

Use of Antibiotic Steroid Gel Foam v/s Antibiotic Steroid Eye Drops after Endoscopic DCR: A Prospective Comparative Study

Monika Patel

Associate Professor, Department of ENT, Saraswathi Institute of Medical Sciences, Hapur.

Received: 16-03-2023 / Revised: 30-03-2023 / Accepted: 30-04-2023

Corresponding author: Dr. Monika Patel

Conflict of interest: Nil

Abstract

Introduction: Endoscopic dacryocystorhinostomy has evolved as an alternative treatment option with significant advantages and success rates for nasolacrimal duct blockage. Various intra operative factors like meticulous surgery and post operative factors like edema, crusting, infection, granulation affect the surgical outcomes. There are several possibilities of postoperative care to prevent crust or synechiae formation, but none of them is highly successful.

Material and Methods: A prospective comparative study was carried out in tertiary care hospitals in Delhi NCR from April 2018 to December 2022. 24 patients diagnosed with symptoms of epiphora, having obstruction at the level of nasolacrimal duct were included in the study. The patients were followed up after 2 weeks, 4 weeks and 8 weeks. The subjects were assessed on the basis of ostium score and presence of crusting, secretions and synechiae.

Result: The difference in the ostium scores of patients 2 weeks, 4 weeks and 8 weeks after treatment was analysed using a chi-square test. On comparing the results all the differences were found to be statistically non-significant ($p > 0.05$). Post operative factors such as crusting, secretions and synechiae were compared after 2 weeks, weeks and 8 weeks after surgery in group 1 and group 2 subjects using a z- test. The results were statistically not significant $p = > 0.05$.

Conclusions: A meticulous surgical procedure is the key to an anatomical and functionally successful endonasal DCR surgery. Postoperatively the patients can be simply put on antibiotic steroid eye drops instead of different materials at ostium site for better results and patient satisfaction with equally successful results.

Keywords: Endonasal DCR, Antibiotic Steroid Eye Drops, Ostium Score.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Endonasal DCR or Endoscopic dacryocystorhinostomy has evolved as an alternative treatment option with significant advantages and success rates for nasolacrimal duct blockage. Various factors such as duration of intubation, pre-existing sinus or nasal abnormalities, previous trauma or nasal surgery affect the surgical outcomes.[1-6] Above all these most important factors

responsible for poor outcome for surgery are inadequate rhinostomy opening, false localization of the sac, inadequate removal of the sac wall, too much of mucosal removal leading to synechiae formation at the surgical site and inability to detect any additional block with NLD (Nasolacrimal duct) block. Appropriate technique that exposes the lacrimal sac fully after removing the

maxillary bone surrounding the sac, creation of a large marsupialized lacrimal sac, and covering the exposed bone with preserved nasal mucosal flaps provide a better success rate.[7]

Post operative crusting or synechiae formation at the ostium, infection or persistent local inflammation could prolong the healing process and lead to surgical failure. There are several possibilities of postoperative care to prevent crust or synechiae formation, but none of them is highly successful. Various studies have revealed significant positive influence of steroid antibiotic impregnated absorbable nasal packing on post operative healing process.[8] We conducted a prospective comparative study to find out the efficacy of antibiotic steroid absorbable gel foam pack v/s antibiotic steroid eye drops on the anatomical, functional outcome and patient satisfaction after endonasal DCR.

Materials and Methods

This prospective comparative study was carried out in a tertiary care hospitals in Delhi NCR from April 2018 to December 2022. 26 patients diagnosed with symptoms of epiphora, having obstruction at the level of nasolacrimal duct were enrolled in the study. The research protocol was approved by the institutional ethics committee. All patients were subjected to detailed history, clinical, hematological and radiological examination. Lacrimal Sac syringing was done in all cases, for bilateral lacrimal system, irrespective of the disease site. Patients having canalicular or punctum block and having history of prior lacrimal system surgery (DCR or DCT), secondary NLDB, with comorbidities like DM, HTN, TB were excluded from the study. Dacrocystography was done when indicated to rule out canalicular obstruction. Nasal endoscopy was done to look for any associated sino-nasal pathology. The patients were recruited as per

