

Primary Endoscopic Dacryocystorhinostomy: Concomitant Sinonasal Pathologies, Either Cause of Disease/or Cause of Recurrence

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Abstract

Objective: The etiology of primary nasolacrimal duct (NLD) obstruction is unknown; however, sinonasal pathologies may have a role in the development of NLD. This case-control study aimed to identify whether sinonasal pathologies were indeed associated with NLD obstruction.

Material and Methods: Fifty-one patients who underwent unilateral primary endonasal endoscopic dacryocystorhinostomy (DCR) were included in the study. The frequency of sinonasal pathologies was compared between patients who underwent DCR and a control group of patients who did not undergo NLD. In addition, patients with and without recurrence after DCR were compared on the basis of their accompanying simultaneous nasal surgical procedures.

Results: The two groups were similar when compared in terms of sinonasal pathologies, as determined via tomography ($p > 0.05$). Sinonasal surgery and DCR had been performed simultaneously on 31.3% of the patients. Evaluation at the 1-year follow-up showed that 44 (86.3%) patients had complete recovery, whereas 7 (13.7%) had recurrence. Simultaneous sinonasal correction surgeries were performed in 2 (28.5%) of the 7 patients with recurrence and in 14 (31.8%) of the 44 patients without recurrence. No statistically significant difference was found between these groups in terms of simultaneous nasal surgery ($p > 0.05$).

Conclusion: The frequency of sinonasal pathologies was not significantly different between controls and patients. Given that the endoscopic approach allows for the simultaneous correction of intranasal pathologies during DCR, the result of surgery is not associated with the presence of sinonasal pathologies; rather, it seems to be associated with the presence/absence of intervention for these pathologies.

Keywords: Dacryocystorhinostomy, concomitant, nasal pathology, nasal surgery

INTRODUCTION

Obstructions of the lacrimal drainage system may cause various problems such as severe swelling and redness in the sac area with acute attacks that demonstrate increased severity. Treatment is conducted via surgical methods in chronic cases. The advantages of endoscopic approach in patients with nasolacrimal duct (NLD) obstruction compared to classical surgery include the lack of skin incision, shorter procedure time, lower risk of bleeding during and after surgery, and the fact that there is no deterioration in the lacrimal pump function (1, 2). However, failure rates remain considerably high in both methods of primary dacryocystorhinostomy (DCR), with studies reporting failure rates in the range of 5%-20% (3, 4).

NLD obstruction is thought to be the result of chronic inflammatory activity in the duct ostium that ultimately leads to fibrosis and stenosis. However, the underlying pathology or etiology cannot be identified in many patients (5, 6). Some studies have suggested that lateral nasal wall pathologies can lead to primary acquired NLD obstruction due to anatomical proximity (7-9). Several studies have linked DCR treatment failure with concomitant nasal pathologies leading to the development of adhesions in the nasal mucosa (5, 6, 10, 11).

As a result of these studies, it is believed that sinonasal pathologies can cause the pathology and affect the surgical result. However, our observations were not compatible with these findings. Considering that sinonasal correction surgeries are very frequent in the ENT setting, and the fact that very few of these patients have NLD, we hypothesized

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that these suggested relationships could be associated with the skewed distribution of patients who were referred to (ear nose throat) ENT clinics. Therefore, in this case-control study, we aimed to investigate whether the reported cause-effect relationships could be replicated.

MATERIAL AND METHODS

Ethical approval was obtained from Harran University School of Medicine (Approval Date: February 10, 2020; Approval Number: HRU/20.03.04). Fifty-one patients who were administered unilateral primary endonasal endoscopic DCR at University of Health Sciences, M. Akif İnan Training and Research Hospital between January 2016 and January 2019 were included in the study. The preoperative diagnoses of the patients were made by ophthalmologists with the help of nasolacrimal canal irrigation and fluorescein test. A second group of 51 patients who had undergone computed tomography because of chronic otitis were included in the study as a control group. Any individuals who had a history of any type of nasal surgery were excluded from the study.

The accompanying sinonasal pathologies of all patients were identified via paranasal sinus tomography. All patients undergoing DCR were assessed for sinonasal pathologies, and necessary interventions for identified pathologies were performed simultaneously. Controls were randomly selected from the chronic otitis patient group with regard to age and gender, and tomographic paranasal sections were examined. The two groups were compared for the presence of sinonasal pathologies. In addition, the follow-up notes in the files of patients who underwent DCR were evaluated, and patients who had recurrence (recurrence group) were compared to those without recurrence (successful treatment) in terms of accompanying sinonasal pathologies and the application of simultaneous nasal interventions. The presence or absence of recurrence was assessed at the 1-year follow-up visit.

