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Long-term results of closed nasolacrimal intubation in adults

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PURPOSE. *Dacryocystorhinostomy (DCR) is the standard surgical treatment for adult nasolacrimal duct obstruction. There have been relatively few studies of closed nasolacrimal duct intubation in adults. The aim of this study was to determine rates of anatomic patency following this procedure.*
METHODS. *The authors carried out a survey of all patients undergoing closed nasolacrimal duct intubation as a primary procedure over a period of 3 years and 4 months. There were 32 eligible patients of whom 20 attended for review.*
RESULTS. *A total of 75% of these cases had patent drainage after follow-up of between 6 months and 3 years. The proportion of patients with persistent patency after intubation was the same regardless of length of follow-up.*
CONCLUSIONS. *The minimally invasive procedure of lacrimal intubation may have a role in some adults with nasolacrimal duct obstruction. (Eur J Ophthalmol 2007; 17: 490-3)*

KEY WORDS. *Dacryocystorhinostomy, Lacrimal drainage surgery, Nasolacrimal system obstruction, Silicone intubation*

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INTRODUCTION

Closed nasolacrimal duct intubation (without dacryocystorhinostomy [DCR]) has been widely advocated for childhood nasolacrimal duct obstruction (1). Despite occasional reports of closed nasolacrimal duct intubation in adults (2-4), this technique is not commonly used in adult patients. We report our results looking at symptom resolution and anatomic patency.

METHODS

Case notes of consecutive patients who had undergone closed nasolacrimal duct intubation over a period of 4 years and 3 months were reviewed. The indication for intubation was symptomatic epiphora with failure of saline to reach the nasopharynx on sac washout, providing there was no long section of canalicular obstruction. Patients who had had previous lacrimal surgery, those with a patent sac washout preoperatively, and those younger than 12 years were excluded from the analysis. An invitation was sent to 32 patients to attend for review, of whom 20 patients attended.
Patients were asked if their symptoms had been relieved. Any adnexal disease was noted. A sac washout was performed after informed consent. Two patients did not give consent and were excluded from further analysis.
Closed intubation, as described by Soll (5) with some modification, was performed under general anesthesia. A

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nasal speculum was used to pack the nose along the floor and under the inferior turbinate with ribbon gauze soaked in 10% cocaine. One drop of topical gentamicin minims was instilled in the conjunctival sac. The inferior punctum was dilated with a Nettleship dilator. A #0 or #00 Bowman probe was passed through the lower punctum into the inferior meatus of the nose. The ribbon gauze was removed from the nose. One bodkin of the Bernard tube (Maersk Medical) was now passed through the lower punctum and into the inferior meatus of the nose. A Hartman-Crocodile forceps was used to locate and draw out the tip of the bodkin from beneath the inferior turbinate. Directing the opening jaw of the Hartman-Crocodile forceps laterally facilitated retrieval of the bodkin. Metal to metal contact of the forceps and the metal bodkin of the Bernard tube as well as the movement of the upper end of the bodkin on contact of the forceps with its tip in the nose were also helpful in locating the tube. The other bodkin was similarly passed down the upper canaliculus and retrieved from the inferior meatus. A silicone sleeve (0.30 mm internal diameter) was passed over the tubes. The tubes were tied in a knot. Another silicone sleeve was passed over the tubes below the knot. The ends of the tube were cut and allowed to retract into the nose. Patients were followed up at 1 day, 1 week, 3 months, and 6 months. The tubes were removed at between 3 and 6 months.

RESULTS

A total of 24 eyes from 18 patients were included, all of whom had a follow-up of more than 6 months after surgery (Tab. I). Documentation of preoperative lacrimal findings was limited. A total of 23 of 24 eyes were documented to have blockage on sac washout but the site of blockage was not specified. One eye was recorded as having blockage at the lower canaliculus. One eye was noted to have a stenosed punctum. All eyes had symptomatic epiphora.

Postoperatively, 75% (18/24) of the cases had patent nasolacrimal systems on sac washout. All 8 patients who had their drainage tubes removed within 3 months after the procedure had a patent nasolacrimal duct. Patients who retained lacrimal tubes for more than 3 months had a failure rate of 36–40% (Tab. II). This difference was statistically significant ($p \leq 0.05$, chi-square value 4, *df* 1). There was no statistically significant association between the proportion of failed cases and the length of follow-up ($p > 0.05$, chi-square value 0.38, *df* 3) (Tab. III).

Four cases had persistence of epiphora despite patency on sac washout. This was due to ectatic puncta in two cases and stenosed puncta in two cases. In one of these cases stenosed puncta had been noted preoperatively.

TABLE I - CHARACTERISTICS OF PATIENTS UNDERGOING CLOSED INTUBATION WITH RESULTS

Patent postoperatively, n (%)	18 (75)
Non patent postoperatively, n (%)	6 (25)
Total eyes	24
Epiphora relieved	14
Epiphora persistent	4
Total patients, n (%)	18
Male	9 (38)
Female	15 (62)
Average age (range), y	69.22 (32–87)
Laterality, R/L	14/10
Average duration (range), wk of intubation	5.21 (1–30)
Pseudofailure, n (%)	4/18 (22) (2 stenosed puncta, 2 ectatic puncta)

TABLE II - NUMBERS OF SUCCESSES AND FAILURES WITH INCREASING PERIOD OF INTUBATION

Period of intubation, mo	Successes	Failures
<1	2	0
1–3	6	0
3–6	7	4
More than 6	3	2
Total	18	6

TABLE III - NUMBERS OF FAILURES AND SUCCESSES WITH INCREASING RATE OF FOLLOW-UP

Length of follow-up, mo	Successes	Failures
<6	0	0
6–12	6	2
13–24	6	2
25–36	5	2
More than 36	1	0
Total	18	6

