e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com

International Journal of Pharmaceutical Quality Assurance 2026; 17(2); 106-111

Original Research Article

Endoscopic Versus External Dacryocystorhinostomy: A Comparative Study of Surgical Outcomes

Tripti Sonker[1], Alafiya Pithawala[2], Abhishek Patel[3], Ruchir Varshney[4]

[1]Assistant Professor, Department of Otorhinolaryngology, LNCT Medical College & Sevakunj Hospital, Indore, Madhya Pradesh, India

[2]Assistant Professor, Department of Otorhinolaryngology, Sri Satya Sai University of Medical Sciences, Sehore, Madhya Pradesh, India

[3]Department of Ophthalmology, Choitram Netralaya, Indore, Madhya Pradesh, India

[4]Associate Professor, Department of Otorhinolaryngology, RKDF Medical College Hospital and Research Centre, Bhopal, Madhya Pradesh, India

Received: 24-12-2025 / Revised: 23-01-2026 / Accepted: 25-02-2026

Corresponding Author: Abhishek Patel

Conflict of interest: Nil

Abstract:

Background: Primary acquired nasolacrimal duct obstruction (PANDO) is a common cause of epiphora in adults and is effectively treated by dacryocystorhinostomy (DCR). External dacryocystorhinostomy (Ex-DCR) has traditionally been considered the gold standard, while endoscopic dacryocystorhinostomy (En-DCR) has emerged as a minimally invasive alternative with cosmetic advantages.

Aim and Objective: To compare the surgical outcomes of endoscopic and external dacryocystorhinostomy.

Materials and Methods: This prospective comparative study was conducted at a tertiary care center over 18 months on 80 patients with PANDO. Patients were randomly divided into two groups: En-DCR (n = 40) and Ex-DCR (n = 40). All patients underwent detailed preoperative evaluation and standard surgical procedures. They were followed up for 6 months. Outcome measures included anatomical success (patency on syringing), functional success (relief of epiphora), operative time, intraoperative blood loss, hospital stay, and postoperative complications.

Results: The anatomical success rate was 90.0% in the En-DCR group and 95.0% in the Ex-DCR group, while functional success was 87.5% and 92.5%, respectively, with no statistically significant difference ($p > 0.05$). The mean operative time was significantly shorter in the En-DCR group (48.6 ± 7.8 minutes) compared to the Ex-DCR group (62.4 ± 8.5 minutes) ($p < 0.001$). Intraoperative blood loss and hospital stay were also significantly lower in the En-DCR group. Visible scar formation was observed only in the external DCR group.

Conclusion: Both endoscopic and external dacryocystorhinostomy are effective procedures for the treatment of PANDO. While external DCR showed slightly higher success rates, endoscopic DCR offered advantages such as shorter operative time, lower morbidity, and a superior cosmetic outcome. Endoscopic DCR represents a safe and effective alternative to the external approach.

Keywords: Dacryocystorhinostomy, Endoscopic DCR, External DCR, Epiphora, Nasolacrimal duct obstruction, Surgical outcome.

DOI: 10.25258/ijpqa.17.2.18

Introduction

Primary acquired nasolacrimal duct obstruction (PANDO) is a common lacrimal drainage disorder characterized by epiphora and recurrent dacryocystitis, resulting from blockage of the nasolacrimal duct and impaired tear outflow. Dacryocystorhinostomy (DCR) is the standard surgical procedure designed to bypass the obstruction by creating a direct anastomosis between the lacrimal sac and the nasal cavity, thereby restoring physiological tear drainage [1]. External dacryocystorhinostomy (Ex-DCR), first described by Toti and later modified by Dupuy-Dutemps and Bourguet, has traditionally been considered the gold standard because of its high anatomical and functional success rates, often exceeding 90–95% [2]. However, the external approach requires a skin incision, which may result in facial scarring, disruption of the medial canthal structures, and longer recovery time [3].

