Original Article / Çalışma - Araştırma

Revisiting unsuccessful endoscopic dacryocystorhinostomy

Başarısız endoskopik dakriyosistorinostominin gözden geçirilmesi

İbrahim Çukurova, MD.,[1] Suphi Bulgurcu, MD.,[2] İlker Burak Arslan, MD.[1]

[1]*Department of Otolaryngology, Tepecik Training and Research Hospital, İzmir, Turkey*
[2]*Department of Otolaryngology, Başkale State Hospital, Van, Turkey*

ABSTRACT

Objectives: This study aims to investigate the reasons for failed dacryocystorhinostomy in patients who underwent revision surgery.

Patients and Methods: A total of 48 patients (31 females, 17 males; mean age 39.8±14.2 year; range 23 to 55 years) who underwent revision endoscopic dacryocystorhinostomy between January 2010 and January 2016 were retrospectively analyzed. The reasons for revision surgery, dacryocystorhinostomy methods in the initial operations, and additional pathologies in the initial operations were recorded.

Results: We found that failed endoscopic dacryocystorhinostomy operations were those with chisel-hammer with a slight difference ($p>0.05$) and the most common reason for revision was inadequate bone window opening ($p<0.05$). Application of septoplasty operation in the same session with endoscopic dacryocystorhinostomy also reduced the success rate ($p>0.05$).

Conclusion: Our study results that adequate bone window opening is more important than the instrument which is used for opening bone window in endoscopic dacryocystorhinostomy. In addition, we suggest that septoplasty should not be applied in the same session with endoscopic dacryocystorhinostomy, as it can reduce the success rate.

Keywords: Dacryocystorhinostomy; endoscopic; revision.

ÖZ

Amaç: Bu çalışmada revizyon cerrahisi yapılan hastalarda dakriyosistorinostominin başarısız olmasının nedenleri araştırıldı.

Hastalar ve Yöntemler: Ocak 2010 - Ocak 2016 tarihleri arasında revizyon endoskopik dakriyosistorinostomi yapılan toplam 48 hasta (31 kadın, 17 erkek; ort. yaş 39.8±14.2 yıl; dağılım 23-55 yıl) geriye dönük olarak incelendi. Revizyon cerrahisinin nedenleri, hastaların ilk ameliyatlarında uygulanan dakriyosistorinostomi yöntemleri ve ilk ameliyatlarında saptanan ek patolojileri kaydedildi.

Bulgular: Başarısız olan endoskopik dakriyosistorinostomi ameliyatların çok az farkla guj-çekiç ile yapılanlar olduğu ($p>0.05$) ve arasında en sık revizyon nedeninin yeterli açılmamış kemik pencere olduğu saptandı ($p<0.05$). Endoskopik dakriyosistorinostomi ile aynı seansta yapılan septoplasti ameliyatının da başarı oranını düşürdüğü belirlendi ($p>0.05$).

Sonuç: Çalışma sonuçlarımız endoskopik dakriyosistorinostomide kemik pencere açılmasında kullanılan aletten daha çok, yeterli genişlikte açılmış kemik pencerenin önemli olduğunu göstermektedir. Ayrıca başarı oranını düşürebileceği için, septoplastinin endoskopik dakriyosistorinostomi ile aynı seansta uygulanmamasını öneririz.

Anahtar Sözcükler: Dakriyosistorinostomi; endoskopik; revizyon.

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Correspondence / İletişim adresi: Suphi Bulgurcu, MD. Tepecik Eğitim ve Araştırma Hastanesi, Kulak Burun Boğaz Kliniği, 35180 Konak, İzmir, Turkey.
Tel: +90 432 - 651 20 37 e-mail *(e-posta):* suphibulg@yahoo.com

Dacryocystorhinostomy (DCR) is generally performed to reduce epiphora in nasolacrimal duct obstruction by creating a tract between the lacrimal sac and the nasal cavity.[1] Dacryocystorhinostomy can be performed externally or endoscopically. In the endoscopic approach, non-power methods (chisel-hammer and Kerrison rongeur) and power methods (high speed drill, microdebrider, piezosurgery and laser) can be used for creating a bone window.[2,3]

High success ratios (80-95%) were reported in many studies before for primary endoscopic DCR, but there can be failure in the remaining 10% cases.[4] The most common cause of DCR failure is related to abnormal ostium recovery that can cause scarring and cicatricial closure of the osteotomy area. Other ostium-associated causes are granuloma formation at the ostium, synechiae formation between the ostium and other nasal structures (such as turbinates or the septum), insufficient removal of bony wall on initial DCR operation, inappropriate location, shape and size of the ostium, and sump syndrome. These failures should be treated with a revision operation.[5]

In this study, we compared factors which may cause revision endoscopic DCR such as dacryocystorhinostomy methods in the first operation and additional pathologies accompanying DCR during the initial operation in patients on whom we applied endoscopic revision dacryocystorhinostomy (ERDCR).