Procedure

Informed consent was obtained from all patients. General anesthesia was preferred in all patients undergoing endoscopic DCR. During the procedure, 0-degree rigid endoscope, metal probe, and silicone stent were used. The bone window was created using a Kerrison forceps (Figures 1-3). All patients underwent the procedure with the same surgical technique and, when necessary, appropriate interventions for nasal pathologies were performed within the same surgery. Silicone tubes remained in place for 6 months in all patients, and patients' complaints (epiphora, symptoms of recurrent dacryocystitis) were evaluated 3 months after the removal of the tubes, and the patency of the canal was checked by lavage from the punctum. Patients who had no complaints (and were found to have patency via lavage) were considered to have undergone successful treatment.

Statistical Analysis

The Statistical Package for the Social Sciences version 15.0 software for Windows (SPSS Inc.; Chicago, IL, USA) was used for statistical analysis. The descriptive data were presented with minimum-maximum values and mean±standard deviation or with frequency (n) and percentage. Chi-square tests were used to compare the distribution of categorical characteristics between the groups. In all comparisons, an alpha error of 5% and lower was accepted to demonstrate statistical significance.

RESULTS

Thirty (58.8%) patients were females, 21 (41.2%) were males, and patients' age ranged from 23 to 59 years (mean age: 32.4±12.7 years). All of the

Table 1. Sinonasal pathologies

	DCR operation group (n=51) n (%)	Control group (n=51) n (%)	p*
Nasal pathology	24 (47)	21 (41)	NS
Septum deviation	14 (27.4)	11 (21.5)	NS
Concha bullosa	12 (23.5)	10 (19.6)	NS
Inferior concha hypertrophy	9 (17.6)	12 (23.5)	NS
Sinus disease	5 (9.8)	5 (9.8)	NS
Agger nasi cell	4 (7.8)	3 (5.8)	NS
Paradoxical middle concha	3 (5.8)	1 (1.9)	NS
Onodi cell	2 (3.9)	3 (5.8)	NS

*Chi-square test
NS: not significant (p>0.05); DCR: dacryocystorhinostomy

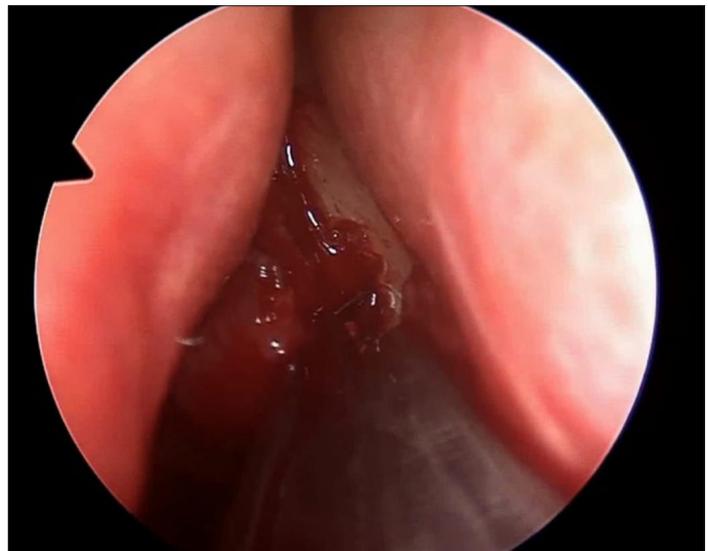


Figure 1. The bone window was created using Kerrison forceps

cases were primary endonasal endoscopic DCR. In the control group, 27 (52.9%) patients were females and 24 (47.1%) were males. The age ranged from 21 to 54 years (mean age: 30.2±10.3 years). No statistically significant difference was found (p>0.05) when the two groups were compared in terms of sinonasal pathologies (Table 1; Figure 2 and 3).

At the 1-year follow-up, 44 (86.3%) patients showed complete recovery; however, 7 (13.7%) were found to have complaints that were conclusive for recurrence. Patients with recurrence had cicatricial closure or inappropriate osteotomy.

When coexistence sinonasal pathology in patients with and without recurrence was evaluated, we found that 3 of the 7 patients (42.8%) with recurrence and 21 of the 44 patients (47.7%) without recurrence had nasal pathologies. The comparison showed a lack of statistically significant difference (p>0.05).

