



ENDOSCOPIC V/S EXTERNAL APPROACH DCR: A COMPARATIVE ANALYSIS

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ABSTRACT **PURPOSE:** The purpose of this study is to compare the success rates of endoscopic endonasal dacryocystorhinostomy (EN-DCR) and external DCR (EX-DCR) for the treatment of epiphora. **Design:** This was a prospective and retrospective, comparative, nonrandomized clinical study. **Methods:** Reviewed medical records at Jay Arogya Hospital from April 2022 to September 2024. Data regarding the lacrimal passage system, comorbidities, surgical outcomes, and postoperative complications were analyzed. Success was defined as patency confirmed by intranasal endoscopic inspection of the ostium and successful lacrimal irrigation; and complete resolution of epiphora which were assessed at postoperative 6th month. **Results:** Total 50 patients, 25 from ENT and 25 from ophthalmology were studied. The overall success rate was 92%, with no significant difference observed between two groups. Complication rate was low in both groups: two cases of postoperative nasal bleeding in EX-DCR, one in EN-DCR and 3 cases of granulation tissue (two in EX-DCR and one in EN-DCR). **Conclusions:** Success rate of DCR in our study was equal, and complication rate was low for both endoscopic and external approaches. There was no statistically significant difference between them. EN-DCR provided higher satisfaction due to quicker recovery and lack of external incision. Endoscopic DCR should be considered as the primary treatment of choice for epiphora.

KEYWORDS :

INTRODUCTION

Dacryocystorhinostomy (DCR) is the standard procedure for the treatment of epiphora due to chronic dacryocystitis. The principle of the surgery is to create an anastomosis between the lacrimal sac and nasal cavity by removing the bone that separates these two structures and bypass the occluded nasolacrimal duct of the downstream. The original surgical technique was first introduced in 1904 by Toti^[1], then modified by Dupuy-Dutemps and Bourguet^[2] and defined as transcutaneous or external DCR (EX-DCR) which has become the traditional procedure and still a gold standard for the treatment of nasolacrimal duct obstruction (NLDO) nowadays due to high success rate. Besides external approach, DCR can also be performed through the nasal cavity and defined as endonasal DCR (EN-DCR). Caldwell^[3] initially described EN-DCR in 1893 by direct inspection from the nostril throughout the procedure; however, it was then fell out of use due to difficulty in visualization and indeterminacy of surgical anatomy. The popularity of EN-DCR did not increase until the 1990s with the advent of rigid fiberoptic endoscope used in functional sinus surgery, which make a great advance in viewing the surgical detail.^[4] The first clinical study of endoscopic DCR was published by McDonogh and Meiring in 1989.^[5] Accompany with the involution of the fine intranasal surgical instruments and utilization of retinal light pipe as surgical anatomy guidance, more and more surgeons rekindle their interest in EN-DCR and have developed various ways of doing it, from mechanical with or without powered device^[6,7] to laser-assisted lacrimal surgery.^[8,9] The advantages of EX-DCR include direct visualization of the lacrimal sac for identification of the sac pathology, no need for expensive instruments, the allowance of secure flaps creation, and sutures to form a fine anastomosis between lacrimal sac and nasal mucosa, which is one of the key factors to surgical success. The disadvantages of EX-DCR are related to the skin incision that may cause scar formation^[10] and interference of the lacrimal pumping function due to disruption of medial canthal tendon, orbicularis muscle, or superficial branch of facial nerve.^[11] On the opposite, EN DCR has benefits of preserving lacrimal pumping function without eyelid anatomy disruption, no risk of external scar, and the ability of concurrently address intranasal pathology in one surgery. The drawbacks of the EN-DCR include high cost of the instrument, steep learning curve of the endoscope technique for ophthalmologist, and difficulty of lacrimal sac-nasal mucosal flaps suturing and manipulation.

METHODS

This is a retrospective, nonrandomized, comparative study conducted at Department of otorhinolaryngology GRMC Gwalior. Medical records of all patients who underwent surgery for chronic dacryocystorhinitis from April 2022 to September 2024 were reviewed. Diagnosis of chronic dacryocystorhinitis was based on the presence of symptoms with epiphora, clinical observation of fluorescein dye disappearance test and documented obstruction by lacrimal irrigation and probing.

Exclusion criteria included canalicular obstruction, congenital NLDO, previous trauma history of lacrimal passage system, previous irradiation therapy covering nasal or periorbital region. About 1% lidocaine with 1:100,000 epinephrine was used for local infiltration of incision site of skin and nasal mucosa. Nasal packing with cotton sponges soaked with mixture of 4% lidocaine and 1:100,000 epinephrine were inserted for intranasal vasoconstriction 20 min before the surgery.