PATIENTS AND METHODS

A total of 48 patients (17 males, 31 females; mean age 39.8±14.2 years; range 23 to 55 years) among 204 patients who were retrospectively evaluated and had endoscopic DCR operation between January 2010 and January 2016, were included for ERDCR. Patients underwent ERDCR after a mean time of 11.1±3.4 months from initial operation. An Ethical Committee approval was obtained and the study was conducted in accordance with the Helsinki Declaration.

Complete preoperative ophthalmic examinations were performed on all patients. Nasolacrimal duct obstruction was confirmed by the Jones I and II tests, the Schirmer basic test, lacrimal probing and irrigation, nasal endoscopic examination, and dacryocystographic scan.

The ERDCR involved the right eye in 26 patients and the left eye in 22 patients. All patients underwent the same DCR technique. For bone window opening, high-speed drill, microdebrider, piezosurgery, Kerrison rounger and chisel-hammer had been used in the primary operation.

Detected intranasal additional procedures were done in the same session before DCR application septoplasty, partial resection of the middle turbinate, endoscopic sinus surgery and inferior turbinate radiofrequency.

Reasons for failure (inadequate bone window, granulation tissue, fibrous tissue and synechiae) and methods used for removing while (chisel-hammer, Kerrison rounger, high-speed drill, microdebrider or piezosurgery) in the initial operation were recorded.

Lacrimal malignancy or "functional epiphora" (which can be related with facial palsy or lower eyelid or punctal malposition) patients were excluded.

A dataset was built using IBM SPSS® for Windows 20.0 software (IBM Corporation, Armonk, NY, USA). Numerical and categorical data were analyzed using Student's t and chi-square tests, where appropriate. A $p<0.05$ value was considered statistically significant.

RESULTS

Among endoscopic DCR applied patients; a chisel-hammer was used in 98 patients (48.03%), a microdebrider in 37 patients (18.13%), a Kerrison rounger in 29 patients (14.21%), piezosurgery in eight patients (3.92%), a drill in seven patients (3.43%) and mixed devices in 25 patients (12.38%). In the same session with endoscopic DCR, septoplasty was performed in 64 patients (31.37%), partial resection of the middle turbinate in 18 patients (8.82%), endoscopic sinus surgery in 15 patients (7.35%), inferior turbinate radiofrequency in 12 patients (5.88%) and septoplasty plus partial middle turbinate resection in 21 patients (10.29%). Instruments used during the initial operation in patients on whom ERDCR was performed are shown in Table 1. The differences among these instruments were not significant ($p>0.05$). The most common cause of failure of operation during the initial surgery was inadequate bone window opening and it was statistically significant ($p<0.05$)

Table 1. Instruments used in the first operation of patients on whom endoscopic revision dacryocystorhinostomy was performed

Instrument	n	%
Chisel-hammer	25/98	25.1
Microdebrider	9/37	24.32
Kerrison rounger	7/29	24.13
Drill	1/7	14.28
Piezosurgery	0/8	0
Chisel-hammer + Kerrison rounger	6/25	24

(Table 2). The most common additional surgical procedure during the initial operation was seen as septoplasty but it was not statistically significant ($p>0.05$) (Table 3).

DISCUSSION

In order to be successful after endoscopic DCR, the bony structure around the lacrimal sac must be removed until the medial wall and most of anterior wall of the lacrimal sac is visible. The laser, rongeur, drill, microdebrider, piezo and chisel were used while extracting the lacrimal bone and the thick part of the maxilla in endoscopic DCR.[5-7] Cokkeser et al.[3] found that chisel-hammer use in endoscopic DCR surgery is less traumatic, simpler and a more controlled method when compared with drill use and reported that its success rate was about 87%. Herzellah et al.[2] compared drill and Kerrison rounger use in endoscopic DCR surgery and did not detect any difference between two methods in terms of success rate and complication ratio. Narioka and Ohashi[8] reported that use of laser in endoscopic dacryocystorhinostomy operation can reduce operation time, amount of bleeding and recovery period; and also reported that its success rate was high. On the other hand Neyt et al.[9] used microdebrider in endoscopic DCR operation and suggested that it is a safe and effective method. Salami et al.,[10] reported that piezosurgery is a novel, reliable method in endoscopic dacryocystorhinostomy operation and mentioned that they were successful in all of their patients. We detected that use of chisel-hammer for bone window opening in patients on whom endoscopic DCR was applied, was less successful then other instruments. We detected that the most successful method in surgery was using piezosurgery.

