Endoscopic Dacryocystorhinostomy with Adjunctive Mitomycin C for Canalicular Obstruction

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Endoscopic Dacryocystorhinostomy with Adjunctive Mitomycin C for Canalicular Obstruction

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ABSTRACT Purpose to report our experience in treating distal and common canalicular obstruction by trephination followed by topical low-dose mitomycin C (0.03%) and silicone intubation during endoscopic dacryocystorhinostomy (DCR). Methods Noncomparative interventional case series of five eyes of five patients with epiphora and clinical evidence of distal or common canalicular obstruction. Only patients with canalicular obstruction at a distance of at least 7 mm distance from the punctum were offered this treatment. Treatment consisted of DCR and trephination under transnasal endoscopic view followed by topical mitomycin C. The major outcome was defined by the patients' subjective assessment of improvement and by objective evaluation of patency by endoscopic examination of the internal ostium, and the passage of fluorescein to the nose (Jones 1). Results Four patients were symptom free, and Jones 1 positive after a mean follow-up period of 15.4 months. One patient had recurrence of her distal canalicular narrowing and needed a Jones tube. No adverse reactions or complaints were reported during and following mitomycin C use. Conclusions Trephination of distal or common canalicular obstruction under endoscopic vision and adjunctive topical Mitomycin C should be considered as a possible viable approach to an external approach canalicular dacryocystorhinostomy.
these procedures are associated with a relatively low success rate, and numerous complications, which include discomfort, tube extrusion, malposition and obstruction.\textsuperscript{1,2}

Mitomycin-C (MMC) has been used in various ocular and lacrimal surgical procedures to reduce scarring in an attempt to enhance success.\textsuperscript{3,4} We present here a retrospective analysis using the clinical assessment of five consecutive patients with distal canalicular or common CO who underwent endoscopic DCR with trephination, MMC application and Crawford silicone intubation between September 2003 and September 2005 by a single surgeon (GW).

**METHODS**

All patients were diagnosed with epiphora. The lacrimal system was evaluated using the fluorescein dye disappearance test, Jones testing using nasal endoscopy and sac washout. A 2.7 mm 30\degree, rigid nasal endoscope was used in the clinic. CO was diagnosed by “soft stop” on probing, and 100% reflux from the same canaliculus. Informed consent was obtained and the hospital institutional committee approved the protocol. The authors adhered to the tenets of the Helsinki declaration.

Endoscopic DCR is described in detail elsewhere.\textsuperscript{5} After the creation of the nasal mucosal flaps and nasal ostiotomy, the medial wall of the lacrimal sac is opened. Trephination of the stenosed segment using a Sisler lacrimal trephine\textsuperscript{®} (Visitec, Sarasota, FL), is performed under direct endoscopic vision. The opening of the common canaliculus is identified under endoscopic vision once the lacrimal sac has been opened, and its position is verified with the assistance of a dental Burnisher double ended ostium seeker (Hu-Friedy, Chicago, IL). Whilst the trephine is passed from the punctum, the direction of trephination is controlled under nasal endoscopic vision to ensure the trephine exits the natural common canalicular opening (Fig. 1).

Crawford stents are inserted under endoscopic control to ensure exit via the common canaliculus. A 0.03% solution of MMC in a 2 ml syringe with a 26 gauge lacrimal cannula (BD Visitec, New Jersey) is used to irrigate the newly trephined canaliculus via the punctum into the nose, with the stents in place. A Codman\textsuperscript{®} neurosurgical pattie (Johnson & Johnson, Raynham, Massachusetts) is preplaced in the nose to soak up any excess MMC. The conjunctival sac is immediately irrigated with normal saline.

The major outcome was defined as resolution of epiphora, and an anatomically patent lacrimal system with free flow of 2% fluorescein to the nasopharynx (Jones 1), confirmed by endoscopic examination of the internal ostium.