inclusion and exclusion criteria and placed alternatively in group 1 and group 2. There were 13 patients in group 1 and 13 in group 2. In group 1 the ostium opening was packed with antibiotic steroid impregnated absorbable gel foams. Group 2 patients were started with antibiotic steroid eye drops post operatively. Nasal cavities of patients of both groups were packed with paraffin nasal packs and removed the next day. Along with this both groups received systemic antibiotic, antihistamines, analgesic and anti-inflammatory drugs for 10 days. Out of the 13 patients in group 1 two patients nasal pack was removed in 2 days. The patients had severe discomfort and epiphora due to pack getting stuck at the osteotomy site. Hence, these were excluded from the study.

The surgery was performed under general anesthesia. Preoperative nasal packing was done with 4 % xylocaine and adrenaline. In addition 2 % xylocaine with adrenaline was infiltrated into the lateral wall. Endonasal DCR was performed following standard methods. In group 1 antibiotic steroid absorbable nasal pack was placed at ostium site keeping the flaps away at the anastomosis site. Paraffin soaked nasal packs were inserted and kept for 24 hours in both groups. Group 2 patients were started on antibiotic steroid eye drops 2 drops four times a day. Pack was removed the next day in both the groups. Post operatively the patients were evaluated with nasal endoscopy according to the ostium score chart. The healing process was assessed for crusting, secretions and synechiae. In present study, functional success was defined as resolution of lacrimal symptoms (epiphora, swelling) and anatomical success was defined as endoscopic evidence of patent neo-ostium and free flow of saline on lacrimal sac syringing. The findings were noted to the ostium score chart[8] (Table 1).

Follow up was done at 2 weeks, 4 weeks and 8 weeks after surgery. The findings were

observed by a single person to minimize inter observer errors. The influence of postoperative antibiotic steroid nasal pack

and antibiotic steroid eye drops on the anatomical and functional outcome was evaluated.

Table 1: Ostium Score Chart.

Parameter	Subparameter	Score	Parameter	Subparameter	Score
1. Location of ostium	In front and above axilla of MT	4	6. ICO	Uncovered by edge, dynamic	4
	Behind axilla of MT	3		Overhanging edge, dynamic	3
	Any other location	2		Partially obstructed/membrane	2
	Not recognizable	1		Not traceable with FEDT/irrigation	1
2. Shape of the ostium	Circular/oval with shallow base	4	7. Silicone stents	Course traced, move with blink/unintubated	4
	Circular/oval with deep base	3		Intubated but lost/removed before 4 weeks	3
	Crescentric/vertical slit/others	2		Associated contact granuloma	2
	Not recognizable	1		Entrapped in ostial tissues	1
3. Size of the ostium (length × breadth)	>8×5 mm	4	8. FEDT	Spontaneous and in <1 minute	4
	5-9×3-5 mm	3		Spontaneous and in >1 minute	3
	1-4×1-3 mm	2		Not spontaneous but positive with irrigation	2
	Obliterated	1		Negative with irrigation	1
4. Ostium cicatrization	None	4	9. Ostium granulomas	None	4
	Pseudocicatrix	3		On one or more edges	3
	Incomplete cicatricial closure	2		Peri-ICO/threatening ICO	2
	Complete cicatricial closure	1		Covering/obstructing ICO	1
5. Synechiae	None	4	10. Other ostium pathologies	None	4
	Nonostial/noninterfering	3		1 minor	3
	Interfering ostial	2		>1 minor	2
	Complete synechial closure	1		Major	1

Maximum possible score: 40
 Minimum possible score: 10
 Ostium grading score: 36-40 = Excellent
 30-35 = Good
 21-29 = Fair
 10-20 = Poor

Overall ostium score:
 OSTIUM GRADE: EXCELLENT
 GOOD
 FAIR
 POOR

Abbreviations: DCR, dacryocystorhinostomy; FEDT, functional endoscopic dye test; ICO, internal common opening; MT, middle turbinate.

Statistical Analysis

To see for significant difference in the ostium score of patients 2 weeks, 4 weeks and 8 weeks after treatment, chi-square test was applied; where $p < 0.05$ indicated significant difference,

whereas, $p > 0.05$ indicated no significant difference in proportions.