Table 2. Reasons for failure in endoscopic dacryocystorhinostomy

Reason	n	%
Only inadequate bone window	19	39.58
Only granulation tissue	4	8.33
Only fibrotic tissue	3	6.25
Only synechia	0	0
Inadequate bone window + granulation tissue	8	16.66
Inadequate bone window + fibrotic tissue	5	10.41
Inadequate bone window + synechia	2	4.16
Granulation tissue + fibrotic tissue	7	14.58

Table 3. Additional surgical procedures that interfere in the operation in patients to whom endoscopic revision dacryocystorhinostomy was applied

Additional surgical procedures	n	%
Septoplasty	22	34.75
Middle turbinate partial resection	3	16.66
Endoscopic sinus surgery	2	13.33
Septoplasty + middle turbinate partial resection	6	28.57
None	15	21.12

The success of DCR surgery depends on creating a large bony ostium and prevention of closure of this stoma. Previously, surgeons tried to open the sac in a limited range at the inferior part, which can cause frequent obstruction of the neoostium due to granulation tissue formation and had higher failure rates. In addition, closing of the ostium with progressive scar formation, the adhesion between ostium and the middle turbinate or septum, and formation of lacrimal sac diverticula may block drainage after operation.[11] Welham and Henderson[12] reported that an inadequate bone window opening is an important factor for failure of endoscopic DCR. In the literature there are many studies about the appropriate sizes of the bone window, which is between 4-12x4-12 millimeter dimensions.[13,14] In this study, we detected that the most important reason of endoscopic DCR failure is inadequate bone window opening.

Tsirbas and Wormald[11] reported that application of septoplasty, middle turbinate surgery and sinus surgery in the same session with endoscopic DCR can increase success rates. We think that the elimination of identified intranasal pathologies for bone window opening can increase success. But in our study, the failure ratio increased in patients on whom endoscopic DCR plus septoplasty or septoplasty plus partial excision of middle turbinate was performed, when compared with patients who did not have any additional pathology. This made us think that elimination of additional pathologies in a previous surgery can be more successful. But further studies are needed in this field.

In conclusion, we detected that adequate bone window opening is more important than the instrument that is used for creating a bone window in endoscopic dacryocystorhinostomy. Septoplasty performed in the same session as endoscopic dacryocystorhinostomy reduces the success rate.

Declaration of conflicting interests

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REFERENCES

1. Walker RA, Al-Ghoul A, Conlon MR. Comparison of nonlaser nonendoscopic endonasal dacryocystorhinostomy with external dacryocystorhinostomy. Can J Ophthalmol 2011;46:191-5.
2. Herzallah I, Alzuraiqi B, Bawazeer N, Marglani O, Alherabi A, Mohamed SK, et al. Endoscopic Dacryocystorhinostomy (DCR): a comparative study between powered and non-powered technique. J Otolaryngol Head Neck Surg 2015;44:56.
3. Cokkeser Y, Evereklioglu C, Tercan M, Hepsen IF. Hammer-chisel technique in endoscopic dacryocystorhinostomy. Ann Otol Rhinol Laryngol 2003;112:444-9.
4. Çukurova I, Caner Mercan G, Çetinkaya E, Gümüsssoy M, Söken H. Endoscopic dacryocystorhinostomy: outcomes using mucosal flap preserving technique. Eur Arch Otorhinolaryngol 2013;270:1661-6.
5. Park J, Kim H. Office-based endoscopic revision using a microdebrider for failed endoscopic dacryocystorhinostomy. Eur Arch Otorhinolaryngol 2016;273:4329-34.
6. Singh AP, Narula V, Meher R. A new approach to endoscopic DCR. Braz J Otorhinolaryngol 2012;78:7-11.
7. Ali MJ, Singh M, Chisty N, Kamal S, Naik MN. Endoscopic ultrasonic dacryocystorhinostomy: clinical profile and outcomes. Eur Arch Otorhinolaryngol. 2016;273:1789-93.
8. Narioka J, Ohashi Y. Transcanalicular-endonasal semiconductor diode laser-assisted revision surgery for failed external dacryocystorhinostomy. Am J Ophthalmol 2008;146:60-8.
9. Neyt P, Delsupehe L. Powered endonasal dacryocystorhinostomy: technique and results of a series of patients. Bull Soc Belge Ophtalmol 2011;317:33-8.
10. Salami A, Dellepiane M, Salzano FA, Mora R. Piezosurgery in endoscopic dacryocystorhinostomy. Otolaryngol Head Neck Surg 2009;140:264-6.
11. Tsirbas A, Wormald PJ. Endonasal dacryocystorhinostomy with mucosal flaps. Am J Ophthalmol 2003;135:76-83.
12. Welham RA, Henderson PH. Results of dacryocystorhinostomy analysis of causes for failure. Trans Ophthalmol Soc U K 1973;93:601-9.
13. Yung MW, Hardman-Lea S. Analysis of the results of surgical endoscopic dacryocystorhinostomy: effect of the level of obstruction. Br J Ophthalmol 2002;86:792-4.
14. El-Sayed Al-Mosallamy SM. A novel technique to improve the results of conventional dacryocystorhinostomy. J Egypt Ophthalmol Soc 2013;106:230-4.