A total of 16 simultaneous interventions for sinonasal pathologies were performed among the patients who underwent DCR: 6 (11.7%) patients

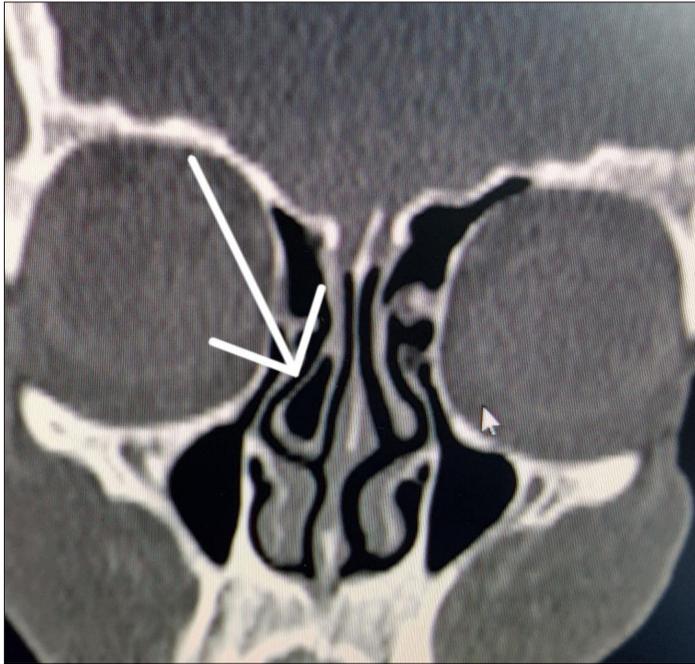


Figure 2. Concha bullosa at DCR operation group



Figure 3. Agger nasi cell (big arrow) and inferior concha hypertrophy (little arrow) at control group

had septoplasty, 4 (7.8%) had partial middle turbinectomy, 2 (3.9%) had septoplasty and partial middle turbinectomy, 2 (3.9%) had septoplasty and inferior concha submucous resection, 1 (1.9%) had endoscopic sinus surgery (polypectomy, uncinectomy, bulllectomy), and 1 (1.9%) had inferior concha submucous resection (Figure 4). Evaluation of simultaneous surgeries showed that 2 of the 7 patients (28.5%) with recurrence and 14 of the 44 patients (31.8%) without recurrence had undergone treatment for concurrent sinonasal pathologies. No statistically significant difference was found in patients with recurrence as compared to those with successful treatment ($p>0.05$) (Figure 5).

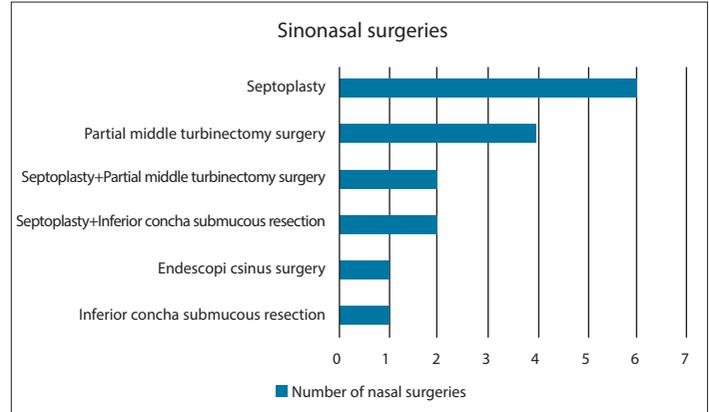


Figure 4. Concurrent sinonasal surgeries

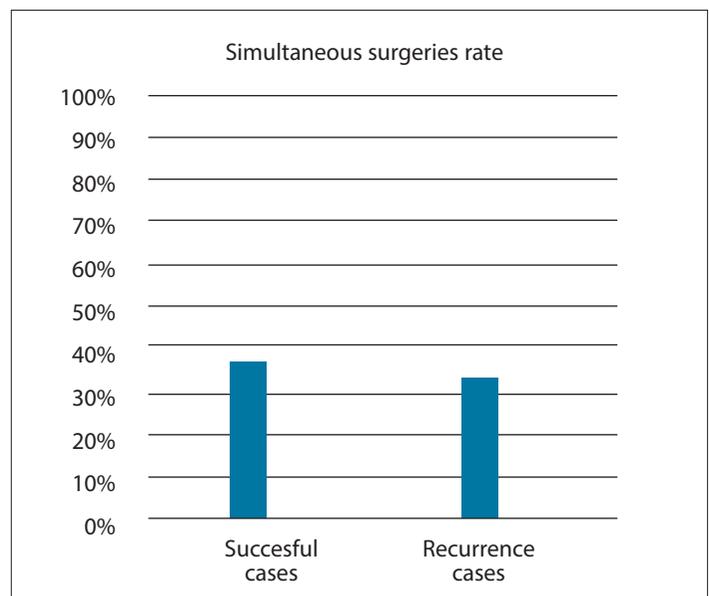


Figure 5. Simultaneous surgery rates in recurrence and successful cases

DISCUSSION

The success rate of endoscopic endonasal DCR is reported to be 81.2%-94.7% in different publications (12). These results are comparable with the 85%-97% success rate reported in studies that employed external DCR (3-5). In the present study, we achieved a success rate of 86.3% with endoscopic treatment, which is in agreement with the findings in the literature. The majority of individuals who have nasolacrimal canal pathologies are diagnosed by ophthalmologists and some are later referred to ENT clinics. Considering the high frequency of sinonasal treatments that do not demonstrate NLD in the ENT setting, we hypothesized that the association between sinonasal pathologies and NLD is not based on a cause-effect relationship but is rather a result of the skewed distribution of patient characteristics because of the clinical variations of patients referred for treatment to the ENT department to the ENT department.