For EX-DCR, a 15–20 mm curved skin incision was made medially to the angular vein at the level of the anterior lacrimal crest. The orbicularis muscle was then bluntly dissected deep down to the periosteum, and the lacrimal sac was exposed by partial incision of the medial canthal ligament. The periosteum was opened by surgical blade and lifted from the anterior lacrimal crest by the Freer elevator. The periosteum along with the lacrimal sac was displaced laterally. A squared bony window, sized 15 mm × 15 mm in diameters, was created with the help of drill between the insertion of the medial canthal tendon superiorly and the proximal nasolacrimal duct inferiorly, extending from anterior to posterior lacrimal crest. The lacrimal sac and nasal mucosa were opened with surgical blade in the shape of letter H, and the opposing mucosa flaps were sutured with interrupted 5-0 Vicryl. The skin was closed with interrupted 6-0 nylon sutures.

For EN-DCR, the surgery was performed with zero-degree Karl Storz endoscope. A crescent knife was used to make a vertical mucosal incision, starting 10–12 mm anterior to the axilla of the middle turbinate along the maxillary line, and extend 15–20 mm inferiorly toward the insertion of inferior turbinate. Freer elevator was used to raise the nasal mucosal flap and dissected posteriorly over frontal process of maxilla to its junction with the lacrimal bone. The nasal

mucosal flap was removed by Blakesley nasal forceps. A bony window, sized 12 mm × 15 mm in diameters, was created by Kerrison rongeur and sometimes with the help of chisel and hammer. After fully exposed of the lacrimal sac, a vertical incision with horizontal releasing incisions at both superior and inferior end was made to cut the sac open. water irrigation from upper and lower punctums was performed to check flow patency. A 10 mm × 10 mm sized absorbable hemostatic gelatin sponge, was packed onto the lacrimal sac, which helped the sac flaps to roll out against the lateral nasal wall and allowed better approximation of sac mucosa to the nasal mucosa edges. nasal dressing was inserted to the nasal cavity at the end of the surgery.

During the postoperative period, all patients were prescribed eye drops with 4% sulfamethoxazole and 0.1% fluorometholone four times a day for 1 month. The skin sutures of the patients with EX-DCR were removed 1-week postoperatively. All patients were assessed at the postoperative 1st week, 1st month, 3rd month, and 6th month. During the follow-up visit, patients were asked about the symptom relief of epiphora and check patency by lacrimal irrigation, and intranasal endoscopic examination.

Primary outcome measurements were the surgical success at the final visit. success was defined as patency confirmed by intranasal endoscopic inspection of the ostium, successful lacrimal irrigation and complete resolution of epiphora and All patients were followed up for at least 6 months. Data were analyzed using SPSS software Version 21.0 (SPSS Inc., Chicago, USA). Continuous variables were presented as mean ± standard deviation. Categorical variables were presented as numbers and percentages. The significance of the difference among groups in terms of means was analyzed by Student's t-test, and categorical variables were analyzed by Chi-square test. $P < 0.05$ was considered statistically significant

RESULTS

After exclusion, those with incomplete data collected, a total of 50 patients underwent 50 DCR surgeries were included in this study. Demographic data of the study population were summarized in Table 1. Comparing EN-DCR to EX-DCR groups of patients, the age was older, and there was no statistically significant difference in gender, laterality, previous sinus disease or surgery, previous lacrimal procedure other than DCR, duration of symptoms before the surgery, and presence of acute or chronic dacryocystitis between two groups. success was achieved in 23 (92%) of 25 cases for EN-DCR and 23 (92%) of 25 cases for EX-DCR.

There was no statistically significant difference regarding success rate between these two groups ($P = 0.511, 0.909$, respectively).

The comparison of surgical outcomes was summarized in TABLE.

Comparative Demographic and Clinical Profile of Endoscopic vs. External DCR Groups

Parameter	Category	Endoscopic DCR (N = 25)	External DCR (N = 25)
Gender	Male	14	14
	Female	11	11
Occupation	Labourer	9	7
	Business	5	7
	Housewife	5	5
	Farmer	4	5
	Student	2	1
Education	Graduate	7	7
	10th Standard	6	7
	Postgraduate	6	6
	Illiterate	6	5
Addiction History	None	13	14
	Tobacco	8	8
	Gutkha	4	3
Past History	None	24	23
	Hypertension	1	1
	Prior DCR	0	1
Associated ENT Conditions	None	21	23
	DNS	3	1
	Epistaxis	0	1
	Spur	1	0
ENT (Ear & Throat)	Normal	17	16

