

Acute Rhinosinusitis After External Dacryocystorhinostomy

Açık Dakriyosistorinostomi Sonrası Akut Rinosinüzit

İlhan ÜNLÜ, MD,¹ Levent TÖK, MD,² Gülin Gökçen KESİCİ, MD,³ Durdu Mehmet KÖŞ, MD⁴

¹ Düzce University Faculty of Medicine, Department of Otolaryngology Head & Neck Surgery, Düzce

² Süleyman Demirel University Faculty of Medicine, Department of Ophthalmology, Isparta

³ Yenimahalle State Hospital, Clinic of Otolaryngology Head & Neck Surgery, Ankara

⁴ Düzce University Faculty of Medicine, Department of Internal Medicine, Düzce

ABSTRACT

Objective: External dacryocystorhinostomy (DCR) is one of the surgical treatment options used for surgical correction of nasolacrimal duct obstruction and has a high success rate. There are studies indicating that mucociliary clearance is disturbed after DCR. In this study we aimed to investigate the effect of DCR on rhinosinusitis development.

Material and Methods: This retrospective study was conducted on patients who underwent unilateral external DCR operation in ophthalmology clinic due to nasolacrimal duct obstruction between September 2005- September 2006, and admitted to ear-nose throat (ENT) outpatient clinic with symptoms of acute rhinosinusitis. Forty three patients who used antibiotics for 14 days, whose rhinosinusitis symptoms persisted, and had paranasal computerized tomography were included in the study. Patients were evaluated for their history, demographic findings, ENT examination findings, and nasal endoscopy findings. Ostiomeatal complex and paranasal sinuses were staged according to Lund-Mackay system.

Results: Sinusitis was present in 22 (51%) out of 43 patients. The difference between the left and right sides was not significant with regard to sinusitis development ($p=0.76$). Ratio of ipsilateral sinusitis was more than contralateral sinusitis. The difference between patients who developed ipsilateral sinusitis and contralateral sinusitis according to mean Lund-Mackay score was not statistically significant ($p=0.49$).

Conclusion: We suppose that external DSR operation does not contribute to the development of acute rhinosinusitis.

Keywords

External dacryocystorhinostomy; sinusitis; nasolacrimal duct; paranasal sinus diseases

ÖZET

Amaç: Eksternal dakriyosistorinostomi (DSR) nazolakrimal kanal tıkanıklığının cerrahi tedavisinden biridir ve başarı oranının yüksek olmasından dolayı yaygın olarak uygulanmaktadır. DSR operasyonu sonrası mukosilyer klirensin bozulduğunu belirten çalışmalar mevcuttur. Bu çalışmada DSR operasyonunun rinosinüzit gelişimine neden olma ihtimalini değerlendirdik.

Gereç ve Yöntemler: Bu retrospektif çalışma Eylül 2005-Eylül 2006 yılları arasında göz hastalıkları kliniğinde nazolakrimal kanal tıkanıklığı nedeni ile uygulanan tek taraflı eksternal DSR operasyonu sonrası akut rinosinüzit belirtileri ile kulak burun boğaz (KBB) polikliniğine başvuran ve 14 günlük antibiyotik tedavisi sonrası şikayetlerinde gerileme olmayan ve şikayetlerinin dördüncü haftasında paranasal sinus bilgisayarlı tomografisi (BT) çekilmiş toplam 43 hasta ile yapılmıştır. Hastaların anamnezleri, demografik bulguları, KBB muayene bulguları ve endoskopi bulguları değerlendirildi. Osteomeatal kompleks ve paranasal sinüsler Lund-Mackay sistemine göre evrelendirildi.

Bulgular: Sinüzit bulguları 43 hastanın 22 (%51)'sinde tespit edildi. Sağ ve sol taraf arasında sinüzit gelişimi yönünden istatistiksel olarak anlamlı bir fark saptanmadı ($p=0.76$). Aynı tarafta sinüzit oranı karşı tarafa göre daha fazla idi. Aynı taraf ve karşı tarafta sinüzit gelişen hastalar arasında Lund-Mackay skorlarına göre istatistiksel olarak anlamlı fark izlenmedi ($p=0.49$).

Sonuç: Bu çalışma sonucunda eksternal DSR operasyonunun akut rinosinüzit gelişimine katkıda bulunmadığı saptanmıştır.

