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COMPARISON BETWEEN ENDOSCOPIC DCR AND EXTERNAL DCR

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ABSTRACT

Purpose: The purpose of this study is to compare the success rates of endoscopic endo-nasal dacryocystorhinostomy and external DCR for the treatment of primary acquired nasolacrimal duct obstruction. **Methods:** Study was conducted for 1year duration in a district hospital pulwama with 100 cases of endoscopic and 60 cases of external DCR with a follow-up of minimum 6 months. Data regarding surgical outcome and complications were analysed and compared using χ^2 test. Study was Prospective non-randomized comparative study. **Results:** Total 160 patients were included in the study, The mean age for endoscopic and external DCR was 33.6 years and 46.0 years, respectively. Mean duration of surgery was much lengthier in external (mean 119.6 minutes) than endoscopic (mean 49.0 minutes) DCR. Bleeding was the most common immediate postoperative complication seen in 33.3% and 10.0% of external and endoscopic DCR cases, respectively. Primary surgical success rate was 90% and 96.7% for endoscopic and external DCR, respectively (P = 0.046). **Conclusion:** Although both END- and EXT-DCRs provide satisfactory outcomes with similar objective and subjective success rates, There was no statistically significant difference between them. EN-DCR provided higher satisfaction due to quicker recovery and lack of external incision.

INTRODUCTION

Chronic dacryocystitis is the chronic inflammation of the lacrimal sac due to stricture of the nasolacrimal duct secondary to chronic inflammation, which is usually nasal in origin. The essential symptom is epiphora, Dacryocystorhinostomy (DCR) is the standard procedure for the treatment of primary acquired nasolacrimal duct obstruction, Either carried externally or endoscopically. It is performed by a standard skin incision, followed by removal of the lacrimal and maxillary bones and a passage formed by the connection of nasal and lacrimal sac mucosas. The reported success rates in the literature with this surgery ranges between 80%-95%. Major complications are listed as scar formation over the incision, infection, ectropion, or disruption of the medial canthal ligament and epistaxis.[1] Besides external approach, DCR can also be performed through the nasal cavity and defined as endonasal DCR (EN-DCR). Caldwell[2] 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.[3] The first clinical study of endoscopic DCR was published by McDonogh and Meiring in 1989.[4] 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[5] and interference of the lacrimal pumping function due to disruption of medial canthal tendon, orbicularis muscle, or superficial branch of facial nerve.[6] 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. Debate continues regarding EX-DCR versus EN-DCR. The reported success rate of both procedures varied in the literature, ranging from 60% to 99%.[7-11] The purpose of this study is to compare the surgical outcomes of EX-DCR and EN-DCR for the treatment of nasolacrimal duct obstruction in our hospital for the past 1 years and to share the personal experience of transition from EX-DCR to EN-DCR as an ophthalmologist.

MATERIALS AND METHODS

This was a prospective, non-randomized study, conducted in the Department of Ophthalmology, in conjunction of Department of Otorhinolaryngology at district hospital pulwama Kashmir for duration of 12 months from January 2016 to december 2016. Before starting the study, institutional ethical committee clearance was obtained. A total 160 eyes were included in study. External DCR was done in 60 eyes whereas endoscopic DCR was done in 100 eyes. All patients were followed up to a minimum of 6 months at 1 month, 3 months and 6 months interval, Patency of the stoma was checked by sac syringing for external DCR and by both sac syringing and endoscopic inspection of the stoma for endoscopic DCR.

Inclusion Criteria

1. All symptomatic cases of epiphora which were diagnosed for primary acquired nasolacrimal duct obstruction or chronic dacryocystitis.
2. Those who were willing to undergo surgery.

Exclusion Criteria

1. Cases with canalicular and punctal obstruction.
2. Cases with ectropion or entropion.
3. Cases with noticeable lower lid laxity.

All patients were well informed about the advantages and disadvantages of the EX-DCR and EN-DCR methods; however, the types of the surgical approach were decided according to the surgeon's judgment. 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 blunt 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. A Crawford bicanalicular silicone stent was inserted and tied in the nasal cavity. The skin was closed with interrupted 6-0 nylon sutures.