Trauma, infection, inflammation, neoplasm, or mechanical factors contribute to the etiology of primary NLD obstruction. However, the underlying mechanism and the direct pathology responsible for obstructions remain unknown. Many studies have reported that sinonasal pathologies may be the cause of nasolacrimal duct obstructions (6, 10, 11, 13). Garfin

(6) reported that the frequency of chronic rhinitis and chronic sinusitis was 78% and 100%, respectively, in patients with dacryocystitis. Habesoglu et al. (14) reported that sinonasal pathologies were present in 95.1% of patients with NLD obstruction and in 58.5% in the control group. Kallman et al. (15) reported the frequency of nasal septum deviation to be 39% in patients with NLD obstruction and 17% in controls. Sefi et al. (8) reported that septal deviation was present in 65% of patients with NLD and 40% of the control group. Kaplan et al. (7) detected one or more sinonasal pathologies in 75% of the patients who underwent endoscopic endonasal DCR. Sinonasal pathologies were observed in 47.1% of patients with NLD obstruction and in 41.2% of the control group in our study. Contrary to the studies in the literature, our study found that sinonasal pathologies were not more common in patients with NLD obstruction compared to the healthy population. This result suggested that sinonasal pathologies were not the cause of NLD obstructions.

The main causes of endoscopic endonasal DCR failure were reported to be associated with pathologies of the nasal septum and concha bullosa and also the presence of polyps in the nasal cavity (16-19). Gokcek et al. (16), in their comparison of patients with and without DCR failure, found that bilateral concha bullosa was responsible for the failure in 2 patients, and ethmoidal sinusitis was present in 3 patients out of the 18 patients with failed DCR. Elmorsy and Fayk (17) found that concha bullosa was present in 8 of their 65 patients with failed external DCR, while 6 patients had rhinosinusitis. Yarmohammadi et al. (18) reported in their study that concha bullosa was found to be responsible for failure in 22 of the 50 (44%) failed DCR surgeries. Lin et al (19) reported that adhesions related to the middle turbinate were common in the external approach. They also stated that if the first surgery was performed with an external approach, septoplasty is more likely to be needed in revision surgery.

Our study showed that patients were similar to controls at baseline in terms of sinonasal pathologies, and the factors responsible for recurrence were not associated with simultaneous intervention in sinonasal pathology. These results show that, rather than the actual presence of sinonasal pathology, the factor responsible for recurrence is the lack of treatment for existing sinonasal pathologies. This is because endoscopic DCR enables the identification and correction of said pathologies during surgery. Therefore, surgical success is affected by not performing simultaneous interventions for sinonasal pathologies.

The primary limitation of our study is the inclusion of a small number of patients from a single center. However, the comparison of two different disease groups in terms of sinonasal pathologies suggests that this study contained a sufficient number of patients. Nevertheless, despite the limitation, our study showed that primary acquired NLD obstruction was primarily an ophthalmological problem, and rhinological problems did not seem to play an important role in etiology.

Patients with primary NLD obstruction with sinonasal pathology should be evaluated in terms of preoperative sinonasal pathologies, since the surgical outcome will be affected if the necessary intervention is not performed. The necessary sinonasal pathologies should be corrected simultaneously along with external or endonasal DCR surgery. This approach will be effective in postoperative success. More extensive studies will better demonstrate the effects of simultaneous treatment of sinonasal pathologies on the results of DCR.

CONCLUSION

The frequency of patients presenting with concurrent NLD obstruction is not surprising considering the incidence of sinonasal pathologies in the

general population. However, it is possible that the majority of patients referred from ophthalmology clinics cause a variation in the distribution of NLD patients with and without sinonasal pathologies, leading to previously identified differences. Simultaneous intervention in sinonasal pathologies reduces the risk of mucosal trauma and adhesion and therefore increases success. The presence of nasal pathology is not the cause of disease, whereas, failure to correct nasal pathologies has a role in increased recurrence.

Ethics Committee Approval: Ethics committee approval was received for this study from the Harran University School of Medicine (Approval Date: February 10, 2020; Approval Number: HRU/20.03.04).

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