To compare the factors such as crusting, secretions and synechiae after 2 weeks, weeks and 8 weeks after surgery in group 1 and group 2 subjects a z- test was applied; where $p < 0.05$ indicated significant difference, whereas, $p > 0.05$ indicated no

significant difference in proportions. The limitation of the study is small numbers.

Results

In the present study in group 1 out of 11 subjects 4 were male and 7 were females, whereas in group 2, out of 13 subjects 5 subjects were male and 8 females. The age group ranged from 31- 69 years in group 1 and 27-59 years in group 2.

In group 1 it was seen that 72.7% study subjects had ostium score good (30-35) and 18.1% subjects had ostium score excellent (36-40), whereas in group 2, 69.3% cases had ostium score good (30-35) and 15.3% had

excellent (36-40). On comparing the difference between two groups was found non-significant with p value 0.89. On subsequent follow up visits the score at 4 weeks in group 1 was good in 81.8% cases and excellent in 0.09%. In group 2, 69.3% subjects had good score and 30.76% subjects had excellent score. The difference was again found non-significant statistically (p= 0.26). At 8 weeks 81.8 % cases were had good score in group 1 and 69.3% cases had good score in group 2. The results were statistically not significant (p value= 0.47).

Further the cases were also evaluated on other parameters like crusting, secretions and synechia formation after the surgery. It was seen that the only 27.7% of patients had crusting at 2 weeks in group 1 and whereas 53.84% cases in group 2 had crusting. However, the difference was not statistically significant (p value= 0.18).

On subsequent follow up visit at 4 weeks 18.18% cases in group 1 had crusting and in

group 2 none. The difference was not statistically significant (p=0.10).

It was seen that the 72.7% of patients had secretions at 2 weeks in group 1 and 46.15% cases in group 2 had secretions. However, the difference was not statistically significant (p value= 0.19) On subsequent follow up visit at 4 weeks 18.18% cases in group 1 had secretions and in group 2 none. The difference was not statistically significant (p=0.10).

After 4 weeks 45.45% cases in group 1 and 46.15% cases in group 2 synechia were noted. These were seen between the middle turbinate and the sac wall but did not obscure the ostium opening.

These remained same until next visit. On comparing the results at 4 weeks and 8 weeks it was found that the results were not statistically significant (p value= 0.97).

In both the groups all study subjects showed anatomical success and functional success.

Table 2: Ostium scores of patients after Endonasal DCR.

Ostium Score	Group 1 (n=11)			Group 2 (n=13)		
	2 wks	4 wks	8 wks	2 wks	4 wks	8 wks
Excellent	2 (18.1%)	1 (0.09%)	2 (18.1%)	2 (15.3%)	4 (30.76%)	4 (30.76%)
Good	8 (72.7%)	9 (81.8%)	9 (81.8%)	9 (69.3%)	9 (69.3%)	9 (69.3%)
Fair	1 (0.09%)	1 (0.09%)	0	2 (15.3%)	0	0
Poor	0	0	0	0	0	0

Table 3: Other parameters after surgery.

Criteria	2 weeks			4 weeks			8 wks		
	Grp 1	Grp 2	P value	Grp 1	Grp 2	P value	Grp 1	Grp 2	P value
Crusting	3 (27.7%)	7 (53.84%)	0.18	2 (18.18%)	0	0.10	0	0	-
Secretions	8 (72.7%)	6 (46.15%)	0.19	2 (18.18%)	0	0.10	0	0	-
Synechia	0	0	-	5 (45.45%)	6 (46.15%)	0.97	5 (45.45%)	6 (46.15%)	0.97

Discussion

A successful DCR surgery requires an adequate rhinostomy along with wide enough opening of the medial wall of sac. The most common reasons for failure are having a small bony ostium located improperly, ostial obstruction because of granulation or synechiae formation at the stoma.[10-12]. Other factors include smooth stomal edges, minimizing trauma to the surrounding tissue and regular post-operative check-ups with sac syringing and check endoscopy to prevent synechiae and re-stenosis.

