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Examination of lateral nasal wall pathologies associated with distal lacrimal duct obstruction

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Abstract

Objective: In this study, the role of lateral nasal wall and sinus pathologies in the etiology of distal lacrimal duct disease has been investigated.

Methods: Seventeen female and 11 male patients who were scheduled for endoscopic endonasal dacryocystorhinostomy and silicon tube intubation between April 1999 and September 2003 were included in the study. The patients underwent general ophthalmologic examinations such as Schirmer test, fluorescein dye disappearance test, Jones I-II tests, canalicular irrigation, canalicular probing, dacryocystography, dacryoscintigraphy for the diagnosis of lacrimal duct obstruction. In the clinics of ENT, for the detection of nasal cavity pathologies, anterior rhinoscopy and diagnostic nasal endoscopic examinations were performed. All patients were evaluated during paranasal computed tomographic examinations regarding osteomeatal complex disease, ethmoid cell opacification, concha bullosa and presence of agger nasi cells and data obtained were compared with findings of 50 control subjects using Fisher's chi-square tests.

Results: On the side where lacrimal duct obstruction exists, agger nasi cells were detected in 17 (60.7%) patients, concha bullosa in 10 (35.7%) patients, ethmoid cell opacification in 6 (21.4%) patients, osteomeatal complex disease in 4 (14.2%) patients, and one or more than one symptom were detected in 21 (75%) patients. Despite higher number of lateral nasal wall and sinus pathologies in the study group when compared with the control group, intergroup difference was not statistically significant ($p>0.05$).

Conclusion: We have concluded that despite the higher rates of lateral nasal wall and sinus pathologies in patients with distal nasolacrimal system obstruction, its etiology has not been adequately expounded and paranasal computed tomographies will have increasing importance in the evaluation of these patients.

Keywords: Lateral nasal wall pathologies, distal lacrimal duct, obstruction.

Özet: Distal lakrimal kanal tıkanıklığına eşlik eden lateral nazal duvar patolojilerinin incelenmesi

Amaç: Bu çalışmada lateral nazal duvar ve sinüs patolojilerinin distal lakrimal kanal tıkanıklığı etiyolojisindeki rolü araştırılmıştır.

Yöntem: Nisan 1999 ile Eylül 2003 tarihleri arasında endoskopik endonazal dakriosistorinostomi ve silikon entübasyonu planlanan 17 kadın ve 11 erkek hasta çalışmaya dahil edildi. Hastaların lakrimal kanal tıkanıklığı tanısı için göz kliniklerinde Schirmer testi, flöresein boya kaybolma testi, Jones I-II testleri, kanaliküler irrigasyon, kanaliküler problama, dakriosistografi, dakriosintigrafi gibi genel oftalmolojik muayeneleri yapıldı. KBB kliniklerinde nazal kavite patolojileri için anterior rinoskopi ve diagnostik nazal endoskopik muayeneleri yapıldı. Tüm hastalarda paranazal bilgisayarlı tomografi ile ostiomeatal kompleks hastalığı, etmoid hücre opasifikasyonu, konka bülloza, agger nazi hücresi varlığı değerlendirilerek 50 kontrol olgusundaki bulgular ile Fisher'in ki-kare testiyle karşılaştırıldı.

Bulgular: Lakrimal kanal tıkanıklığın olduğu tarafta agger nazi hücresi 17 (%60.7), konka bülloza 10 (%35.7), etmoid hücre opasifikasyonu 6 (%21.4), osteomeatal kompleks hastalığı 4 (%14.2), bir veya daha fazla bulgu 21 (%75) hastada saptandı. Bu lateral nazal duvar ve sinüs patolojileri çalışma grubunda kontrol grubuna oranla yüksek bulunmasına karşılık istatistiksel olarak anlamlı bulunmadı ($p>0.05$).

Sonuç: Lateral nazal duvar ve sinüs patolojilerini distal nazolakrimal sistem tıkanıklığı olan hastalarda yüksek oranda bulmamıza rağmen etiyolojisini açıklamakta yetersiz olduğu ve paranazal bilgisayarlı tomografinin bu hastaların değerlendirilmesinde artan öneme sahip olacağı kanısına vardık.

Anahtar sözcükler: Lateral nazal duvar patolojileri, distal lakrimal kanal, tıkanıklık.