For EN-DCR, the surgery was performed with zero-degree Karl Storz endoscope. A light pipe used in retinal surgery was inserted from the upper punctum to localize the lacrimal sac. 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 Kerrisonrongeur 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. Fluorescein dye water irrigation from upper and lower punctums was performed to check flow patency. The Crawford bicanalicular (FCI ophthalmic, France) stent was inserted and tied in the nasal cavity. A 10 mm × 10 mm sized kenacort-soaked SPONGOSTAN™ (absorbable hemostaticgelatin sponge, Ferrosan Medical Devices A/S, Denmark) 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. Nasopore® fragmentable nasal dressing (Polyganics BV, Groningen, Netherlands) 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. The silicone tube was removed 6 months 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 fluorescein dye disappearance test, lacrimal irrigation, and intranasal endoscopic examination.

Primary outcome measurements were the anatomical and functional success at the final visit. Anatomical success was defined as patency confirmed by intranasal endoscopic inspection of the ostium and successful lacrimal irrigation. Functional success was defined as complete resolution of epiphora and positive fluorescein dye disappearance test. Secondary outcome measurements were the postoperative time to the resolution of epiphora and surgical-related complications. All patients were followed up for at least 6 months.

RESULTS

In this study, total 160 eyes of patients were included. 100 of total 160 eyes had undergone endoscopic DCR and 60 had external DCR. Out of the total 100 in endoscopic DCR group, 50 underwent conventional endoscopic surgery, 26 eyes had powered endoscopic surgery and 24 underwent endoscopic DCR with silastic sheet. Silastic sheets were used only in cases of narrow

nasal cavity to prevent damage of septal mucosa and consequent synechia formation.

Massive to minimum intraoperative bleeding compared in two groups. Massive intraoperative bleeding was noted in 20 (33.3%) cases and moderate bleeding in 28 (46.7%) cases in external DCR. In endoscopic DCR surgery, massive bleeding occurred only in 10% of cases and in most (56%) of the cases minimum amount of bleeding noted. The difference was highly significant. All these complications were managed conservatively.

Intraoperative bleeding	Endoscopic DCR	External DCR
	No. percentage	No percentage
Massive	10 10.0	20 33.3
Moderate	34 34.0	28 46.7
Minimum	56 56.0	12 20.0
Total	100 100.0	60 100.0

Intraoperative bleeding associated with endoscopic and external DCR

The average follow up period was 6.1 months. In endoscopic DCR group, out of 100 cases, 95 cases (90%) demonstrated primary surgical success, which is defined as decreased or absent epiphora and adequately patent lacrimal system in 1st month of follow-up period. Twenty-nine (96.7%) out of 60 cases had patent lacrimal passage and one presented with functional block after 1 month in external DCR group. The difference was statistically significant ($P = 0.046$).

Result of syringing	1 month	1 month	6 month	6 month
	Endoscopic DCR	External DCR	Endoscopic DCR	External DCR
	No percentage	No percentage	No percentage	No percentage
Patent	90 90.0	58 96.7	92 92.0	56 93.3
Partially blocked	0 0	1 3.3	0 0	0 0
Blocked	10 10.0	0 0	8 8.0	4 6.5
Total	100100.0	60100.0	100 100.0	60 100.0

DISCUSSION

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. Our study was a prospective, non-randomized study done on 160 eyes of 160 patients presented with epiphora or chronic dacryocystitis. The mean age of the patients who underwent endoscopic DCR was 33.6 years compared to external DCR group, which was 46 years. This indicates that acquired nasolacrimal duct obstruction is more common in middle age group. There is a declining trend towards both extremes of age. This may be due to the fact that amount of lacrimal secretion is less in extremes of ages. Similar data was found by many previous workers.[12,14,15,16] Eighty percent eyes presented with epiphora and mucocele had lacrimal sac and nasolacrimal duct obstruction; and remaining cases had canalicular obstruction.

