

## COMPARISON OF EXTERNAL AND ENDONASAL DACRYOCYSTO-RHINO-STOMY IN ACQUIRED NASOLACRIMAL DUCT OBSTRUCTION

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**ABSTRACT: AIM:** To compare the success rate and complications of external dacryocystorhinostomy with that of endonasal dacryocystorhinostomy. **STUDY DESIGN:** Prospective randomized comparative study. **MATERIAL AND METHODS:** Sample Size: The study comprises of 60 eyes of 54 consecutive patients with chronic dacryocystitis of which 28 patients underwent external dacryocystorhinostomy and 26 patients underwent endonasal endoscopic dacryocystorhinostomy. All the patients were selected by simple random method. **INCLUSION CRITERIA:** All symptomatic epiphora cases diagnosed for primary acquired nasolacrimal duct obstruction by the means of lacrimal sac syringing were taken for the study. Nasal endoscopy was done in all the patients to rule out any associated nasal pathology. **EXCLUSION CRITERIA:** Patients with nasal and canalicular pathology, bleeding disorders, uncontrolled hypertension and diabetes mellitus were excluded. **STATISTICAL ANALYSIS:** The data was analysed by the SPSS software version 16.0. Chi Square and Fisher's exact test were used to compare the assumption between the two groups. P value less than 0.05 was considered as significant. **RESULTS:** The overall primary success rate of external dacryocystorhinostomy was 93.33% and that of endonasal dacryocystorhinostomy was 90% at 3 months after surgery, but this difference was not statistically significant (P=1.0). **CONCLUSION:** External DCR remains as the gold standard in the treatment of nasolacrimal duct obstruction for a successful outcome with minimal complications.

**KEYWORDS:** Syringing, Nasal endoscopy, Dacryocystorhinostomy.

**INTRODUCTION:** Tears from the conjunctival sac after bathing the ocular surface, pass through the lacrimal puncta in the upper and lower lids to the respective lacrimal canaliculi, then to the common canaliculus to empty into the lacrimal sac located in the lacrimal fossa. From the lacrimal sac, tears pass to the nasolacrimal duct (NLD) along the lateral wall of the nose to open at the inferior meatus. Obstruction anywhere along this course can result in symptomatic epiphora.<sup>1</sup>

Epiphora is excessive watering due to imperfect drainage of tears through the lacrimal passages and accounts for approximately 3% of all ophthalmologic visits.<sup>2</sup> The most common cause being chronic dacryocystitis, which manifests as the inflammation of the lacrimal sac and nasolacrimal duct. It causes the troublesome and conspicuous symptom of watering from the eyes leading to social handicap.

Cardinal symptoms of dacryocystitis are watering and discharge from the eye. The first report of dacryocystorhinostomy was made by Caldwell in 1893.<sup>3</sup> An ENT surgeon by profession, Caldwell created a rhinostomy using an intranasal approach by removing a portion of the inferior turbinate and following the nasolacrimal duct to the lacrimal sac.

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Although there are many variations in surgical technique, all share the feature of creating an anastomosis between the lacrimal sac and the nasal cavity through a bony ostium. The most substantial distinction between techniques is whether the surgeon uses an internal (Intranasal) or the more traditional external (Transcutaneous) approach.

External DCR is technically easier, with an unimpaired view of the surgical area<sup>8</sup> and well defined landmarks allowing the creation of a wide bony window and the use of mucosal flaps to obtain an epithelized DCR tract.<sup>4,5</sup> An external DCR is also superior for management of an unexpected neoplasm or an intraoperative complication.<sup>6</sup>

Several variations of endonasal DCR are available. Some surgeons use fiber optic probe passed through a canaliculus to transilluminate the lacrimal sac. This probe helps to identify the thin lacrimal bone. Balloon catheters have also been used to enlarge osteotomy sites. Many of these internal techniques require expensive equipment and most surgeons find that no matter what variation is used, the results are not comparable to the higher success rate of an external DCR.