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Congenital or acquired lacrimal duct obstruction (LDO) is a frequently encountered ophthalmologic problem.[1] Despite secretion of normal amounts of tears, watering of eyes and overflow of tears because of blockage of the lacrimal drainage system is called epiphora. Dacryocystorhinostomy (DSR) is the most frequently used surgical method in the management of the problems affecting various levels of the lacrimal duct starting from the punctum up to its opening into the inferior meatus of the nose. DSR communicates the lacrimal sac with nasal cavity.[2,3] Despite the consensus reached in its treatment, the etiology of acquired LDO can not be identified in most of the cases.

This study has been planned on the assumption that LDO may develop synchronously with or as a potential outcome of rhinologic problems or diseases of nasal sinuses in consideration of close anatomical relationship between nasolacrimal system, lateral nasal wall and sinusal structures.

Materials and Methods

A total of 28 patients (patient group) who were scheduled for endoscopic endonasal dacryocystorhinostomy and silicon tube implantation between April 1999 and September 2000 were included in this prospective study. Fifty patients without symptoms of sinus diseases and nasolacerimal duct obstruction who consulted to our intensive care unit and underwent computed tomographic (CT) examinations of paranasal sinuses because of maxillofacial trauma were included in the study as a control group (control group).

Twenty-eight patients out of the patient group who had pathologies of upper lacrimal system were excluded from the study. The patients underwent Schirmer test to exclude "dry eye" and florescein dye disappearance test, Jones I-II tests, canalicular probing, dacryocystography and dacryoscintigraphy for identification and localization of the obstruction. Twenty-eight patients who had LDO underwent general ENT examinations. For initial evaluation of anterior septum and conchae, anterior rhinoscopy was performed using nasal speculum and forehead light. As a topical decongestant and local anesthetic, following the application of oxymetazoline containing nasal sprays and 5% pantocaine, nasal endoscopy was performed. Using rigid endoscopes with a diameter of 4 mm and 00 and 300 lenses, pathologies including conchal hypertrophy, polyps and mucopurulent discharge that might cause obstruction of inferior meatus of the nasolacrimal duct were evaluated.

The patients were laid in prone position with their necks held in hyperextension so as to keep drained secretions away from the region of osteomeatal complex, then 3 mm-thick paranasal CT sections were obtained. CT results were analyzed as for osteomeatal complex disease, ethmoid cell opacification, concha bullosa and presence of agger nasi cells by an independent radiologist. Pneumatization of the vertical part of the middle turbinate and inferior bullous part was evaluated as an indication of concha bullosa. Mucosal consolidations of ethmoid cells up to 2–3 mm were accepted as a component of nasal cycle. Consolidations above these values were evaluated. Opacifications of middle meatus, hiatus semilunaris and infundibulum or mucosal thickenings more than 3 mm were considered as osteomeatal complex disease.

Results

A total of 28 (17 male and 11 female) patients with a median age of 41.9 years (range: 9 to 67 years) were included in the patient group. Distal LDO was detected on the left (n=12; 42.9%), right (n=13; 46.4%) and both sides (n=3; 10.7%).

When paranasal sinus CT findings were evaluated, agger nasi cells were detected on the side of the obstruction in 17 (60.7%) patients and excessive pneumatization and opacification were noted on the side of the obstruction in 2 patients. In the control group, agger nasi cells were detected in 25 (50%) patients without any statistically significant intergroup difference. (p=0.36). The study and the control groups did not differ statistically significantly with respect to the presence of concha bullosa (p=0.97), ethmoid cell opacification (p=0.164) and osteomeatal complex disease (p=0.36). Presence of one or more than one manifestation was detected in 21 (75%) patients in the study and 30 (60%) cases in the control groups Any intergroup difference was not detected as for this variable (p=0.18) (Table 1).

Discussion

Acquired lacrimal duct obstruction causes epiphora which frequently results in dacryocystitis. Either performed with endonasal or external approach, dacrycystorhinostomy is a widely, accepted and recommended effective treatment method. However, the etiology of acquired lacrimal duct obstruction has not been fully elucidated yet.[1]

In the literature, nasolacrimal duct involvement has been reported secondary to radiotherapy, foreign substance, specific inflammatory diseases as sarcoidosis, or Wegener's granulomatosis, specific infections as lepra, tuberculosis and rhinosporidiosis, primary neoplasms, herpes simplex disease, secondary to extrinsic tumors and acquired LDO secondary to very diverse etiologies as 5-fluorouracil treatment have been reported.[2–5] However, in

two-thirds of the patients, the etiology of the constriction could not be found and these cases were considered to be idiopathic.[6] Familial tendency, anatomical variations and recurrent infections of the nasolacrimal duct are considered as predisposing factors.