Anahtar Sözcükler

Eksternal dakriyosistorinostomi; sinüzit; nazolakrimal kanal; paranasal sinüs hastalıkları

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Correspondence

İlhan ÜNLÜ, MD

Düzce Üniversitesi Faculty of Medicine,
Department of Otolaryngology Head & Neck Surgery,
Konuralp 81160, Düzce, TURKEY
E-mail: drillhan@gmail.com

INTRODUCTION

Acquired nasolacrimal duct obstruction is common lacrimal system pathology in adults. Approximately 16% of the adult population has chronic rhinosinusitis. Therefore coexistence of nasolacrimal duct obstruction and rhinosinusitis is common. Nasolacrimal duct obstruction may arise as the result of nasal or paranasal pathologies due to direct connection between the lacrimal sac and the nasal mucosa.¹

External dacryocystorhinostomy (DCR) is one of the treatments of acquired nasolacrimal duct obstruction for oculoplasty specialists. With improvements in the endonasal approach, endoscopic DCR has become a viable alternative to external DCR.² Success rate of DCR is high and around 90-98% in terms of patency of lacrimal passage but it was reported in various studies that mucociliary clearance had been disturbed following this operation.³⁻⁶ Postoperative maxillary sinusitis was reported as 2%, postoperative frontal sinusitis was reported as 0.3-2% following DCR.^{7,8}

The aim of our study is to investigate whether there is acute rhinosinusitis or not in patients whose complaints were not improved with antibiotic treatment by using paranasal sinus tomography in patients who undergo external DCR operation and admit to outpatient clinic with symptoms of acute rhinosinusitis.

MATERIAL AND METHODS

The study was carried out in accordance with the principles of Helsinki Declaration. Informed consent was obtained from the patients and local ethics committee approval was obtained from our university prior to the study.

Patients who underwent unilateral external DCR operation in ophthalmology clinic because of nasolacrimal duct obstruction between September 2005 and September 2006 and who were admitted to Ear Nose Throat (ENT) outpatient clinic with symptoms of acute rhinosinusitis (nasal discharge, postnasal drip, nasal obstruction, facial pain and headache, fever, cough) were put on 14 days antibiotic treatment. 43 patients whose complaints were persisted after antibiotic treatment were evaluated by using paranasal Computed Tomography within one month were included in this retrospective study. Patients' anamnesis, demographic findings, ENT examination findings

and endoscopy findings were recorded. Patients who had septum deviation, concha hypertrophy, allergic rhinitis, nasal polyposis findings and rhinosinusitis findings in the preoperative ENT consultation were not included in the study. Osteomeatal complex and paranasal sinuses were staged according to Lund-Mackay⁹ system in sinus tomography obtained in coronal plane (Table 1).

Statistical analysis

Data analysis was done by using SPSS (Statistical Package for Social Sciences) for Windows 15.0 (SPSS Inc., Chicago, Illinois, USA) program. Mean \pm standard deviations of continuous variables, percent and patient numbers of categorical variables were calculated. Binary logistic regression analysis was used for evaluating the influence of age, gender, operation side on sinusitis development. For all statistical tests used, values of $P < 0.05$ were considered statistically significant.

RESULTS

A total of 43 patients (32 female-74.4%, 11 male-25.6%) were included in the study. Mean age was 44.4 ± 14.4 (16-74) years. Mean age of females was 44.7 ± 13.9 (16-74) years and mean age of males was 43.6 ± 16.5 (22-66) years. Of the all patients, 22 (51.2%) underwent right and 21 (48.8%) underwent left external DCR operation.

Sinusitis was detected in 22 out of 43 patients (51%), among the patients who have sinusitis 12 of them (54.5%) underwent right and 10 of them (47.6%) underwent left external DCR operation ($P = 0.76$).

Among the patients who underwent right DCR, sinusitis in the right side was detected in 4 patients

Table 1. Radiologic grading of sinus systems proposed by Lund-Mackay.

Sinus	Left	Right
Maxillary		
Anterior ethmoidal		
Posterior ethmoidal		
Sphenoidal		
Frontal		
Ostiomeatal complex		
Total points for each side		

Scoring: For all sinus systems (except the ostiomeatal complex): 0=no abnormalities, 1=partial opacification 2=total opacification. For the ostiomeatal complex: 0=non occluded, 1=occluded.

Table 2. According to the operations side of rhinosinusitis rates.

	Right DCR (n=22)	Left DCR (n=21)
Rhinosinusitis (%)		
Right	4 (18.2)	2 (9.5)
Left	0	5 (23.8)
Bilateral	8 (36.4)	3 (14.3)
No rhinosinusitis	10 (45.5)	11 (52.4)

DCR: Dacryocystorhinostomy.

(18.2%) and bilateral sinusitis was detected in 8 patients (36.4%). Sinusitis only in the right side was detected in 2 patients (9.5%), only in the left side in 5 patients (23.8%), in both side in 3 patients (14.3%) among the patients who underwent left DCR (Table 2). When all patients were evaluated together, ratio of ipsilateral sinusitis was 46.5% and ratio of contralateral sinusitis was 30.2%.

Right and left paranasal sinuses were evaluated separately according to Lund-Mackay staging system and scored. When only patients with sinusitis were evaluated ($n = 22$) mean Lund-Mackay score was 3.32 ± 1.88 for the patients who developed ipsilateral sinusitis and 1.55 ± 1.73 for the patients who developed contralateral sinusitis and the difference was not statistically significant ($P = 0.49$). In bilateral cases, while ipsilateral Lund-Mackay score was 1.02 ± 1.96 , contralateral score was 0.67 ± 1.38 .

Influence of age, gender and operation side on sinusitis development was not found statistically significant with logistic regression analysis ($P = 0.919$; 0.336; 0.197, respectively).