### **SUBJECT AND METHODS:**

**Sample Size:** The study comprises of 60 eyes of 54 consecutive patients with chronic dacryocystitis of which 28 patients underwent external dacryocystorhinostomy and 26 patients underwent endonasal endoscopic dacryocystorhinostomy. All the patients were selected by simple random method.

**Ethical Clearance:** This study was undertaken with clearance from the Ethical Committee of SRMS Medical College, Bareilly. Subjects were enrolled with an oral consent.

**STUDY METHOD:** A detailed history regarding the complaint of epiphora- onset and duration was enquired.

Complete ophthalmic examination was carried out including - examination of the eyelids for trichiasis, ectropion, entropion, lower lid laxity and orbicularis weakness, medial canthal area for swelling/fistula, regurgitation on sac area. A detailed slit lamp examination of puncta, conjunctiva and cornea was done.

Complete nasal examination- to rule out deviated nasal septum, turbinate hypertrophy, polyps or any mass in nasal cavity.

**INVESTIGATIONS:** Syringing was done to check the patency of lacrimal passages and to know the site of obstruction.

Routine blood and urine examination, Bleeding time, clotting time and diagnostic nasal endoscopy were performed.



**Picture 1: Lacrimal sac syringing**



**Picture 2: Digital pressure over sac area showing mucopurulent regurgitation**

**RESULTS:** The present study was conducted in the departments of Ophthalmology and ENT and Head and Neck at Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly for a period of one year, a total of 60 eyes of 54 consecutive patients were taken for the study.

Group 1 included- 30 eyes of 28 patient who underwent external dacryocystorhinostomy

Group 2 included- 30 eyes of 26 patient who underwent endonasal dacryocystorhinostomy and then, comparison was done.

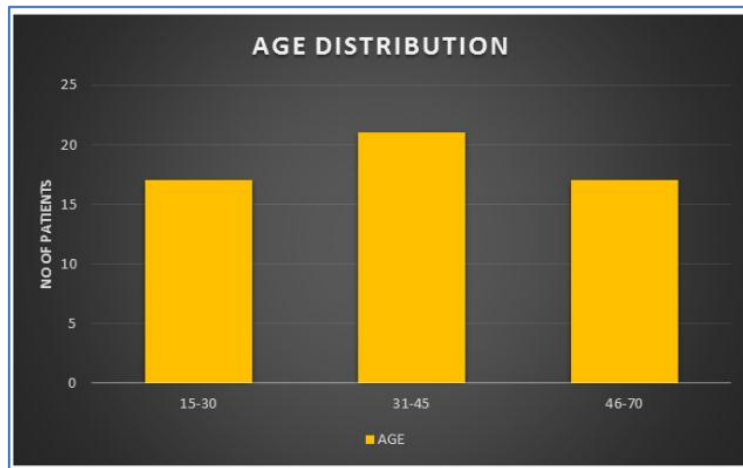
In the table 1, out of total 54 patients, maximum number of patients are in the age group 31-45 i.e. 21 (38.89%) and almost equal patients are seen in other age groups.

AGE (IN YEARS)	NO. OF PATIENTS (%)
15-30	17 (31.48%)
31-45	21 (38.89%)
46-70	16 (29.63)
<b>TOTAL</b>	<b>54 (100)</b>
<b>Standard Deviation</b>	<b>40.87 (15.27)</b>

**TABLE 1: AGE DISTRIBUTION OF PATIENTS**

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**Fig. 1: SHOWING AGE DISTRIBUTION CHART.**