Several techniques anchoring of the anterior lacrimal sac flap to the periosteum[13], lacrimal diaphragm and periosteum saturation[14], bicanalicular double silicone intubation[15], the sleeve technique[16], and the use of mitomycin C[17] are described for better surgical outcomes.

It is thought that anchoring the anterior flap to the periosteum and the sleeve technique might especially help prevent the newly formed anterior mucosal flap from collapsing because the sac flaps are physically tented [13,16]. Similar mechanical tenting effect by placing the absorbable packing materials at the site of the newly formed anastomosis before the suturing of the anterior flaps was studied and found to be effective.

Nasal packing does not only aid in hemostasis but also directly affects wound healing.[18-24] Packing materials are broadly divided into non-absorbable and absorbable materials. Non-absorbable materials include Vaseline gauze strips and MeroGel, which inhibit bleeding through a compression mechanism.[18] Absorbable materials such as Gelfoam[19] and MeroGel[20] have been reported to be successful as packing materials after DCR. These absorb fluids while supporting and providing pressure against the surrounding tissue. This potentially prevents undesired postoperative adhesions[21]. Use of gel foam

reduces the formation of granulations and improves healing. However, these are associated with mild discomfort postoperatively. There is a constant sense of foreign body sensation inside the nose and some of them having temporary epiphora due to its presence around the ostium.

In our study we compared the efficacy of gel foam soaked in antibiotic steroid solution against the use of antibiotic steroid eye drops after DCR. It was seen that ostium score after 2 weeks in both the groups was almost equal and not significant.

Both the groups had excellent to good outcome. The outcome was usually as a result of meticulous surgical steps rather than the postoperative intervention. Three out of 13 group 1 patients with gel foam soaked in antibiotic steroid solution experienced severe discomfort postoperatively and were not willing to continue with the packing. The resulting epiphora was disturbing and they had anxiety associated with that.

This may be because the gel foam soaked in antibiotic steroid solution might have stuck in the ostium which hampered the drainage of tears. Rest of the patients tolerated the packing with mild discomfort. With instillation of saline nose drops the symptoms improved in a week. Whereas group 2 patients had a better quality of life without any such issues.

Here we can conclude that meticulous surgical procedure is the key to an anatomical and functionally successful Endonasal DCR surgery. Postoperatively the patients can be simply put on antibiotic steroid eye drops instead of different materials at ostium site for better results and patient satisfaction with equally effective results.