With advances in nasal endoscopy, endoscopic dacryocystorhinostomy (En-DCR) has emerged as a minimally invasive alternative that avoids external scarring and preserves the lacrimal pump mechanism. This technique also allows

simultaneous correction of associated intranasal pathologies such as septal deviation or sinus disease, which may contribute to surgical failure if untreated [4]. Several studies have reported comparable success rates between En-DCR and Ex-DCR, with endoscopic procedures achieving 85% to 95% success rates, similar to those of the external approach [5]. Moreover, En-DCR offers advantages including reduced intraoperative bleeding, shorter operative time, faster postoperative recovery, and superior cosmetic outcomes [6]. Despite these benefits, some authors have reported slightly higher anatomical success rates with Ex-DCR, possibly due to better visualization and larger osteotomy size [7].

Given these considerations and the ongoing debate regarding the optimal surgical approach, a comparative evaluation of both techniques is essential. The present study was therefore conducted to compare the surgical success rate, complications, operative parameters, and patient satisfaction between endoscopic and external dacryocystorhinostomy in patients with primary acquired nasolacrimal duct obstruction.

Materials and Methods

Study Design and Setting: This prospective, comparative, interventional study was conducted in the Department of Ophthalmology in collaboration with the Department of Otorhinolaryngology at a tertiary care teaching hospital over 18 months (January 2023 to June 2025).

Study Population and Sampling: Eighty patients with primary acquired nasolacrimal duct obstruction (PANDO) were included. They were randomly assigned into two groups of 40 each: Group A underwent endoscopic dacryocystorhinostomy (En-DCR), and Group B underwent external dacryocystorhinostomy (Ex-DCR). Randomization was performed using computer-generated numbers.

Inclusion and Exclusion Criteria: Inclusion criteria were patients aged ≥18 years with epiphora, confirmed PANDO, positive regurgitation on pressure over the lacrimal sac (ROPLAS), and patent canaliculi. Exclusion criteria included congenital nasolacrimal duct obstruction, canalicular obstruction, prior lacrimal surgery, lacrimal sac tumors, acute dacryocystitis, severe nasal pathology, or medically unfit patients.

Preoperative Evaluation: All patients underwent comprehensive ophthalmic and ENT assessments. This included best corrected visual acuity, slit lamp examination, lacrimal syringing and probing, and nasal endoscopy to confirm obstruction and exclude nasal pathology.

Surgical Procedures: In the En-DCR group, the procedure was performed under local anesthesia using a rigid nasal endoscope. After mucosal decongestion, an incision was made near the middle turbinate, the lacrimal bone was removed using a Kerrison punch, and the sac was opened. Patency was confirmed by syringing, and silicone stents were placed in selected cases. In the Ex-DCR group, a skin incision was made near the medial canthus, the lacrimal sac was exposed, osteotomy was created, and lacrimal and nasal mucosal flaps were sutured according to the Dupuy-Dutemps and Bourguet method.

Postoperative Care and Follow-up: Postoperatively, all patients received topical antibiotics, oral antibiotics, analgesics, and nasal decongestants. Follow-up visits were scheduled at 1 week, 1 month, 3 months, and 6 months. At each visit, symptom relief, lacrimal syringing, and complications were assessed.

Outcome Measures: Primary outcomes were anatomical success (patency on syringing at 6 months) and functional success (resolution or significant improvement of epiphora). Secondary outcomes included operative time, intraoperative blood loss, hospital stay, and postoperative complications.

Statistical Analysis: Data were analyzed using SPSS version 27.0. Means and standard deviations were used for continuous variables, while categorical variables were presented as frequencies and percentages. An independent t-test was used to compare continuous data, and the chi-square test was used to compare categorical data. A p-value of <0.05 was considered statistically significant.

