Efficacy of Mitomycin-C Irrigation after Balloon Dacryocystoplasty

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PURPOSE: To evaluate the safety and efficacy of mitomycin-C irrigation after balloon dacryocystoplasty in the treatment of epiphora caused by obstruction of the lacrimal system.

MATERIALS AND METHODS: Thirty-five lacrimal systems in 33 patients with obstruction of the lacrimal system were assigned to one of two groups: 17 lacrimal systems were irrigated with mitomycin-C after balloon dacryocystoplasty (mytomycin-C group), and 18 were not irrigated with mitomycin-C after balloon dacryocystoplasty (non–mitomycin-C group). In the mitomycin-C group, the lacrimal systems were irrigated with 0.2 mg/mL mitomycin-C via the inferior lacrimal punctum in three different sessions: immediately, 1 week, and 1 month after balloon dacryocystoplasty. The cumulative patency rates after balloon dacryocystoplasty were calculated by using the Kaplan-Meier method and were compared between the two groups with use of the log-rank test.

RESULTS: Balloon dacryocystoplasty and subsequent mitomycin-C irrigation were technically successful in all lacrimal systems. There were no side effects or complications associated with mitomycin-C use. The cumulative patency rate in the mitomycin-C group was significantly higher than that in the non–mitomycin-C group after balloon dacryocystoplasty ($P = .0150$, log-rank test).

CONCLUSIONS: Mitomycin-C irrigation is safe and effective in increasing the patency rate of the lacrimal system after balloon dacryocystoplasty.

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Abbreviations: DCG = dacryocystography, DCR = dacryocystorhinostomy, NLD = nasolacrimal drainage system

TOGETHER with nasolacrimal stent placement, fluoroscopically guided balloon dacryocystoplasty has been an alternative method for treating epiphora caused by partial or complete obstruction of the nasolacrimal drainage system (NLD). There have been several reports of balloon dacryocystoplasty with substantial differences in the initial success rates, varying from 35% to 90% (1–10). One-year patency rates have been reported to vary from 25% to 75% (2,5,6,11), and the 5-year patency rate has been reported to be 36.9% (5). Dacryocystorhinostomy (DCR) is the surgical treatment of epiphora in which the occluded NLD is recanalized by creating an anastomosis between the lacrimal sac and the nasal cavity to bypass the obstruction (9). In comparison to DCR, balloon dacryocystoplasty is associated with less morbidity (ie, does not require an incision), is technically simple, and obviates the need for general anesthesia (1,12). In terms of long-term patency, however, the results of balloon dacryocystoplasty alone has not been encouraging compared to that with DCR (2,5,6,11,13).

Recently, the efficacy and safety of adjunctive mitomycin-C application has been demonstrated after removal of an occluded nasolacrimal stent (14) and in DCR (15–18). In an effort to achieve long-term patency of an NLD after balloon dacryocystoplasty, mitomycin-C irrigation was performed in this study. The purpose of this study was to investigate the clinical effectiveness of mitomycin-C use in the NLD after balloon dacryocystoplasty.

MATERIALS AND METHODS

This study was performed with the approval of our institutional review board. Written informed consent was obtained from all patients at enrollment.

Patient Population

This was a retrospective review of the records and/or images of patients

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with obstruction of the NLD who underwent fluoroscopically guided balloon dacryocystoplasty with or without irrigation with mitomycin-C. Between November 1997 and June 2006, we attempted balloon dacryocystoplasty in 148 NLDs in 133 patients who presented with epiphora. We excluded pediatric patients with congenital obstructions in the NLD (18 NLDs in 16 patients) because the success rate of balloon dacryocystoplasty alone has been reported to be very high in congenital obstruction (12,19,20). We also excluded patients with common canalicular obstruction (95 NLDs in 84 patients) given the high risk of reflux of mitomycin-C solution into the ocular surface stemming from the small space of the common canaliculus. Thus, the final study population consisted of 35 NLDs in 33 patients (five men and 28 women; age range, 27–92 years; mean age, 59 years). We divided the present study population into two groups: 17 NLDs were irrigated with mitomycin-C after balloon dacryocystoplasty ("mitomycin-C group"), and 18 were not irrigated with mitomycin-C after balloon dacryocystoplasty ("non–mitomycin-C group"). The mitomycin-C group underwent balloon dacryocystoplasty and subsequent irrigation with mitomycin-C between April 2002 and June 2006, whereas the non–mitomycin-C group underwent balloon dacryocystoplasty between November 1997 and March 2002. There was no crossover of patients during the follow-up between the two groups. The baseline characteristics of the two groups are detailed in the **Table**.