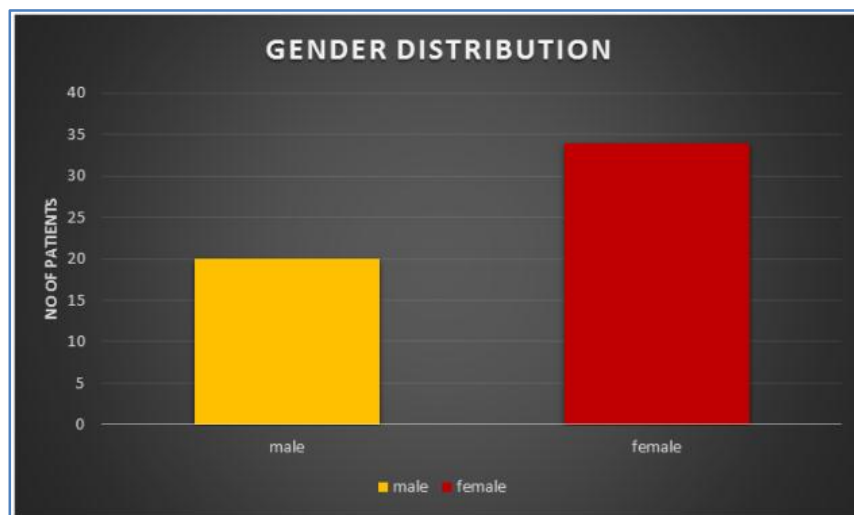
**Fig. 1**

The table 2 shows that females were in majority in both the external and endonasal group. They were 71.43% females in external group and 53.85% in endonasal group. There was no significant in proportion of gender between the groups.

GENDER	NO. OF PATIENTS (%)		Test of significance
	EXTERNAL	ENDONASAL	
MALE	8 (28.57)	12 (46.15)	$X^2 = 1.79$
FEMALE	20 (71.43)	14 (53.85)	$P = 0.181(\text{NS})$
<b>TOTAL</b>	<b>28</b>	<b>26</b>	

Table 2

**Fig. 2: GENDER DISTRIBUTION OF PATIENTS.**



**Fig. 2**

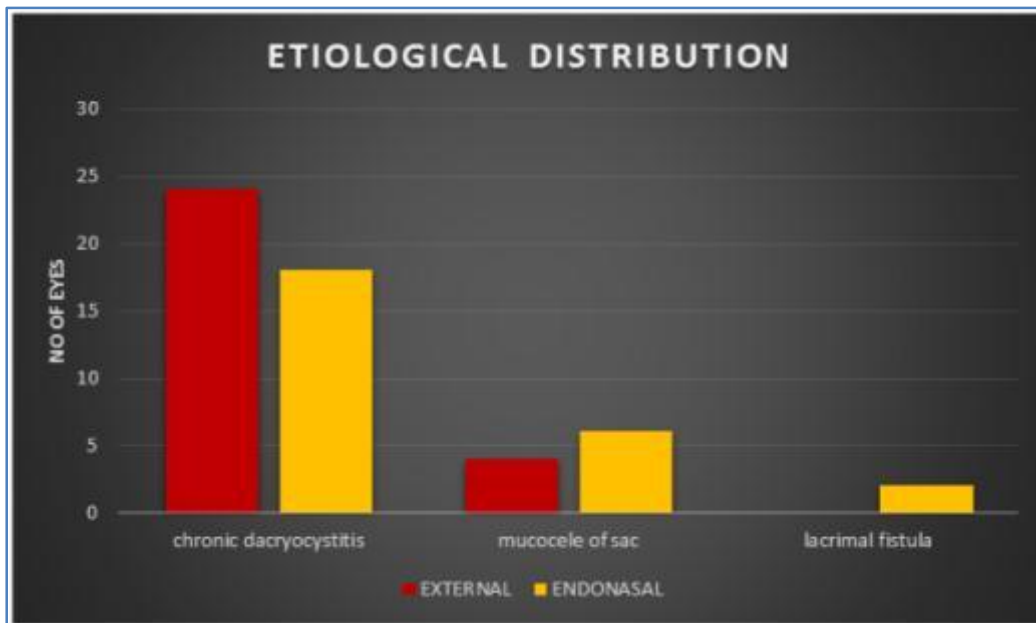
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The table 3 shows that majority of the patients who underwent dacryocystorhinostomy had chronic dacryocystitis (77.78%) as the etiological cause in both the groups, followed by mucocele of the sac (18.52%) and lacrimal fistula (3.70%) in some patients.