DISCUSSION

Osteomeatal complex is composed of ethmoid infundibulum, uncinate process, hiatus semilunaris, frontal recess, anterior ethmoid cells and maxillary sinus ostium and serves as a common drainage way for frontal, maxillary and anterior ethmoid sinuses.¹⁰ The opinion that mucosal pathologies in this region play an important role in sinusitis development is accepted.

Cilia providing nasal mucociliary clearance may be affected from anatomic, physiologic and pathologic internal and external factors beside heat, humidity, pH and osmolality. These factors impair mucociliary clearance and lead to upper and lower respiratory tract infections.³

In external DCR operation, lacrimal sac is anastomosed with nasal mucosa just in front of the adhesion site of middle turbinate. It was reported in various studies that mucociliary clearance may be disturbed due to tear's continuous irritation of ciliary cells, change of mucosal quality, foreign body effect of the silicon tube and surgical trauma.³⁻⁶ In the study of Unal et al. ipsilateral and contralateral mucociliary clearance were compared and a significant prolongation was detected in mucociliary clearance time of the operated side.³ Studies are available reporting similar changes following endoscopic DCR. In the study of Shams and Selva, conducted with the patients who undergo endoscopic DCR, they reported that DCR operation would facilitate acute rhinosinusitis development by deteriorating mucociliary activity which is already slow in patients with chronic rhinosinusitis.¹¹

Okuyucu et al. detected that mucociliary clearance time prolonged both after external and endoscopic DCR however they did not find a significant difference between two operation types with regard to mucociliary clearance time.⁵

When nasal mucociliary clearance measurements of the patients who undergo DCR were evaluated at preoperative and postoperative first and third months, while preoperative and postoperative 3th month mucociliary clearance measurements were equal in both nasal cavities, it was seen to be significantly longer on the operated side at postoperative first month.⁴ Shaw et al. reported that epithelial regeneration and ciliary functions improved 84 days after full thickness resection of nasal mucosa.⁶

In our study, ipsilateral sinusitis was detected in 9 patients, contralateral sinusitis was detected in 2 patients and bilateral sinusitis was detected in 11 patients who were detected to have sinusitis within one month after external DCR. Ipsilateral mean Lund-Mackay score was found higher in 9 of bilateral cases. However, when only patients with sinusitis were evaluated the difference between right and left sides was not statistically significant.

In conclusion, we think that prolonged nasal mucociliary clearance or direct surgical trauma to osteomeatal complex does not contribute to the development of acute rhinosinusitis after external DCR. Nevertheless, the surgeon should be sensitive and careful to the nasal mucosa and osteomeatal complex and may request endoscopic assistance.

REFERENCES

1. Benninger MS, Ferguson BJ, Hadley JA, Hamilos DL, Jacobs M, Kennedy DW, et al. Adult chronic rhinosinusitis: definitions, diagnosis, epidemiology, and pathophysiology. *Otolaryngol Head Neck Surg* 2003;129(3):1-32.
2. Marcet MM, Kuk AK, Phelps PO. Evidence-based review of surgical practices in endoscopic endonasal dacryocystorhinostomy for primary acquired nasolacrimal duct obstruction and other new indications. *Curr Opin Ophthalmol* 2014;25(5):443-8.
3. Unal M, Oz O, Adiguzel U, Vayisoglu Y, Vatansever H, Gorur K. Mucociliary clearance after external dacryocystorhinostomy. *Clin Otolaryngol Allied Sci* 2004;29(3):264-5.
4. Yigit O, Kirgezen T, Taskin U, Yener M. Endoscopic dacryocystorhinostomy appears to impair nasal mucociliary clearance. *Ear Nose Throat J* 2011;90(9):23-7.
5. Okuyucu S, Akoglu E, Oksuz H, Gorur H, Dagli S. The effect of dacryocystorhinostomy on mucociliary function. *Otolaryngol Head Neck Surg* 2009;140(4):585-8.
6. Shaw CK, Cowin A, Wormald PJ. A study of the normal temporal healing pattern and the mucociliary transport after endoscopic partial and full-thickness removal of nasal mucosa in sheep. *Immunol Cell Biol* 2001;79(2):145-8.
7. Leong SC, Macewen CJ, White PS. A systematic review of outcomes after dacryocystorhinostomy in adults. *Am J Rhinol Allergy* 2010;24(1):81-90.
8. Fayet B, Racy E, Assouline M. Complications of standardized endonasal dacryocystorhinostomy with unciformectomy. *Ophthalmology* 2004;111(4):837-45.
9. Lund VJ, Kennedy DW. Staging for rhinosinusitis. *Otolaryngol Head Neck Surg* 1997;117(3):35-40.
10. Zinreich SJ. Functional anatomy and computed tomography imaging of the paranasal sinuses. *Am J Med Sci* 1998;316(1):2-12.
11. Shams PN, Selva D. Acute post-operative rhinosinusitis following endonasal endonasal dacryocystorhinostomy. *Eye (Lond)* 2013;27(10):1130-6.