Results

The demographic profile of the patients is shown in Table 1. The mean age in the En-DCR group was 42.8 ± 11.6 years, and in the Ex-DCR group, 44.1 ± 10.9 years; the difference was not statistically significant ($p = 0.612$). Females were predominant in both groups, accounting for 65.0% in the En-DCR group and 70.0% in the Ex-DCR group. The right side was more commonly affected in both groups; however, there was no statistically significant difference in laterality between the two groups ($p = 0.654$) (Table 1).

Table 1: Demographic Characteristics of Study Participants

Parameter	En-DCR (n=40)	Ex-DCR (n=40)	p value
Mean age (years)	42.8 ± 11.6	44.1 ± 10.9	0.612
Female (%)	26 (65.0%)	28 (70.0%)	0.631
Male (%)	14 (35.0%)	12 (30.0%)	
Right side (%)	23 (57.5%)	21 (52.5%)	0.654
Left side (%)	17 (42.5%)	19 (47.5%)	

The intraoperative and perioperative parameters are summarized in Table 2. The mean operative time was significantly shorter in the En-DCR group (48.6 ± 7.8 minutes) compared to the Ex-DCR group (62.4 ± 8.5 minutes), and this difference was statistically significant ($p < 0.001$). Similarly, mean intraoperative blood loss was significantly less in the En-DCR group (42.3 ± 9.6 ml) compared to the Ex-DCR group (65.7 ± 11.2 ml) ($p < 0.001$). The mean hospital stay was also significantly shorter in the En-DCR group (1.2 ± 0.4 days) than in the Ex-DCR group (2.3 ± 0.6 days), as shown in Table 2.

Table 2: Intraoperative and Postoperative Parameters

Parameter	En-DCR	Ex-DCR	p value
Mean operative time (minutes)	48.6 ± 7.8	62.4 ± 8.5	<0.001*
Mean intraoperative blood loss (ml)	42.3 ± 9.6	65.7 ± 11.2	<0.001*
Hospital stays (days)	1.2 ± 0.4	2.3 ± 0.6	<0.001*

*Statistically significant

The anatomical and functional success rates of the procedures are presented in Table 3. Anatomical success was achieved in 36 patients (90.0%) in the En-DCR group and 38 patients (95.0%) in the Ex-DCR group. Functional success, defined as resolution of epiphora, was observed in 35 patients (87.5%) in the En-DCR group and 37 patients (92.5%) in the Ex-DCR group. Although the success rate was slightly higher in the external DCR group, the difference was not statistically significant ($p = 0.456$). The comparative anatomical and functional success rates are also illustrated in Figures 1 and 2, respectively.