In a study in Bangladesh, the duration of surgery in endoscopic DCR was 59.7 ± 8.8 minutes which was significantly higher than for external DCR group which was 54.3 ± 5.6 minutes.[12] Muscatello *et al*., showed that mean time for endonasal endoscopic DCR was 30 minutes, range 15-110 minutes and time progressively decreased with increasing surgical experience.[17] Hartikainen *et al*., concluded that average duration for endoscopic DCR was 38 minutes and 78 minutes for external DCR.[18] We found that average time required for endoscopic DCR was 49 minutes as compared to external DCR was 119.6 minutes. In our study, we found that surgical times are closely related to the surgical experience of the surgeon and intraoperative bleeding. As most of the surgery in our study was done by residents who lack surgical experience, time taken was more.

Complication rate was low in both types of surgery. Complication of excessive intraoperative bleeding occurred in external and endoscopic DCR was 33.3% and 10% cases, respectively. This finding corroborates with study done by Moras *et al*.[14] Again, in a study of 79 external DCRs, 14 patients had postoperative haemorrhage compared to 0 out of 51 patients in the endoscopic DCR group.[19] However, some studies show that bleeding is more common in endoscopic DCR surgeries. In the study by Khan *et al*., they found that there was moderate bleeding in 13.3% cases of external DCR and 20% cases of endoscopic DCR.[12] Karim *et al*., found no serious complication in their study, except only

three patients (one in external DCR group and two in endoscopic DCR group) with postoperative haemorrhage requiring conservative treatment.[13] Other complications included lacrimal sac flap loss during separation of sac from lacrimal fossa and loss of nasal mucosa during cutting in external DCR. There were no such complications noted in endoscopic DCR surgery. However, there were no episodes of orbital hematoma, diplopia and cerebrospinal fluid (CSF) leakage in both groups in our study.

The average follow up period was 6.1 months in our study. The primary surgical success rate in endoscopic DCR group was 90% and 96.7% in external DCR group after 1st month of follow–up period. In endoscopic DCR group, all five (10%) of patients with persistent obstruction of neo-ostium subsequently underwent revision procedures. At 6 month of follow-up 92% had a successful surgical outcome in endoscopic DCR compared to external DCR which showed 93.3% successful outcome. This difference was not statistically significant ($P = 0.609$).

The success rate for endoscopic DCR appears to be comparable to the "gold standard" external approach, with success rate ranging from 78% to 97%.[20,21] Our success rate in both group is comparable to various studies. Khan *et al*., showed that success rate was 73.3% with endoscopic approach and 80% with external approach.[12] Karim *et al*., has found similar success rate in both approaches (endoscopic DCR 82.4% versus external DCR 81.6%; $P = 0.895$).[13] In the study, Gupta *et al*., found that success rate endonasal DCR was 90% after a single procedure and 95% after revision procedure, which was equal to external approach, which is comparable to our study.[15]

CONCLUSION

DCR is the treatment of choice for nasolacrimal duct obstruction. It can be performed by external or endoscopic approach. Both these approaches have minimal complications and comparable surgical outcome. This indicates that these two DCR techniques are acceptable alternatives. So it can be concluded that endoscopic DCR is a safe, minimally invasive effective day care technique with a good aesthetic result and the choice of surgery should depend upon patient's preference, availability of resources and surgeon's expertise.