Characteristics of Patients in the Mitomycin-C Group and Non–Mitomycin-C Group

Characteristics	Mitomycin-C Group	Non–Mitomycin-C Group	*P* Value
No. of patients	16	17	···
No. of lacrimal systems	17	18	···
Age (y)			.420
Range	33–92	27–79	···
Mean	55	50	···
M/F ratio	2:14	3:14	.999
Cause of obstruction			.338
Idiopathic	16	14	···
Traumatic	1	4	···
Obstruction level			.658
Sac	2	1	···
Junction	8	10	···
Duct	6	7	···
DCR tract	1	0	···
Severity of obstruction at DCG			.092
Complete	12	7	···
Partial	5	11	···
Duration of epiphora			.384
Range	1 mo–20 y	3 mo–30 y	···
Mean	6.2 y	4.3 y	···
Grade of epiphora*			.402
4	2	5	···
5	15	13	···

* Grade 4 = epiphora requiring dabbing more than 10 times a day but no constant tearing. Grade 5 = constant tearing.

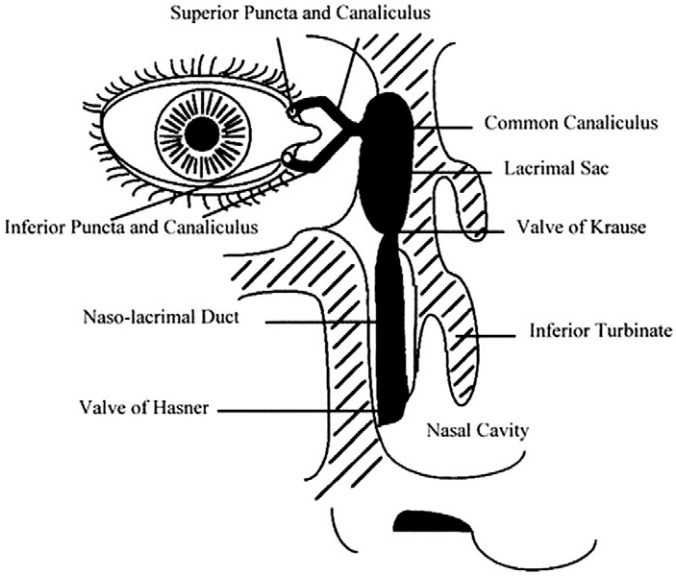

Figure 1. Diagram shows the anatomy of the NLD. Reprinted, with permission, from reference 10.

Techniques of Balloon Dacryocystoplasty and Mitomycin-C Irrigation

The site and severity of obstruction were evaluated before balloon dacryocystoplasty by means of dacryocystography (DCG) (**Fig 1**). After local anesthesia was induced, a 0.018-inch balltipped guide wire (M.I.Tech, Seoul, Korea) was introduced through the superior punctum and advanced gently across the obstruction into the inferior meatus of the nasal cavity. The guide wire was pulled out of the external naris with a hook (Cook, Queensland, Australia), and the hook was removed from the guide wire by cutting the ball with wire-cutting scissors (Storz, St. Louis, Mo). Then, a deflated 4-mm-diameter lacrimal balloon catheter (Balt, Montmorency, France) was passed in a retrograde fashion over the guide wire. The balloon was dilated with manual inflation with a 5-mL plastic syringe for 1 minute. After deflation, the balloon was withdrawn inferiorly and the wire was withdrawn superiorly. DCG was then performed through the inferior punctum immediately after the procedure to verify the patency of the NLD. Irrigation with normal saline was then performed through the inferior punc-