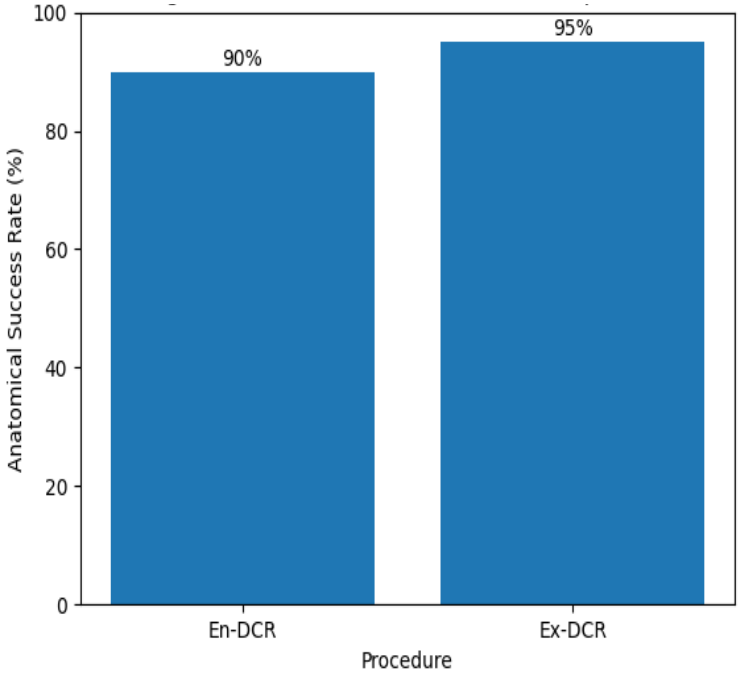

Figure 1: Anatomical Success Rate Comparison

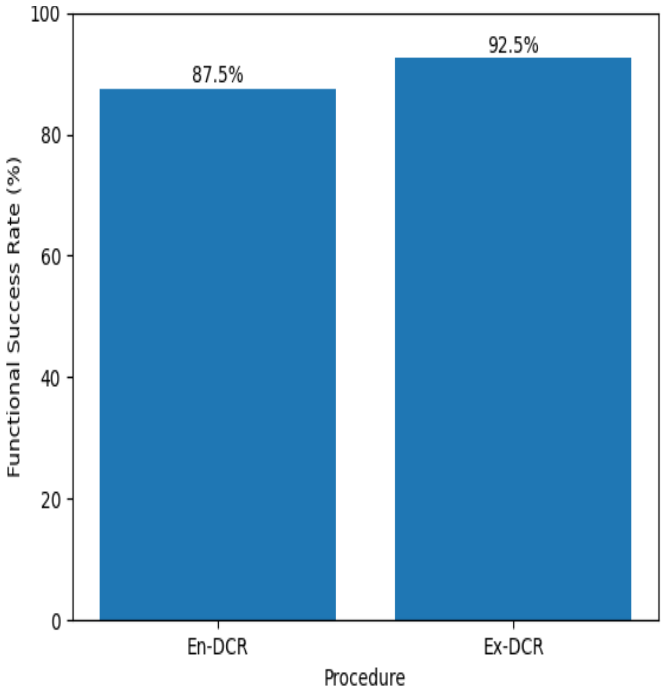

Figure 2: Functional Success Rate Comparison

Table 3: Surgical Success Rate

Outcome	En-DCR (n=40)	Ex-DCR (n=40)	p value
Anatomical success	36 (90.0%)	38 (95.0%)	0.394
Functional success	35 (87.5%)	37 (92.5%)	0.456
Failure	5 (12.5%)	3 (7.5%)	

Postoperative complications in both groups are shown in Table 4. Postoperative nasal bleeding occurred in 7.5% of patients in the En-DCR group and 12.5% in the Ex-DCR group. Wound infection was observed only in the Ex-DCR group (7.5%). Visible scar formation was observed in 15.0% of patients in the Ex-DCR group, whereas none in the En-DCR group developed scar formation; this difference was statistically significant (p = 0.011). Synechiae formation was slightly higher in the En-DCR group (10.0%) compared to the Ex-DCR group (5.0%). These complication rates are summarized in Table 4.

Table 4: Postoperative Complications

Complication	En-DCR	Ex-DCR	p value
Nasal bleeding	3 (7.5%)	5 (12.5%)	0.456
Wound infection	0 (0%)	3 (7.5%)	0.078
Scar formation	0 (0%)	6 (15.0%)	0.011*
Synechiae	4 (10.0%)	2 (5.0%)	0.394

The comparison of mean operative time between the two groups is shown in Figure 3, which demonstrates a significantly shorter operative duration in the endoscopic group than in the external group.