BIBLIOGRAPHY

1. Preechawai P. Results of nonendoscopicendonasaldacryocystorhinostomy. Cli n Ophthalmol, 2012; 6(1): 1297–1301. [PMC free article] [PubMed]
2. Caldwell GW. Two new operations for obstruction of the nasal duct. NY Med J., 1893; 57: 581–2.
3. Watkins LM, Janfaza P, Rubin PA. The evolution of endonasaldacryocystorhinostomy. Surv Ophthalmol, 2003; 48: 73–84. [PubMed]
4. McDonogh M, Meiring JH. Endoscopic transnasaldacryocystorhinostomy. J Laryngol Otol., 1989; 103: 585–7. [PubMed]
5. Rizvi SA, Saquib M, Maheshwari R, Gupta Y, Iqbal Z, Maheshwari P, et al. Cosmetic evaluation of surgical scars after external dacryocystorhinostomy. Int J Ophthalmol, 2016; 9: 1745–50. [PMC free article][PubMed]
6. Vagefi MR, Winn BJ, Lin CC, Sires BS, LauKaitis SJ, Anderson RL, et al. Facial nerve injury during external dacryocystorhinostomy. Ophthalmology, 2009; 116: 585–90. [PubMed]
7. Dolman PJ. Comparison of external dacryocystorhinostomy with nonlaserendonasaldacryocystorhinostomy. Ophthal mology, 2003; 110: 78–84. [PubMed]
8. Ozer S, Ozer PA. Endoscopic vs. external dacryocystorhinostomy-comparison from the patients' aspect. Int J Ophthalmol, 2014; 7: 689–96. [PMC free article] [PubMed]
9. Huang J, Malek J, Chin D, Snidvongs K, Wilcsek G, Tumuluri K, et al. Systematic review and meta-analysis on outcomes for endoscopic versus external dacryocystorhinostomy. Orbit., 2014; 33: 81–90. [PubMed]
10. Ben Simon GJ, Joseph J, Lee S, Schwarcz RM, McCann JD, Goldberg RA, et al. External versus endoscopic dacryocystorhinostomy for acquired nasolacrimal duct obstruction in a tertiary referral center. Ophthalmology, 2005; 112: 1463–8. [PubMed]
11. Lee DW, Chai CH, Loon SC. Primary external dacryocystorhinostomy versus primary endonasaldacryocystorhinostomy: A review. Clin Exp Ophthalmol, 2010; 38: 418–26. [PubMed]
12. Khan MK, Hossain MA, Hossain MJ, Al-Masud A, Rahman MZ. Comparative study of external and endoscopic endonasaldacryocystorhinostomy for the treatment of chronic dacryocystitis. JAFMC Bangladesh, 2011; 7: 15–7.
13. Karim R, Ghabrial R, Lynch TF, Tang B. A comparison of external and endoscopic endonasaldacryocystorhinostomy for acquired nasolacrimal duct obstruction. Clin Ophthalmol, 2011; 5: 979–89. [PMC free article] [PubMed]
14. Moras K, Bhat M, Shreyas CS, Mendonca N, Pinto G. External dacryocystorhinostomy versus endoscopic dacryocystorhinostomy: A comparison. J Clin Diagn Res., 2011; 5: 182–6.
15. Gupta S, Goyal R, Thakur AS, Singh H. Conventional dacryocystorhinostomy versus endonasaldacryo-cystorhinostomy - a comparative study. Peoples J Sci Res., 2008; 1: 1–4.
16. Küpper DS, Demarco RC, Resend R, Anselmo-Lima WT, Valera FC, Moribe I. Endoscopic nasal dacryocystorhinostomy: Results and advantages over the external approach. Braz J Otorhinolaryngol, 2005; 71: 356–60. [PubMed]

17. Muscatello L, Giudice M, Spriano G, Tondini L. Endoscopic dacryocystorhinostomy: Personal experience. ActaOtorhinolaryngol Ital., 2005; 25: 209–13. [PMC free article] [PubMed]
18. Hartikainen J, Antila J, Varpula M, Puukka P, Sepp H, Grénman R. Prospective randomized comparison of endonasal endoscopic dacryocystorhinostomy and external dacryocystorhinostomy. Laryngoscope, 1998; 108: 1861–6. [PubMed]
19. Cokkeser Y, Evereklioglu C, Er H. Comparative external versus endoscopic dacryocystorhinostomy: Result in 115 patients (130 eyes) Otolaryngol Head Neck Surg., 2000; 123: 488–91. [PubMed]
20. Smith W, Merkonidis C, Draper M, Yung M. Endoscopic dacryocystorhinostomy in warfarinized patients. Am J Otolaryngol, 2006; 27: 327–9. [PubMed]
21. Jin HR, Yeon JY, Choi MY. Endoscopic dacryocystorhinostomy: Creation of a large marsupialized lacrimal sac. J Korean Med Sci., 2006; 21: 719–23. [PMC free article] [PubMed]