

Is Endoscopic Dacryocystorhinostomy an Alternative to External Approach Dacryocystorhinostomy

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ABSTRACT

Objective: To compare the efficacy of Endoscopic Dacryocystorhinostomy with External approach Dacryocystorhinostomy.

Study Design: Comparatives analytical study.

Place and Duration of Study: Armed Forces Institute of Ophthalmology, Rawalpindi Pakistan, Nov 2017 to Apr 2018.

Methodology: This analytical comparative study was carried out at Armed Forces Institute of Ophthalmology Rawalpindi. A total of 80 patients suffering from epiphora due to nasolacrimal duct obstruction were divided into two groups. Group-A underwent endoscopic Dacryocystorhinostomy while Group-B underwent external Dacryocystorhinostomy. At 6-months success of Dacryocystorhinostomy was assessed subjectively from symptomatic relief of epiphora.

Results: The efficacy of Group-A treatment was significantly higher as that of Group-B treatment. i.e. Group-A: 90% vs. Group-B: 67.5%. The *p*-value was calculated to be 0.014 which was statistically significant.

Conclusion: Based on this study, it is safe to conclude that endoscopic Dacryocystorhinostomy is an effective alternative to external approach Dacryocystorhinostomy in treating cases with epiphora due to nasolacrimal duct obstruction.

Keywords: Chronic Dacryocystitis, Dacryocystorhinostomy, Efficacy, Endoscopic, External, Epiphora.

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INTRODUCTION

External Dacryocystorhinostomy (DCR) is the "Gold Standard" technique for treatment of acquired nasolacrimal duct obstruction. A review of literature reveals an overall success rate of about 85% to 90%¹ in this technique and an average failure rate of 9.4%.² Failure is defined in terms of persistence of epiphora and inability to irrigate the lacrimal system. Two most frequent causes of failure in DCR are scarring and granulation tissue formation at osteotomy site and common canaliculus.²

Classically, DCR been performed by using an external approach. The invention of rigid nasal endoscopes later allowed for an endoscopic method. In 1989 McDonogh and Meiring described endoscopic intranasal DCR for the first time.³ While external DCR is still considered to be the gold standard, endoscopic DCR has emerged in recent past as an equally effective alternative. Various studies have shown that success rate ranges from 63% to 90% for both procedures.¹ The apparent advantages of endonasal DCR over external DCR are its less invasive nature, shorter operative time and preservation of pump function of the

orbicularis oculi muscle due to the absence of an external skin and orbicularis incision. Various studies have shown success rates of endonasal DCR upto 92%.^{1,4} In one of the study carried out at Jules Stein Eye Institute UCLA, success rate of external DCR was shown to be 70%.⁵

The present study was carried out in this context with the aim of comparing the success rates of external and endonasal endoscopic DCR regarding the resolution of epiphora and patient satisfaction. Due to certain obvious advantages discussed above endoscopic DCR might eventually replace the external approach.

METHODOLOGY

The analytical comparative study was carried out at Armed Force Institute of Ophthalmology from November 2017 to 30th April 2018. Sample size was calculated using WHO calculator. The Level of significance was kept at 5% while the power of test was kept at 80%. Anticipated population proportion of Endo-DCR group was 92%⁴ while anticipated population proportion Ext-DCR group was 70%.⁵ The minimum sample size in each group came out to be 40 and the total sample size was calculated to be 80. Non-probability consecutive sampling was carried out. After approval from hospital ethical committee, 80 adult patients were selected.

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Inclusion Criteria: Patients aged 15–70 years of both genders who were having epiphora due to chronic dacryocystitis, complete nasolacrimal duct obstruction confirmed with hard stop on probing and regurgitation of fluid through opposite punctum on syringing or primary cases of nasolacrimal duct obstruction, were included.

Exclusion Criteria: Cases who had suspicion of lid malignancy, radiation therapy to head and neck, previous lid surgery/ trauma and cases having common canalicular or individual canalicular occlusion were excluded from the study.

