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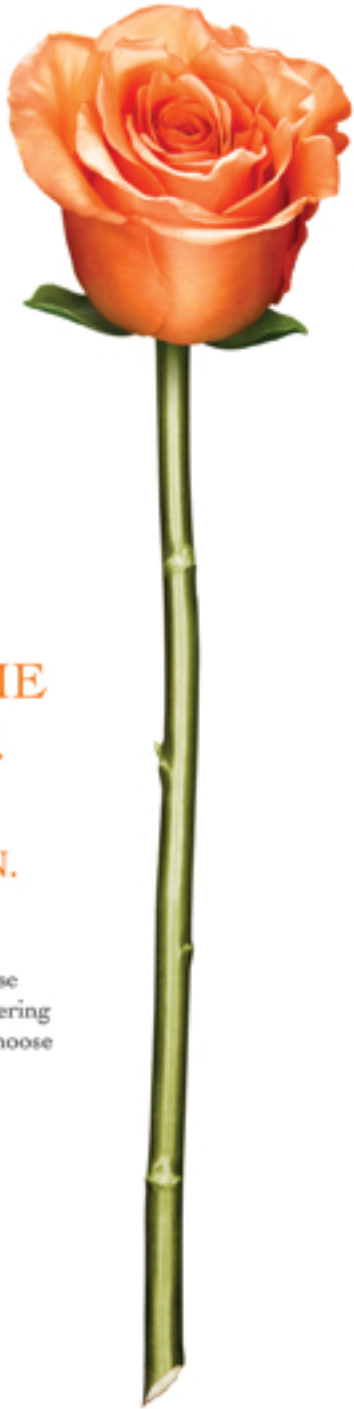

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A novel method to convert bicanalicular intubation into monocanalicular intubation in endoscopic dacryocystorhinostomy

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Abstract: *Endonasal endoscopic dacryocystorhinostomy (EN-DCR) is an effective treatment for acquired nasolacrimal duct obstruction. Although the exact role of silicone intubation remains controversial, it is routinely performed to increase the success rate of the procedure. Occasionally, difficulty may be encountered during silicone tube intubation commonly when one end of the bicanalicular stent has been successfully passed into the nasal cavity but the other end fails. In which case either this has to be converted to a monocanalicular stent or leave without stenting. We hereby report a novel method to tackle this situation by converting a bicanalicular stent into a monocanalicular stent using simple knotting steps. From our experience with three patients, the end-results were safe and well-tolerated. This modified lacrimal intubation stent may also be used when the standard Monoka monocanalicular stent is not available.*

Key words: *Bicanalicular intubation, endoscopic dacryocystorhinostomy*

Introduction

Endonasal endoscopic dacryocystorhinostomy (EN-DCR) is a popular surgical procedure for acquired nasolacrimal duct obstruction. The most common reason for failure in EN-DCR is re-stenosis of the rhinostomy site,[1] up to 83% of failed DCR was secondary to obliterative scarring at the ostium in Sprekelsen's cohort.[2] Various adjunctive measures have been introduced to overcome this problem, including intubation with silicone tubes, use of anti-metabolites like mitomycin-C. However, the exact role of lacrimal intubation has recently been challenged as some authors suggested that the placement of silicone tubes increases the risk of osteotomy closure by causing granulomatous reaction.[3,4] Till date, there are only limited published data comparing EN-DCR with and without intubation[5,6] and the necessity for stenting remains controversial. Many surgeons still prefer intubation especially in cases where the mucosal flaps are not well apposed or in revision DCR[1].

Lacrimal intubation during EN-DCR may not always be smooth and successful. Possible causes of difficult intubation include a proximal upper or lower canalicular stenosis which is under-diagnosed before the operation or formation of false-tract during forceful silicone tube insertion. When one end of the bicanalicular stent

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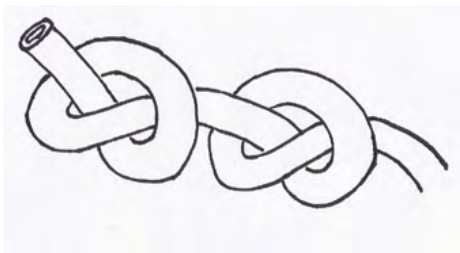
is successfully passed into the nasal cavity but the other end fails to negotiate through, the conventional solution is to remove the half- inserted bicanalicular stent, and either to leave without stenting or to re-insert a new monocanalicular stent through the patent pathway. We hereby report a novel method to tackle this situation by manually transforming a bicanalicular stent into a monocanalicular stent using simple knotting steps.