References

1. Ben Simon, G. J. *et al.* External versus endoscopic dacryocystorhinostomy for acquired nasolacrimal duct obstruction in a tertiary referral center. *Ophthalmology*. 2005; 112: 1463–1468.
2. Eyigor, H., Unsal, A. I. & Unsal, A. The role of accompanying sinonasal abnormalities in the outcome of Endonasal dacryocystorhinostomy. *Am J Rhinol*. 2006;20: 620–624.
3. Tanigawa, T. *et al.* Outcomes of endoscopic endo nasald acryocystorhinostomy for intractable lacrimal dacryostenosis and associated factors. *Int J Ophthalmol*. 2016;9: 1471–1475.
4. Zen, J. *et al.* Long-term results of endonasal dacryocystorhinostomy. *Eur Arch Otorhinolaryngol*, 2009;266:1733–1738.
5. Dolmetsch, A. M. Nonlaser endoscopic endonasal dacryocystorhinostomy with adjunctive mitomycin C in nasolacrimal duct obstruction in adults. *Ophthalmology*. 2010; 117: 1037–1040.
6. Olver, J. M. success rates for endonasal dacryocystorhinostomy. *Br J Ophthalmol*. 2003;87: 1431.
7. Gupta N. *Indian J Otolaryngol Head Neck Surg* 2011; 63(1):40–44.
8. Grzeskowiak B, Wierzchowska M, Walorek R, Seredyka-Burduk M, Wawrzyniak K, Burduk PK. Steroid vs. antibiotic impregnated absorbable nasal packing for wound healing after endoscopic sinus surgery: a randomized, double blind, placebo-controlled study. *Braz J Otorhinolaryngol*. 2019; 85:473-80.
9. Ali MJ, Psaltis AJ, Wormald PJ. Dacryocystorhinostomy ostium: parameters to evaluate and DCR ostium scoring. *Clin Ophthalmol*. 2014; 9(8):2491-9.
10. Konuk O, Kurtulmusoglu M, Knatova Z, Unal M. Unsuccessful lacrimal surgery: causative factors and results of surgical management in a tertiary referral center. *Ophthalmologica*. 2010; 224:361–366.
11. Wang YP, Wang MC, Chen YC, *et al.* The effects of Vaseline gauze strip, Merocel, and Nasopore on the formation of synechiae and excessive granulation tissue in the middle meatus and the incidence of major postoperative bleeding after endoscopic sinus surgery. *J Chin Med Assoc*. 2011; 74:16–21.
12. Basmak H, Cakli H, Sahin A, *et al.* Comparison of end canalicular laser dacryocystorhinostomy with and without endonasal procedures. *Graefes Arch Clin Exp Ophthalmol*. 2011; 249:737–743.
13. Holt GR, Holt JE, Cortez EA. Dacryocystorhinostomy utilizing an anterior lacrimal sac flap to periosteum technique. *Otolaryngol Head Neck Surg*. 1979; 87:174–182.
14. Ciftci F, Dinc UA, Ozturk V. The importance of lacrimal diaphragm and periosteumsuturation in external dacryocystorhinostomy. *Ophthal Plast Reconstr Surg*. 2010; 26:254–258.
15. Hwang SW, Khwarg SI, Kim JH, *et al.* Bicanalicular double silicone intubation in external dacryocystorhinostomy and canaliculoplasty for distal canalicular obstruction. *Acta Ophthalmol*. 2009; 87:438–442.
16. Jo YJ, Kim KN, Lee YH, *et al.* Sleeve technique to maintain a large mucosal ostium during endoscopic dacryocystorhinostomy. *Ophthalmic Surg Lasers Imaging*. 2010; 41:656–659.
17. Deka A, Bhattacharjee K, Bhuyan SK, *et al.* Effect of mitomycin C on ostium in dacryocystorhinostomy. *Clin Experiment Ophthalmol*. 2006; 34:557–561.
18. Wang YP, Wang MC, Chen YC, *et al.* The effects of Vaseline gauze strip, Merocel, and Nasopore on the formation of synechiae and excessive granulation

- tissue in the middle meatus and the incidence of major postoperative bleeding after endoscopic sinus surgery. *J Chin Med Assoc.* 2011; 74:16–21.
19. Basmak H, Cakli H, Sahin A, et al. Comparison of end canalicular laser dacryocystorhinostomy with and without endonasal procedures. *Graefes Arch Clin Exp Ophthalmol.* 2011; 249:737–743.
 20. Wu W, Cannon PS, Yan W, et al. Effects of Merogel coverage on wound healing and ostial patency in endonasal endoscopic dacryocystorhinostomy for primary chronic dacryocystitis. *Eye (Lond).* 2011; 25:746–753.
 21. Miller RS, Steward DL, Tami TA, et al. The clinical effects of hyaluronic acid ester nasal dressing (Merogel) on intranasal wound healing after functional endoscopic sinus surgery. *Otolaryngol Head Neck Surg.* 2003; 128:862–869.
 22. Berlucchi M, Castelnuovo P, Vincenzi A, et al. Endoscopic outcomes of resorbable nasal packing after functional endoscopic sinus surgery: a multicenter prospective randomized controlled study. *Eur Arch Otorhinolaryngol.* 2009; 266:839–845.
 23. Shoman N, Gheriani H, Flamer D, Javer A. Prospective, double-blind, randomized trial evaluating patient satisfaction, bleeding, and wound healing using biodegradable synthetic polyurethane foam (NasoPore) as a middle meatal spacer in functional endoscopic sinus surgery. *J Otolaryngol Head Neck Surg.* 2009; 38:112–118.
 24. Wormald PJ, Boustred RN, Le T, et al. A prospective single-blind randomized controlled study of use of hyaluronic acid nasal packs in patients after endoscopic sinus surgery. *Am J Rhinol.* 2006; 20:7–10.