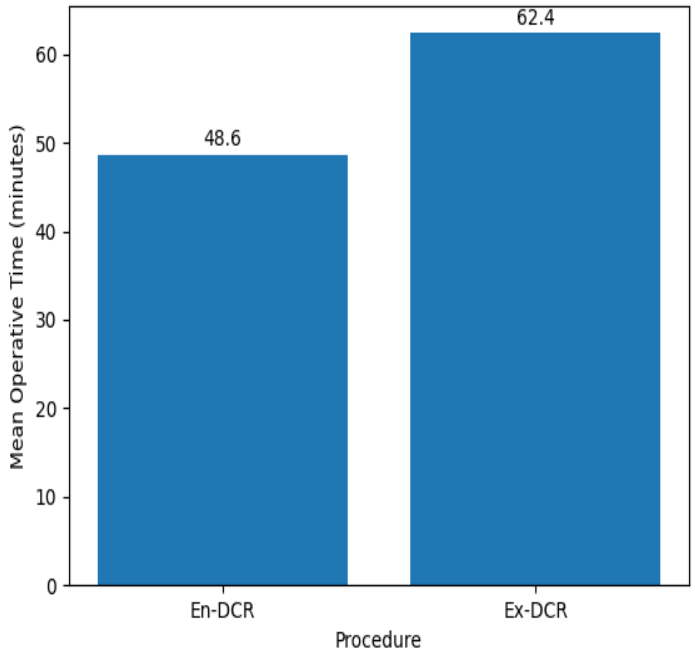

Figure 3: Mean Operative Time Comparison

Discussion

Dacryocystorhinostomy (DCR) remains the definitive treatment for primary acquired nasolacrimal duct obstruction (PANDO), with the principal objective of restoring physiological tear drainage and relieving epiphora. The present study compared the surgical outcomes of endoscopic dacryocystorhinostomy (En-DCR) and external dacryocystorhinostomy (Ex-DCR). It demonstrated that both procedures are highly effective, with comparable anatomical and functional success rates. However, the endoscopic approach showed advantages in terms of operative time, intraoperative morbidity, and cosmetic outcome.

In the present study, the mean age of patients was 42.8 ± 11.6 years in the En-DCR group and 44.1 ± 10.9 years in the Ex-DCR group, with female predominance in both groups. This finding is consistent with previous studies, which have reported that PANDO occurs more commonly in middle-aged females due to narrower nasolacrimal ducts and hormonal influences [8]. A similar female predominance was reported by Karim et al., who observed that 64% of patients undergoing DCR were female [6].

The anatomical success rate in our study was 90.0% in the En-DCR group and 95.0% in the Ex-DCR group, while functional success was 87.5% and 92.5%, respectively. Although the success rate was slightly higher in the external DCR group, the difference was not statistically significant. These findings are comparable to those reported by Dolman, who found success rates of 90.2% for endoscopic DCR and 96.0% for external DCR, with no significant difference between the two techniques [5]. Similarly, a systematic review by Leong et al. concluded that both procedures provide equivalent outcomes when performed by experienced surgeons [4].

External DCR has traditionally been regarded as the gold standard due to its direct visualization of the lacrimal sac and precise mucosal flap anastomosis, which contributes to its high success rate [2]. However, advances in endoscopic instrumentation and surgical techniques have significantly improved the success rates of En-DCR, making it a reliable alternative. Feng et al. reported pooled success rates of 91.4% for external DCR and 88.4% for endoscopic DCR, with only a small difference between the two approaches [9].

In the present study, the mean operative time was significantly shorter in the En-DCR group compared to the Ex-DCR group. This finding is consistent with the study by Karim et al., who reported that endoscopic DCR required less operative time due to the avoidance of skin incision and soft-tissue dissection [6]. Reduced operative time decreases surgical morbidity and improves operating room efficiency.

Intraoperative blood loss was also significantly lower in the endoscopic group in the present study. This may be attributed to endoscopic visualization, which enables precise identification of anatomical structures and targeted bone removal. Similar findings were reported by Babu et al., who observed reduced tissue trauma and bleeding in endoscopic procedures [10].

Cosmetic outcome is an important consideration, particularly in younger patients and females. In the

present study, visible scar formation was observed only in the external DCR group. This is an inherent disadvantage of the external approach, as it involves a cutaneous incision. Endoscopic DCR avoids external scar formation and preserves the medial canthal anatomy, resulting in superior cosmetic results. This advantage has been consistently highlighted in previous studies [4,10].

Postoperative complications observed in the present study included nasal bleeding, wound infection, and synechiae formation. Wound-related complications were seen only in the external group, whereas intranasal adhesions were slightly more common in the endoscopic group. These findings are consistent with previous reports indicating that complication profiles differ between the two procedures, but overall complication rates remain low [9].

