Learning Curve Does Not Affect Predictors of Patency After Transnasal Endoscopic Dacryocystorhinostomy with Ultrasonic Bone Aspirator

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Abstract

Purpose: To determine if surgical experience improves outcomes after endoscopic dacryocystorhinostomy (endoDCR) with ultrasonic bone aspirator (UBA).

Methods: A retrospective, institutional review board approved chart review of 550 endoDCRs with UBA over three years performed by a single otolaryngologist. Data included demographics, indication of nasolacrimal duct obstruction, intraoperative findings, and postoperative sequela. Patients undergoing primary endoDCR were grouped into early phase (2011-2013) and recent phase (2014-2015)

Results: One hundred fifty primary endoDCRs with UBA were analyzed. 75 patients in the early phase and 75 patients in the recent phase were match controlled by age and ethnicity. 5.3% of the early phase had persistent epiphora at 6 months vs 2.7% of the recent phase (p=0.68). 2.7% of the early phase and 2.7% of the recent phase experienced postoperative epistaxis. 2.7 % of patients in the early phase required a revision endoDCR with UBA vs 0 patients in the recent phase (p=0.5). The average time to revision DCR was 17 months (range of 11-24 months). There were no cases of cerebrospinal fluid leakage, visual loss, diplopia, or uncontrolled epistaxis in either group.

Conclusions: Our growing experience with the endoDCR with UBA appears to show reasonable efficacy. While the surgical outcomes show improving trends with experience, there was no statistically significant difference between the early and recent phase. Predictors of patency are unlikely to be related to surgical experience.

Introduction

The surgical management of nasolacrimal duct obstruction (NLDO) includes both external dacryocystorhinostomy (extDCR) and endoDCR. Many recent studies have shown equivalent success rates coming from the two approaches (1-3). Still, the most common post operative adverse outcome is persistence of epiphora due to an inadequate nasolacrimal fistula.

Given these trends, powered endoDCR has become widely used (1-3). The key steps for success are the creation of a large and superior osteotomy in the lacrimal sac to expose the entirety of the lacrimal sac and to fully marsupialize the sac into the nasal cavity (4-7). Mechanical drills are popular and widely used to create the osteotomy after mucosal flaps are raised. More recently, the ultrasonic bone aspirator has been utilized and has been shown to have similar rates of success and efficacy as the endoDCR with a drill (8-10). It is a newer surgical tool safely employed in endoDCR that uses low-frequency ultrasonic vibrations to emulsify bone and spare soft tissue while simultaneously irrigating and aspirating the surgical field (11-13).

The aim of this study is to examine if increasing surgical experience with the ultrasonic bone aspirator (UBA) in endoDCR affects predictors of patency and post operative sequela.

Methods & Materials

Only patients undergoing primary DCR were included in the study after institutional review board approval had been obtained. All UBA-DCR surgeries were performed between January 2011 and February 2015 by the authors. Patient were divided into two groups: early phase, which included patients between 2011-2013, and the late phase with patients between 2014-2015

All surgeries were performed under general anesthesia on an outpatient basis. The Sonopet Omni UST-2001 aspirator (Stryker Corporation, Kalamazoo, MI, USA) was used with an extended bayonet handpiece and a Spetzler claw tip for all UBA-DCRs. Intraoperative image guidance (iNtellect Cranial Navigation System, Stryker Corporation) was used in most patients, based on equipment availability. Surgical technique was performed as previously described (10).

Inclusion criteria included patients undergoing primary DCR for primary nasolacrimal duct obstruction. Patients were excluded on the basis of previous DCR, previous nasal surgery, previous trauma, concurrent diagnoses of rheumatologic diseases, and previous exposure to chemoradiation or radioactive iodine.

Postoperatively, patients were assessed at 1 week, 6 weeks, 3 months, 6 months and if necessary, additional postoperative assessments were performed for persistence of disease,. In this study, postoperative results were gauged solely on the patients' assessment of their epiphora, epistaxis, dacryocystitis, sinusitis and need for revision endoDCR. Probing and irrigation were performed in patients without complete resolution of epiphora, but these data were not included.

Results

Clinical data from 150 patients undergoing primary endoDCR with UBA were reviewed, comparing the two cohort groups: early phase (N=75) and recent phase (N=75). The demographics are summarized in Table 1.

Postoperative sequela were compared in Table 2. 5.3% of patients in the early phase had persistence of epiphora at 6 months and 2.7% of patients in the late phase also noted persistence of their symptoms. Comparing the two groups, there was no statistically significant difference for rates of postoperative epiphora at six months.

Postoperative epistaxis occurred in 2.7% of cases in both the early and late phase. The epistaxis cases were all managed conservatively and did not require surgery.

Finally, when looking at the rate of revision surgery after primary endoDCR with the ultrasonic aspirator, the early phase had two patients (2.7%) that required revision surgery whereas the late phase did not have any patients. There was no statistically significant difference between the two groups when looking at the rate for revision surgery.

Of the two patients who did need revision surgery, scarring at the ostetotomy site was noted and all underwent successful revision surgery with endoDCR with UBA. The average time to revision surgery was 17 months months (11-24 months). All had resolution of symptoms afterwards.

Tables & Figures

Table 1 – Demographics

	Early Phase		Late Phase	
Avg Age	59.3		62.9	
Primary Procedures		%		%
Left	24	32	11	15
Right	18	24	24	32
Bilateral	33	44	40	53
Female	66	88	61	81
Race				
White	63	84	52	70
Asian	2	2.7	2	2.7
Black	3	4	7	9.3
Hispanic	2	2.7	0	0
Other	2	2.7	9	12

Table 2 – Post Operative Sequela

	Early Phase	%	Late Phase	%	P value
Epiphora at 6 months	4	5.3	2	2.7	0.68
Epistaxis	2	2.7	2	2.7	1
Postop dacryocystitis	0	0	0	0	null
Postop sinusitis	2	2.7	0	0	0.50
Revision surgery	2	2.7	0	0	0.50

Conclusion

In this study, we present our experience with the largest study of endoDCR with UBA to examine patency and success rates over a four year period. Our results show an overall success rate of 96%. This is equivalent to success rates for endoDCR reported in the literature (1-3) and our previous experience with endoDCR with UBA (10). More importantly, we also show that surgical experience with the UBA and the learning curve inherent in utilizing a new tool does not affect postoperative sequela when comparing our early and recent groups.

In 2014, Chappell et al. wanted to evaluate the learning curve and operative time for ultrasonic endoDCR over a two year period in 20 patients. They showed a decrease in total operative time in routine unilateral and bilateral DCR by 36.4% and 33.9% respectively. They reached a plateau of 67 min and 80 mins. In 17 patients with uncomplicated epiphora, they reported 100% anatomic success and 84.6% functional success.

Our growing experience with the endoDCR with UBA appears to show reasonable efficacy. While the surgical outcomes show improving trends with experience, there was no statistically significant difference between the early and recent phase. Predictors of patency are unlikely to be related to surgical experience.

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