An informed consent was taken from all patients. All patients being worked up for epiphora undergone full examination including visual acuity, slit lamp examination of lids, conjunctiva, cornea and puncta to rule out any punctal occlusion or malpositioning. Regurgitation test was performed under slit lamp biomicroscope in all patients and probing and sac syringing preoperatively in operation theatre. Patients were divided into 02 groups viz endoscopic DCR group (Group-A) and external DCR group (Group-B). The surgical technique in endoscopic DCR group involved use of endoscope and punch forceps and the standard surgery technique of external DCR was used in all patients of external DCR group. At 6 months success of DCR was assessed subjectively from symptomatic relief of epiphora. Data collected was entered in data collection proforma and was analysed using SPSS version 17. The *p*-value of <0.05 was considered statistically significant.

RESULTS

The Mean age of patients in Group-A and Group-B was 50.17±13.84 and 48.70±12.23 years. In Group-A, minimum and maximum age of patients was 18 and 70 years while in Group-B, it was 27 and 70 years respectively. In Group-A 9(22.5%) patients were male and 31(77.5%) female patients were included while in Group-B 17(42.5%) male and 23(57.5%) female patients were included. Efficacy of Group-A treatment was significantly higher as that of Group-B treatment. i.e. Group-A: 90% vs. Group-B: 67.5%, *p*-value=0.014. In all age groups efficacy of Group-A treatment was higher as compared to Group-B treatment. But none of the age groups showed statistical significance for efficacy. i.e. 18-30 years: Group-A: 100% vs. Group-B: 80%, *p*-value= 0.556, 31-40 years: Group-A: 83.3% vs. Group-B: 71.4%, *p*-value= 0.563, 41-50 years: Group-A: 100% vs. Group-B: 69.2%, *p*-value= 0.081, 51-60 years: Group-A: 81.8% vs.

Group-B: 66.7%, *p*-value= 0.445 & 61-70 years: Group-A: 88.9% vs. Group-B: 55.6%, *p*-value= 0.147. Among male patients efficacy of Group-A treatment was significantly higher as compared to Group-B treatment. i.e. Group-A: 100% vs. Group-B: 58.8%, *p*-value= 0.030. However among female patients efficacy of Group-A treatment was high as that of Group-B treatment but it was not statistically significant. i.e. Group-A:87.1% vs. Group-B:73.9%, *p*-value= 0.217

Table-I: Age and Gender of Patients in Treatment Groups

	Group-A	Group-B
N	40	40
Mean Age	50.17±13.84	48.70±12.23
Male	9(22.5%)	17(42.5%)
Female	31(77.5%)	23(57.5%)

Table-II: Efficacy of Treatment

	Group-A	Group-B	<i>p</i> -value
Yes	36(90%)	27(67.5%)	0.014
No	4(10%)	13(32.5%)	

Table-III: Efficacy of Treatment stratified for gender of patients

Gender	Efficacy	Group-A	Group-B	<i>p</i> -value
Male	Yes	9(100%)	10(58.8%)	0.030
	No	0(0%)	7(41.2%)	
Female	Yes	27(87.1%)	17(73.9%)	0.217
	No	4(12.9%)	6(26.1%)	

Group-A: Endo DCR

Group-B: External DCR

DISCUSSION

External DCR surgery, at the turn of the century, was regarded as the gold standard in treatment for nasolacrimal duct obstruction.⁶ This procedure has got advantages of direct visualization of the anatomical structures surrounding the lacrimal sac compared to endoscopic DCR.⁷ Disadvantages of this procedure include cutaneous scar and the potential for injury to medical canthal structures, cerebrospinal fluid rhinorrhoea and functional interference with the physiological action of lacrimal pump.⁸

However, endoscopic DCR is getting popularity among patients due to equal promising results and especially due to lack of external scar.⁷ Endoscopic DCR allows direct inspection of lacrimal sac for underlying pathology. Assessment of failure can also be viewed endoscopically, so mistakes can be corrected immediately. Again it can be converted to external DCR in difficult cases or those with lacrimal sac tumours.⁹

In this study efficacy of endoscopic DCR was significantly higher as compared to external DCR. i.e.