DIAGNOSIS	EXTERNAL No. (%)	ENDONASAL No. (%)	TOTAL No. (%)
CHRONIC DACRYOCYSTITIS	24 (85.71)	18 (69.23)	42 (77.78)
MUCOCELE OF THE SAC	4 (14.29)	6 (23.08)	10 (18.52)
LACRIMAL FISTULA	0	2 (7.69)	2 (3.70)

Table 3

**Fig. 3: ETIOLOGICAL DISTRIBUTION OF CASES.**



**Fig. 3**

Anesthesia	NO. OF EYES (%)		Total	Test of significance
	External	Endonasal		
LOCAL	26 (86.67)	27 (90)	53(88.33)	P= 1.0 (Fisher's exact test)
GENERAL	4 (13.33)	3 (10)	7(11.67)	
<b>TOTAL</b>	<b>30 (100)</b>	<b>30 (100)</b>	<b>60(100)</b>	

TABLE 4: ANAESTHESIA IN BOTH GROUPS

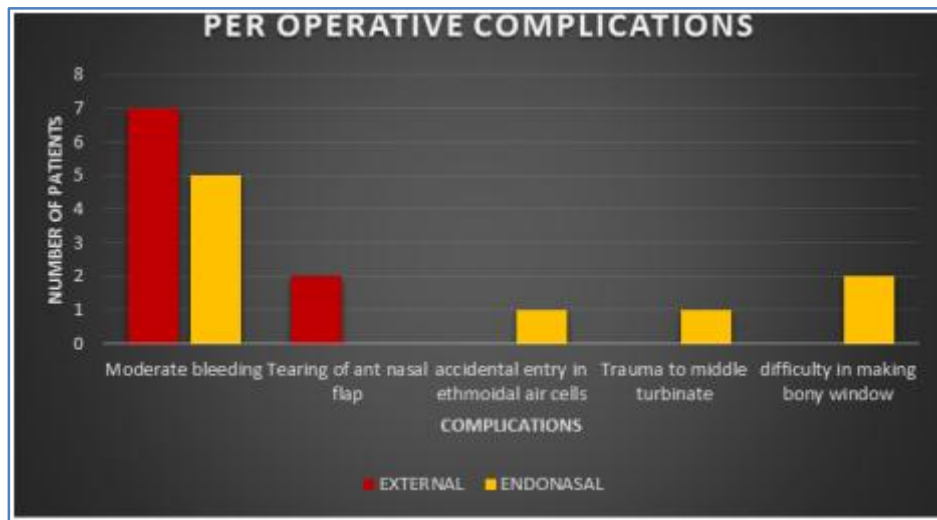
88.33% of patients in both external and endonasal group were operated under local anaesthesia. 11.67% were taken up for general anaesthesia due to their age and apprehension for the surgery.

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COMPLICATIONS	EXTERNAL		ENDONASAL	
	No:	%	No:	%
Moderate bleeding	7	23.33	5	16.67
Tearing of anterior nasal flap	2	6.67	0	0
Laceration of punctum	0	0	0	0
Accidental entry into ethmoidal air cells	0	0	1	3.33
Trauma to middle turbinate	0	0	1	3.33
Difficulty in making a bony window	0	0	2	6.67

**TABLE 5: INTRA OPERATIVE COMPLICATIONS**

**Fig. 4: INTRA OPERATIVE COMPLICATIONS.**



**Fig. 4**

Moderate bleeding was seen in 23.33% of the patients in external group & 16.67% in endonasal group. Tearing of anterior nasal flap was seen in external group in 6.67% of the patients. 3.33% of the patients in endonasal group had accidental entry into ethmoidal air cells & trauma to the middle turbinate during the surgery. Difficulty in making a bony window was seen in 6.67% patients of endonasal group.