	Diseased	8	9
Intraoperative Complication	None	24	23
	Bleeding	1	2
Additional Nasal Surgery	None	19	23
	Septoplasty	4	1
	FESS	1	1
	Spurectomy	1	0
Visual Acuity (6/6)	Right Eye	16	17
	Left Eye	17	16
Surgical Outcome	Successful	23	23
	Unsuccessful	2	2
Postoperative Patency (1 week)	Patent	25	25
	Blocked	2	2
Postoperative Patency (6 months)	Patent	23	23
	Blocked	2	2
Success Rate		92%	92%

DISCUSSION

In our study, the overall success rate of DCR for dacryocystitis was 92%, which was similar to previous reports in the literature. There was no significant difference in success rate between EN-DCR (92%) and EX-DCR (92%). The reported success rate of EN-DCR in the literature ranges from 60% to 99% [12-16] and EX-DCR from 80% to 95%.

Studies for comparison of surgical outcomes of two approaches had been conducted and the results varied in the literature. There is still no consensus that which procedure is superior to the other. Lacking of standardized outcome measurements, variable surgical techniques, nonrandomized case selection, experience of the surgeon may all contribute to the variable reported outcomes. In our study, the success rates were assessed not only the symptoms relief from the subjective aspect of patients but also fluorescein dye disappearance test and lacrimal irrigation from the objective view of the physician. However, there was still bias in personal interpretation of both sides and that was the weak point of this study. The decision of surgical approach, through either external or endoscopic routes, for DCR often reflects the surgeon's training background. Ophthalmologist is familiar with the surgical incision through medial canthal area, while otorhinolaryngologist favors the transnasal endoscopic view to approach the lacrimal sac. With the increasing collaboration between these specialties, the practice pattern changes. From my 10-year personal experience, surgical approaches gradually transitioned from only EX-DCR for the first few years to mainly EN-DCR (97.8%) in recent years. The key point of the changing was due to increasing capability of utilizing endoscopy. Besides surgeons' preference, patients' choice is actually the major concern for determinant of surgical approach of DCR. comparing EN-DCR to EX-DCR suggested that both procedures have high success rate and equivalent low risk of complications. However, absence of skin scar and quicker recovery time led to significant higher patient satisfaction for those who underwent EN-DCR.

Although surgical success was comparable between two groups at final visit in our study, time to relief of symptoms after the surgery was statistical significantly shorter in EN-DCR compare to EX-DCR (1.7 vs. 3.7 weeks). We also observed few cases with transient lagophthalmos, which mostly resolved in 1-month postoperatively, that resulted in prolonged tearing despite anatomical patency in EX-DCR. That might result from disruption of medial canthal tendon along with orbicularis muscle and superficial branches of facial nerve that interfered the lacrimal pumping function by external skin incision. Few but still cases (7%) of EX-DCR in our study revealed skin wound complications of all degree. Although the mean age was older and the prevalence of diabetic was higher among patients underwent EX-DCR, we did not find correlations of these factors to the delayed time of symptom relief in EX-DCR compare to EN-DCR group. However, further randomized, controlled study is needed to clarify the association between them. With the convincing data that supported in our study, we believe it is worthwhile to shift EX-DCR to EN-DCR for patients' own good. 4 out of 50 cases (9.6%) in our study were consider surgical failure for those with symptoms of persisted tearing at final visit. Intranasal endoscopic findings of these patients included cicatricial closure of the ostium, adhesion of the nasal mucosa involving the middle turbinate or nasal septum, granulation tissue obscured the ostium, or membrane obstructing common canalicular opening. In another study, In a review of 100 revision DCRs performed in India, Dave et al. found most common causes of surgical failure included inadequate osteotomy, inappropriate sac marsupialization, and cicatricial closure.[24] Lin GC reported the

causes of failure DCR of 53 consecutive patients underwent EN-DCR revision surgeries and found 9.5% vs. 9.4% sump syndrome in EX-DCR and EN-DCR, respectively.[25] This might explain those who revealed functional failure despite anatomical patency. Here, we would like to emphasize the importance of intranasal endoscopic examination during follow-up period since it is helpful for understanding the wound healing process and improving surgical outcomes.

CONCLUSIONS

Both EX-DCR and EN-DCR surgeries for the treatment of epiphora in our study revealed high success rate and low risk of complications. However, patients underwent EN-DCR had shorter recovery time and higher satisfaction due to lack of external incision, although final surgical outcomes were comparable between two groups. Otorhinolaryngologists should definitely find ourselves a role in endoscopic lacrimal surgery and consider EN-DCR as primary treatment of choice for epiphora due to dacryocystorhinitis.

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