Chronic infection of the maxillary and ethmoid sinuses, extreme septal deviation, acute infection of the nasal cavity can lead to inflammatory reaction in the lacrimal system through Hasner membrane. As a result of this inflammatory reaction, ulceration, scar formation and stenosis may develop. Similar pathological process can develop through descendant route as a result of conjunctival infections.[6] We have performed the present study assuming that pathologies affecting this region might have a place in the etiology of idiopathic distal LDO considering the adjacency of the lacrimal duct to the lateral wall of the nasal cavity.

Garfin et al. who performed one of the first studies which suggested potential involvement of lacrimal duct with anomalies and pathologies of the lateral nasal wall and paranasal sinuses because of their close anatomical relationship, believes that chronic rhinitis or chronic sinusitis (especially ethmoiditis) is the etiological factor in 78% of the patients with dacryocystitis.[7] Bale compared lacrimal and nasal flora in patients with dacryocystitis and detected synchronous nasal pathologies as septum deviation, inferior concha hypertrophy, rhinitis and their combinations in 28% of these patients.[8] Gray, studied 100 children with LDO and observed a relationship between septal deviation and nasal obstruction in all these cases.[9] Similarly, Bernstein reported that dacryocystitis or even conjunctivitis can occur as a complication of chronic sinusitis in pediatric patients.[10]

However, in some studies any relationship between LDO and nasal pathologies has been rejected.[11,12] In an autopsy study performed by Seidenari on 3 patients with known nasolacrimal duct obstruction, normal nasal mucosa was observed and sinus disease was indicated as the primary etiology for LDO. Leinberg and Mc Cormick performed nasolarimal duct biopsies during dacryocystorhinostomy and reported manifestations of chronic inflammation, moderate degree of mucosal glandular hyperplasia and nasal mucosal areas of consolidations. However, they could not observe a marked nasal anomaly.[11]

Prevalence rates of agger nasi cells reported in the literature range between 10 and 100 percent.[13,14] Bolger et al. detected agger nasi cells in 98.5% of the cases; however, in some studies lower incidence rates as 3–23.6% have been reported.[14,16] This controversy may originate from different definitions of agger nasi cells. In our study, we described agger nasi cells as anatomic structures under frontal sinus lying anterolateral and inferior to the frontoethmoidal recess and covered by nasal bone like a dome which also extend into lacrimal fossa and found them as insignificant factors in the etiology of congenital and acquired LDO However, we think that more comprehensive larger scale studies should be made on this subject.

Some studies performed related to concha bullosa have demonstrated that this disease could not lead to sinus disease,[14,19] while others indicated its frequent observance in chronic and recurrent sinusitis.[17,18,20] We evaluated the impact of concha bullosa on distal LDO and concluded that it did not have a place in the etiology in 35.7% of the patients and 36% of the control subjects. Our results were in compliance with the outcomes of the study performed by Kallman et al. who detected concha bullosa in 35% of the patients and 40% of the control subjects.[12] In another study conducted by Knijnik in 2007 on 268 patients which investigated difficulty of performing DCR, and in 37 (138%) patients endoscopic DCR was found to be challenging and in 14 of them nasal pathology was detected.[21]

In a recent study performed in Turkey by Habesoglu et al., the authors examined sinonasal anomalies which accompanied nasolacrimal duct obstruction in 41 patients and they found statistically significant rates for concha bullosa, inferior concha hypertrophy, osteomeatal com-

Table 1. Prognostic factors and rate of graft success after tympanoplasty.

Radiological findings	Patients (n=28)	Control cases (n=50)	p value
Agger nasi cell	17 (60.7%)	25 (50%)	0.36
Concha bullosa	10 (35.7%)	18 (36%)	0.97
Ethmoid cell opacification	6 (21.4%)	5 (10%)	0.164
Osteomeatal complex disease	4 (14.2%)	6 (12%)	0.36
Presence of one or more than one finding	21 (75%)	30 (60%)	0.18

plex disease and maxillary sinusitis, while the rates of nasal septum deviation, middle concha disorders, presence of Onodi and agger nasi cells were not statistically significant in these 14 patients.[22]

As an outcome of the present study, even though we found higher rates of lateral wall and sinus pathologies in patients with distal LDO, we have concluded that these manifestations failed to clarify the etiology of the disease and just like functional endoscopic sinus surgery, computed-tomographic imaging techniques will have an gradually increasing importance in the evaluation of the patients with LDO.

Conflict of Interest: No conflicts declared.

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