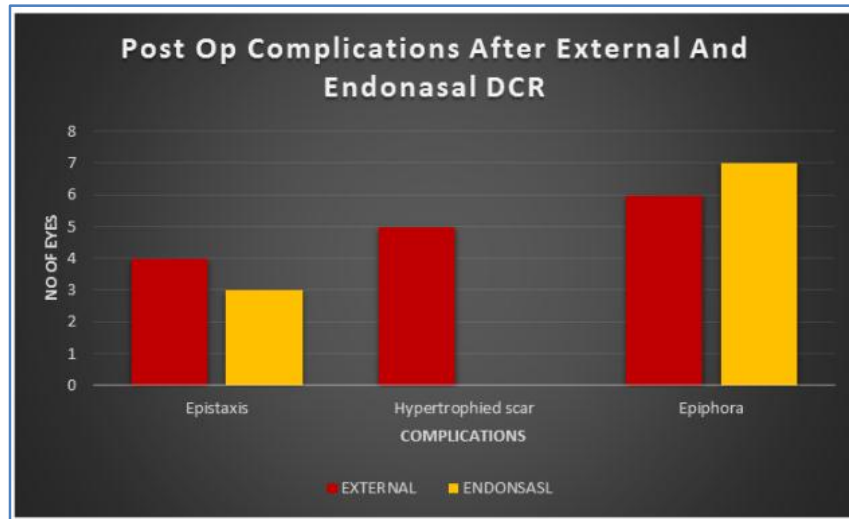
Table 6 shows that post-operative epistaxis was seen in 13.33% of the patients in external group, whereas in 10% in endonasal group. Hypertrophied scar was noted in 5 patients after external DCR, on the other hand epiphora was seen in both the groups with a slight higher percentage in endonasal group.

COMPLICATIONS	EXTERNAL No. of eyes (%)	ENDONASAL No. of eyes (%)
Epistaxis	4 (13.33)	3(10)
Hypertrophied scar	5 (16.67)	0
Epiphora	6 (20)	7(23.33)

**TABLE 6: POST OPERATIVE COMPLICATIONS AFTER EXTERNAL AND ENDONASAL DACRYOCYSTORHINOSTOMY**

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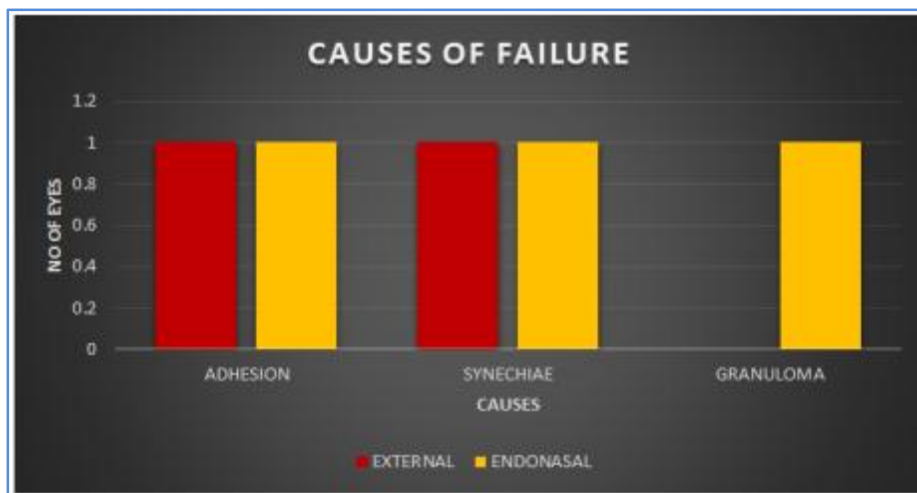
**Fig. 5: POST OPERATIVE COMPLICATIONS AFTER EXTERNAL AND ENDONASAL DACRYOCYSTORHINOSTOMY.**