Procedure

We report three patients with acquired NLDO who underwent primary EN-DCR. Initial steps for the DCR were performed in a standard fashion and were uneventful. Since no canalicular obstruction was noted in pre-operative probing, bicanalicular lacrimal intubation was planned for all three cases. In each of these cases, one end (referred to as 'distal end') of the bicanalicular silicone stent (BD Visitec™ Lacrimal Intubation Set, BD Ophthalmic Systems, UK) was successfully intubated reaching the nasal cavity. However, the other end (referred as 'proximal end') failed to negotiate through the other canaliculus despite repeated attempts. This was postulated to be due to tissue edema secondary to trauma from initial attempts to probe through the canaliculi. Instead of pulling out the 'distal end' that was already in the nasal cavity, we took the following steps: (1) Use the 'proximal end' of the silicone tube to tie two simple knots, one next to the other (Fig. 1); (2) Use a straight iris scissors to cut away the excessive tube, leaving a free end of about 1-1.5 mm; (3) Pull the 'distal end' in the nasal cavity until the knots reach the punctum and act as a 'collarette'; (4) Rotate the tube in a way that the cut end of the tube is not touching the globe; (5) cut the 'distal end' to the appropriate length and secure with a metal clip. The nose was packed as usual and the surgery completed.



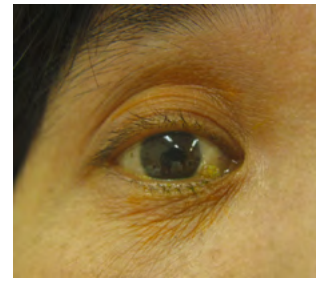


Fig. 1. Tying two simple knots with the silicone tubing.
Fig. 2. The 'simple knots' act as a 'collarette'. There was no ocular surface abrasion or inflammation.

Post-operatively, all patients experienced minimal to no discomfort. There was no evidence of conjunctival and corneal abrasion or inflammation, or movement of the knots with ocular movement on slit-lamp biomicroscopy on follow-up visits at Week 1 (Fig. 2) and Week 4. As the knots rest well on the punctum with minimal movement, no trapped mucus or debris in the knots was observed. All the modified stents stayed *in situ* until the planned removal at Week 4. No spontaneous extrusion or migration was observed. All three dacryocystorhinostomies remained patent up to the follow-up at six months.

Discussion

It is generally accepted that lacrimal intubation increases surgical success in EN-DCR,[1] especially in cases where the mucosal flaps cannot be well apposed during the procedure and in revision cases. However, there are some instances when bicanalicular intubation may not be possible. The above-mentioned manual transformation of bicanalicular stent to monocanalicular stents offers a number of benefits. Firstly, one does not need to remove the silicone tube that is already passed into the nasal cavity and reinsert a new monocanalicular stent, as two possible problems can be associated with the removal-reinsertion procedure: (1) Repeated trauma to the DCR pathway, leading to scarring and subsequent stenosis of the osteotomy site; (2) Re-insertion may be difficult or impossible. By reducing excessive manipulation, we avoid jeopardizing the chance of success of the EN-DCR. Secondly, the maneuver of tying a simple knot is quick and easy to learn. This manual transformation significantly saves the surgeon's time as compared to removal-reinsertion procedure. Finally, this manual transformation also saves the cost of a new monocanalicular stent.

In our experience with the three patients in this series, these modified monocanalicular stents were safe and well-tolerated. Since the silicone tubes were soft and the cut edges were relatively smooth, they did not cause significant irritation or trauma to the ocular surface. There was minimal movement of the knots on ocular movement, as there was a substantial segment of silicone tubing in the canaliculi and osteotomy to create enough friction to stabilize the tubing. Although the size of the double knots was bigger compared to the collarette of the commercially available Monoka monocanalcular stent, our patients did not complain of any significant discomfort. In fact, this relative big-sized 'collarette' carries a lower risk of being buried and intracanalicular migration. Its large size also facilitates subsequent removal. Finally, this technique may also be used to produce monocanalicular stent substituting standard Monoka device when the latter is not available, *e.g.*, in emergency room for repair of lacrimal laceration, or in smaller ophthalmic units, where stock is not avialable due to low utilization rate or cost concern.

Summary

We report a novel method to convert a bicanalicular stent into a monocanalicular stent in EN-DCR. From our experience, the end-product is safe and well-tolerated by patients.

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