**RESULTS**

Following the operation, four patients remained asymptomatic for an average follow-up period of 15.4 months. (range: 8–19 months) (Table 1). They had a Jones 1 positive test and endoscopically the ostia were open. One patient was symptomatic with a persistent stenosis of the common canaliculus (the endonasal DCR ostium remained widely patent), and her symptoms resolved after placement of a Jones tube. The silicone tubes remained in position for an average period of 8.8 months (range, 6–12 months) before removal. There were no additional operative or
TABLE 1  Details, Diagnosis, Operative and Postoperative Information

<table>
<thead>
<tr>
<th>Patient No.</th>
<th>Age/Gender/Onset of epiphora</th>
<th>Lacrimal Pathology</th>
<th>Operation Type</th>
<th>Time of Stent</th>
<th>Follow-up (months)</th>
<th>Successful result (+/−)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>53/F/10 months</td>
<td>Rt lower CC obstruction</td>
<td>Rt endoscopic DCR with proximal trephination, MMC and SI</td>
<td>12</td>
<td>19/+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>74/F/2 years</td>
<td>Rt and left (7 mm¹) lower distal canalicular obstruction</td>
<td>Rt endoscopic DCR with canalicular trephination, MMC and SI</td>
<td>6</td>
<td>16/+</td>
<td>Thyroid orbitopathy</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>48/F/30 years</td>
<td>Rt complete obstruction of proximal UC, and distal LL obstruction (8 mm¹)</td>
<td>Rt endoscopic DCR with septoplasty, LC trephination, MMC and SI</td>
<td>11</td>
<td>17/+</td>
<td>Epiphora since age 17</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>21/F/5 years</td>
<td>Rt CC obstruction</td>
<td>Rt endoscopic DCR with proximal trephination, MMC and SI</td>
<td>9</td>
<td>17/−</td>
<td>Postop persistent CC stenosis Needed Jones tubes</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>80/F/2 years</td>
<td>Lt distal LL obstruction (8 mm¹)</td>
<td>Lt septoplasty, endoscopic DCR with distal trephination, MMC and SI</td>
<td>6</td>
<td>8/+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Distance from the punctum, Rt- Right, MMC—mitomycin C, SI—Silicone intubation, CC—common canalicular, UC—upper canalicular, LC—lower canalicular.

The main causes of long-term DCR failure are fibrous tissue growth, scarring and granulation tissue formation at the ostiotomy site. The same healing process will also promote flap adhesion, or induce re-obstruction of the common canalculus after trephination. Thus, inhibition of fibrous tissue growth and scarring by applying antifibrotic agents over the canalculus may help to minimize recurrent stenosis of the common canalculus.³

MMC, an antibiotic, antineoplastic agent isolated from Streptomyces caespitosus, decreases fibroblast collagen synthesis by inhibiting the synthesis of DNA, cellular RNA and protein.³ Its effect in glaucoma filtering surgery and pterygium excision has been well established clinically. Its use in DCR may lead to decreased rhinostomy scarring and better long-term patency.³,⁴

Controversy exists regarding the efficacy of adjunctive low-dose MMC during lacrimal surgery for adults with blocked nasolacrimal ducts. However, most of the studies did show better results and improved long-term outcomes of intraoperative MMC application for conventional ³,⁴ and endonasal DCR performed for nasolacrimal duct obstruction.³ MMC over the ostiotomy was effective in maintaining a larger ostiotomy site.⁴
MMC complications reported in glaucoma filtration or pterygium surgery included dry eye, superficial punctate epitheliopathy, punctal stenosis, corneal and scleral melt, maculopathy, wound infection and leak and endophthalmitis. The safety and efficacy of MMC in endonasal endoscopic laser-assisted CDR has been confirmed. Fortunately, in our study, there were no complications such as abnormal nasal bleeding, mucosal necrosis, infection or ocular complications noted with the topical MMC.

In summary, endoscopic DCR with trephination, MMC application and silicone intubation for common and distal canalicular obstruction should be considered as an alternative to an external approach C-DCR. Although this series is small, our success rate in this population is encouraging. Prospective randomized trials with more cases and long term follow up are required to establish the value of this technique in relation to already established procedures.

REFERENCES