Endo DCR: 90% vs. External DCR: 67.5%, p -value = 0.014. Results of this study is inconsistent with the findings of KN Jha as in his findings he showed no significant difference in the success rate of both procedures. i.e. Success rate of Endoscopic DCR: 95% & External DCR: 90.9% respectively.¹⁰ Success rate of endoscopic dacryocystorhinostomy in previous studies ranges in between 82-92%.^{6,11-16} Efficacy of endoscopic dacryocystorhinostomy in this study was 90% which lies in line with the success rate reported in previous studies in literature. Rinky Saha and his team members also reported no statistically significant difference between the success rate of Endo DCR and external DCR. i.e. 92% vs. 93.67%.¹ These findings are not consistent with the findings of this study. A report by the American Academy of Ophthalmology in 2001 concluded that it was difficult to make a definitive evidence-based determination about the relative efficacies of endonasal and external DCR because of deficiencies in the literature reports.¹⁷ Since then there have been several reports about surgical outcomes with endoscopic DCR. Some current investigations showed higher success rates (82%-100%) by External – DCR.¹⁸⁻²⁰ In this study efficacy of external DCR was seen in only 67.5% cases which is quite low when compared with the above mentioned success rate for external DCR reported in previous studies. One of the main difference of Endoscopic-DCR versus External-DCR is a decreased success rate with Endoscopic-DCR.^{18,19} But some articles showed Endoscopic-DCR to be a useful alternative to External-DCR.²¹ Medial canthal tendon is preserved in endoscopic DCR just as the physiology of the lacrimal pump mechanism. Young women like endoscopic DCR due to fewer scars in comparison to external approach.²² Some people including Young patients with a flat central nasal bridge or dark skin are more susceptible to scar, and that why an endonasal methods is the choice for these group of patients. Subjects with functioning filtration blebs must be chosen for endoscopic DCR to avoid pressure on the globe.¹⁸ Endonasal DCR has a shorter operative time and it has been indicated to have lower postoperative recovery time.^{6,18,23} However, there are only very few comparative studies to compare primary success rates between external DCR and endoscopic endonasal procedures.²⁴ Few studies have established outcome measures, with some describing success as patentability to irrigation, while others have focused on addressing symptoms. EESDCR results are not as good as those with EX-DCR, presumably reflecting the fact that, while performing an EES-DCR,

most surgeons traditionally create a smaller rhinostomy, although the use of this technique varies. Owing to advancements in technology, the disparities in results between the two procedures have been minimized over the last 10 years, and we agree that selecting the method of procedure is generally based on surgeon's expertise, available resources and patient preferences.²⁴

External DCR in the treatment of nasolacrimal duct obstruction remains the gold standard in terms of functional outcome. Due to advances in instrumentation, in particular the implementation of rigid nasoendoscope, FESS and laser surgery, interest in the recently developed EES-DCR technique has been rekindled. The benefits of external DCR include the high degree of predictability and direct anatomical visualization that are very important for sac-tumors.

This technique makes precise anastomosis between the nasal sac and the nasal mucosa possible. External DCR, however, has several drawbacks like facial scarring, malfunction of the lacrimal pump resulting from disruption of medial canthal anatomy and orbicularis oculi muscles, and limitations in the patients with acute dacryocystitis with abscess development.²⁴ The endoscopic approach decreases the possibility of intervening with the physiological medial canthal tendon and tear pump. This approach also reduces the scar that is cosmetically essential for certain groups of patients, particularly young people. EES-DCR also has a shorter post-surgical recovery duration and a reduction in post-surgical complications, such as bleeding and brain fluid rhinopathy. Serious complications are rarely observed in either type of DCR surgery, including orbital and subcutaneous emphysema, retrobulbar haemorrhage, medial rectal paresis, and orbital fat hernias. The endoscopic approach allows for the diagnosis and treatment of associated disorders, including septal deviation, sinus disease and turbinate hypertrophy. Endoscopic endonasal DCR plays a proven role in the DCR surgical revision.

For the case of cicatricial obstruction at the osteotomy site, endoscopic revision is easier to conduct, and the patient is more likely to tolerate such a revision without any visible external wounds. Endoscopic DCR is more costly than conventional DCR, with high cost of equipment. Endoscopic DCR is more difficult to learn technically, and several studies have reported the learning curve for the endoscopic procedure.²⁴

CONCLUSION

Results of this study showed that endoscopic DCR is more effective than external DCR in treating patients presenting with epiphora. Endo-DCR surgery offers a very attractive alternative to the well-established technique of external DCR surgery for the treatment of primary acquired nasolacrimal duct obstruction with equivalent success rates.

Conflict of Interest: None.

Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

SH & SAHN: Concept, Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

SM & ZI: Data acquisition, data analysis, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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