**Fig. 5**

Figure 5 describes the causes of failure on post-operative nasal endoscopy. Of 2 eyes which failed after external dacryocystorhinostomy, 1(3.33%) eye showed synechiae between the ostium and the septum and 1(3.33%) eye showed adhesion between the ostium and the middle turbinate. Of 3 eyes which failed after endonasal dacryocystorhinostomy, 1(3.33%) eye showed adhesion, 1(3.33%) eye showed synechiae and 1(3.33%) eye showed granuloma formation within the ostium.

**Fig. 6: CAUSES OF FAILURE.**



**Fig. 6**

Out of 30 eyes which underwent external DCR, 28 (93.33%) eyes were patent and 1 (3.33%) eye had regurgitation of mucopurulent fluid & 1 (3.33%) eye had regurgitation of clear fluid. Out of 30 eyes which underwent endonasal DCR, 27 (90%) eyes were patent, 1 (3.33%) eye had regurgitation of clear fluid & 2 (6.67%) eyes had regurgitation of mucopurulent fluid. Table 5 is

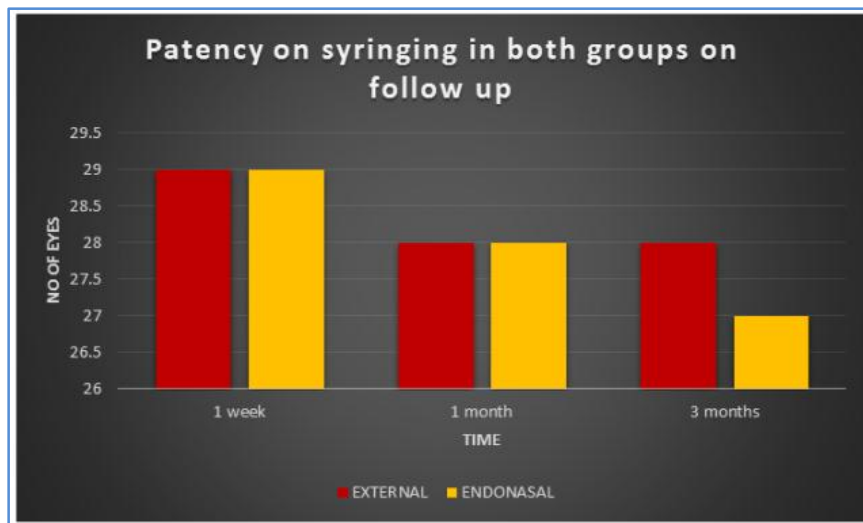
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showing the final result of syringing after the follow up of 3 months. Success rate of 93.33% was observed in external group, whereas it was 90% in endonasal group, but it was not statistically significant.

Patency on syringing	EXTERNAL DCR No. (%)	ENDONASAL DCR No. (%)	Test of significance
1 week	29 (96.67)	29 (96.67)	P= 1.0 (Fisher's exact test)
1 month	28 (93.33)	28(93.33)	
3 months	28 (93.33)	27(90)	

**TABLE 7: COMBINED TABLE SHOWING PATENCY ON SYRINGING IN BOTH GROUPS ON FOLLOW UP**

**Fig. 7: PATENCY ON SYRINGING IN BOTH GROUPS ON FOLLOW UP.**



**Fig. 7**

**DISCUSSION:** In the present study, most of the patients (38.89%) were in the age group of 31-45 years. In a study by Kuldeep Moras et al, it was also seen that majority of the patients who underwent dacryocystorhinostomy were in the 3<sup>rd</sup> and 4<sup>th</sup> decades of life (62.5%).<sup>7</sup>

In our study, females constituted 62.96% whereas males constituted 37.04% and our data correlates with the studies conducted by Dolman PJ in 1995,<sup>4</sup> Tsirbas in 1999<sup>8</sup> & Ben Simon in 1999.<sup>9</sup>

In our study, 77.78% of the patients had chronic dacryocystitis, followed by Mucocele of the sac in 18.52% and lacrimal fistula in 3.7% of the patients and they all were idiopathic in nature.

