Gibbs[12]. Our study revealed no benefit in using Silicone stent as an adjunct in primary endoscopic dacryocystorhinostomy. Similar results were reported by Acharya et al[13], Kakkar et al[14] and Unlu et al[15]. Our experience is that, creating a large stoma by excising the entire medial wall of the lacrimal sac and meticulous surgical technique without causing unnecessary trauma and adjacent raw areas between the lateral nasal wall and middle turbinate/ Septum is sufficient to ensure a good surgical result in the majority of patients. Silicon stent can be reserved for patients who come with failure of primary endoscopic DCR surgery.

#### V. Conclusion

In our study, the results of endoscopic dacryocystorhinostomy with Silicone stent were 90% whereas endoscopic dacryocystorhinostomy without Silicone stent was 80% after a follow-up period of 6 months. However, this difference in the results is statistically insignificant (p>0.05). Hence we conclude that Silicone stent has no significant beneficial effect in preventing reclosure of the dacryocystorhinostomy stoma after primary endoscopic dacryocystorhinostomy. Meticulous, atraumatic surgical technique is gold standard in achieving a successful surgical result. Silicone stent can be reserved for patients who come with failure of primary endoscopic DCR surgery.

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