The slightly lower success rate observed in endoscopic DCR may be attributed to factors such as inadequate osteotomy size, improper sac exposure, or postoperative fibrosis. However, with increasing surgical experience and improved instrumentation, the success rates of endoscopic DCR have approached those of external DCR [10].

Limitations

The present study had certain limitations. First, the sample size was relatively small, and the study was conducted at a single tertiary care center, which may limit the generalizability of the findings. Second, the follow-up period was limited to 6 months, and long-term outcomes and late failures could not be assessed. Third, surgeon-related factors and the learning curve associated with endoscopic DCR may have influenced the surgical success rates. Finally, patient-reported quality of life and cosmetic satisfaction were not evaluated using standardized questionnaires.

Conclusion

Both endoscopic and external dacryocystorhinostomy are effective treatments for primary acquired nasolacrimal duct obstruction, with comparable success rates. Although external DCR showed a slightly higher success rate, the difference was not statistically significant. Endoscopic DCR offers advantages such as shorter operative time, less blood loss, shorter hospital stay, and no external scar, providing better cosmetic outcomes. Thus, endoscopic DCR is a safe and cosmetically superior alternative, while external DCR remains a reliable option in selected cases.

References

1. Riskin DJ, Longaker MT, Gertner M, Krummel TM. Innovation in surgery: a historical perspective. Ann Surg. 2006 Nov;244(5):686-93. doi: 10.1097/01.sla.0000242706.91771.ce.
2. Tarbet KJ, Custer PL. External dacryocystorhinostomy. Surgical success, patient satisfaction, and economic cost. Ophthalmology. 1995 Jul;102(7):1065-70. doi: 10.1016/s0161-6420(95)30910-4.
3. Mandeville JT, Woog JJ. Obstruction of the lacrimal drainage system. Curr Opin Ophthalmol. 2002 Oct;13(5):303-9. doi: 10.1097/00055735-200210000-00003.
4. Leong SC, Macewen CJ, White PS. A systematic review of outcomes after dacryocystorhinostomy in adults. Am J Rhinol Allergy. 2010 Jan-Feb;24(1):81-90. doi: 10.2500/ajra. 2010.24.3393.
5. Dolman PJ. Comparison of external dacryocystorhinostomy with non-laser endonasal dacryocystorhinostomy. Ophthalmology. 2003 Jan;110(1):78-84. doi: 10.1016/s0161-6420(02)01452-5.
6. Karim R, Ghabrial R, Lynch T, Tang B. A comparison of external and endoscopic endonasal dacryocystorhinostomy for acquired nasolacrimal duct obstruction. Clin Ophthalmol. 2011;5:979-89. doi: 10.2147/OPTH.S19455.
7. Saha R, Sinha A, Phukan JP. Endoscopic versus external approach dacryocystorhinostomy: A comparative analysis. Niger Med J. 2013 May;54(3):165-9. doi: 10.4103/0300-1652.114580.
8. Woog JJ. The incidence of symptomatic acquired lacrimal outflow obstruction among residents of Olmsted County, Minnesota, 1976-2000 (an American Ophthalmological Society thesis). Trans Am Ophthalmol Soc. 2007;105:649-66. PMID: 18427633.
9. Feng YF, Cai JQ, Zhang JY, Han XH. A meta-analysis of primary dacryocystorhinostomy with and without silicone intubation. Can J Ophthalmol. 2011 Dec;46(6):521-7. doi: 10.1016/j.jcjo.2011.09.008.
10. Babu AR, Sandhya D, Amulya TM, Tharunika S. Endoscopic Dacryocystorhinostomy: A Comprehensive Review of Surgical Techniques and Clinical Outcomes. Indian J Otolaryngol Head Neck Surg. 2024 Oct;76(5):4575-4579. doi: 10.1007/s12070-024-04925-z.