DISCUSSION

Dacryocystorhinostomy is the standard surgical treatment for adult nasolacrimal duct obstruction. Success rates for the external approach vary from 70 to 92% (6, 7). Endonasal DCR (non-laser) success rates are on the order of 85% (6, 8), while those of laser endonasal DCR range from 65 to 71% (8, 9). Closed nasolacrimal duct intubation (without DCR) is a simple minimally invasive technique that is widely advocated for childhood nasolacrimal duct obstruction that does not respond to probing (10). There have been relatively few studies of closed nasolacrimal duct intubation in adults. Fulcher et al (2) reported resolution of symptoms in 54.3% of cases with a mean follow-up period of 15 months. More recently, the same group described their results for long-term (mean 78 months) control of epiphora (11). They report complete symptom resolution in 50.7% and partial improvement in a further 38.5%. A recent study from China (12) reporting on 383 adults' eyes found complete symptom resolution in 73% and partial resolution in a further 5%. Of note, in this study intubation was performed under local anesthesia with intravenous sedation. Another study compared monocanalicular versus bicanalicular intubation (3) and found that the success rates were 61.53% and 59.09%, respectively. In all of these studies success was defined in terms of symptom resolution. Neither reported on results of postoperative sac washouts. We could only find one published work looking at sac washout results following silicone intubation in adults (13). The authors of this study reported patency in 89% of cases with uncomplicated obstruction.

In the study from China (12) the indications were persistent epiphora or recurrent dacryocystitis resulting from congenital (their study also looked at children) or acquired nasolacrimal duct obstruction unrelieved by previous probing. Similarly, in the work of Connell et al (11), the indication is persistent epiphora despite attempted syringing and probing. Five patients in this study had apparent lacrimal pump failure with no obstruction prior to intubation. In our study the indication for intubation was symptomatic epiphora with failure of saline to reach the nasopharynx on sac washout, providing there was no long section of canalicular obstruction. The data in our study therefore specifically reflect the efficacy of this technique in restoring anatomic patency in cases where there was known preoperative obstruction.

In our study the failure rate rose with intubation of more than 3 months (Tab. II). There was no failure in cases intubated for up to 3 months but the rate rose sharply to 36 to 40% with intubation periods greater than 3 months. In our series there was no specific protocol for timing of removal of the tubes. It is possible the tubes may have been left in place for longer in patients where there was little symptomatic improvement; thus it is not possible to draw valid conclusions regarding the effects of length of intubation from our series.

The inferior turbinate was not fractured in any of our cases. Although it has been recommended that an ENT surgeon should be available to assist in the retrieval of lacrimal tubes (1) this was not found necessary in any of our cases. Persistence of the relief of symptoms and objective evidence of lacrimal patency in a proportion of cases after up to 3 years of follow-up in this series suggests that closed lacrimal intubation should be considered in adults where a minimally invasive technique is required.

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REFERENCES

1. Aggarwal RK, Mission GP, Donaldson I, Willshaw HE. The role of nasolacrimal intubation in the management of childhood epiphora. Eye 1993; 7: 760-2.
2. Fulcher T, O'Conner M, Moriarty P. Nasolacrimal intubation in adults. Br J Ophthalmol 1998; 82: 1039-41.
3. Kashkouli MB, Kempster RC, Galloway GD, Beigi B. Monocanalicular versus bicanalicular silicone intubation for nasolacrimal duct stenosis in adults. Ophthalmic Plast Reconstr Surg 2005; 21: 142-7.
4. Inatani M, Yamauchi T, Fukuchi M, Denno S, Miki M. Direct silicone intubation using Nunchaku-style tube (NST-DSI) to treat lacrimal passage obstruction. Acta Ophthalmol Scand 2000; 78: 689-93.
5. Soll DB. Silicone intubation: an alternative to dacryocystorhinostomy. Ophthalmology 1978; 85: 1259-65.

6. Ben Simon GJ, Joseph J, Lee S, Schwarcz RM, McCann JD, Goldberg RA. External versus endoscopic dacryocystorhinostomy for acquired nasolacrimal duct obstruction in a tertiary referral center. Ophthalmology 2005; 112: 1463-8.
7. Kashkouli MB, Parvaresh M, Modarreszadeh M, Hashemi M, Beigi B. Factors affecting the success of external dacryocystorhinostomy. Orbit 2003; 22: 247-55.
8. Moore WM, Bentley CR, Olver JM. Functional and anatomic results after two types of endonasal dacryocystorhinostomy: surgical and holmium laser. Ophthalmology 2002; 109: 1575-82.
9. Tripathi A, Lesser TH, O'Donnell NP, White S. Local anaesthetic endonasal endoscopic laser dacryocystorhinostomy: analysis of patients' acceptability and various factors affecting the success of this procedure. Eye 2002; 16: 146-9.
10. Al-Hussain H, Nasr AM. Silastic intubation in congenital nasolacrimal duct obstruction: a study of 129 eyes. Ophthalmic Plastic Reconstr Surg 1993; 9: 32-7.
11. Connell PP, Fulcher TP, Chacko E, O'Connor MJ, Moriarty P. Long term follow up of nasolacrimal intubation in adults. Br J Ophthalmol 2006; 90: 435-6.
12. Wang L, Chen D, Wang Z. New technique for lacrimal system intubation. Am J Ophthalmol 2006; 142: 252-8.
13. Psilas K, Eftaxias V, Kastanioudakis J, Kalogeropoulos C. Silicone intubation as an alternative to dacryocystorhinostomy for nasolacrimal drainage obstruction in adults. Eur J Ophthalmol 1993; 3: 71-6.