80% of the patients who presented with epiphora and mucocele, had lacrimal sac and NLD obstruction and remaining cases had canalicular obstruction in a study done by Rinki Saha et al<sup>10</sup> in 2013.

In our study, 86.67% of the patients in external group and 90% patients of endonasal group were operated under local anaesthesia. 11.67% of the total patients were operated under general anaesthesia. Local anaesthetic techniques have been reported with safe results for patients. A



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prospective study of 26 endoscopic DCRs done by Howden J et al showed no anaesthetic complications under local anaesthesia.<sup>11</sup> Both surgical procedures can be performed as day cases.

During the surgery, moderate bleeding was seen in 23.33% of the patients in external group and 16.67% in endonasal group. Tearing of anterior nasal flap was seen in external group in 6.67% of the patients. 3.33% of the patients in endonasal group had accidental entry into ethmoidal air cells and trauma to the middle turbinate during the surgery. Difficulty in making a bony window was seen in 6.67% patients of endonasal group.

In the study conducted by Cokkesser in 2000, intra operative haemorrhage occurred in 15% eyes during external dacryocystorhinostomy and 15.69% eyes during endonasal dacryocystorhinostomy.<sup>12</sup>

Failure were due to synechiae, adhesions and granulation tissue formation and they were diagnosed by nasal endoscopy. After external dacryocystorhinostomy, 1 eye had adhesions and 1 eye had synechiae. After endonasal dacryocystorhinostomy, 1 eye had adhesion, 1 eye had synechiae and 1 eye had granulation.

Sprekelson and Barberan stated that the main cause of failure in dacryocystorhinostomy surgery is fibrosis of the intranasal ostium<sup>13</sup>.

In the present study after external dacryocystorhinostomy, 13.33% eyes had post-operative epistaxis, 16.67% eyes had hypertrophic scar and 20% eyes had epiphora post operatively. In other studies post-operative haemorrhage occurred in 3.9% eyes by Tarbet and Custer in 1995.<sup>14</sup>

In the present study after endonasal dacryocystorhinostomy, 10% eyes had post-operative epistaxis, and 23.33% had epiphora post operatively.

In other studies, post-operative haemorrhage occurred in 6.25% eyes by Hartikainen et al,<sup>15</sup> 3% eyes in Tsirbas et al,<sup>8</sup> and 3.9% eyes in Tarbet and Custer.<sup>14</sup>

The overall primary success rate of external dacryocystorhinostomy was 93.33% and that of endonasal dacryocystorhinostomy was 90% at 3 months after surgery, but this difference was not statistically significant (P=1.0).

Khan et al, showed that success rate was 73.3% with endoscopic approach and 80% with external approach.<sup>16</sup> Karim et al found success rate of 82.4% in endoscopic DCR and 81.6% in external DCR.<sup>17</sup> Cokkessor et al found comparable success rates between external and endonasal DCR (90% versus 88%).<sup>12</sup> Dolman et al, also found that both procedures have equivalent success rates.<sup>4</sup>

Most of the comparative study show almost similar results between these two procedures. Both the procedures have some advantages and disadvantages.

Complication rates are low in both. There was no statistically significant difference between endoscopic and external DCR in our study and the success rate of both the procedures are comparable. Endonasal DCR is preferred by many patients because of the lack of a cutaneous scar. So the choice in regards to surgical technique should depend upon patient's preferences, availability of resources and surgical expertise.

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