An Intravenous Catheter Used as a Lacrimal Trephine

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ABSTRACT

Objective: To describe a surgical technique of using a peripheral intravenous catheter to treat canalicular obstruction.
Methods: A peripheral intravenous catheter was used to treat canalicular obstruction instead of commercial lacrimal trephine. Five patients from January 2009 to March 2010 underwent lacrimal trephination using a 20-gauge intravenous catheter followed by bicanalicular silicone stent intubation.
Results: Of five patients, three patients had common canalicular obstruction; two patients had distal canalicular obstruction, with the obstruction sites 8 and 9 mm from the punctum. Improved epiphora and anatomic patency were achieved in four cases. Minor complications included punctal laceration and a prolapsed stent.
Conclusion: Our technique used an intravenous catheter which is readily available in the operating room and is a safe and effective method to treat canalicular obstruction.

Keywords: Canalicular obstruction, lacrimal trephine, intravenous catheter

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INTRODUCTION

Canalicular obstruction is a major challenge for oculoplastic surgeons. Lacrimal bypass surgery with implantation of a Lester Jones tube with or without dacryocystorhinostomy (DCR) is associated with multiple complications including Jones tube displacement, mucosal overgrowth, diplopia, and granuloma formation at either end of the tube or the surrounding area.[1] Microsurgical canalicular reconstruction or canaliculoplasty developed by A. Reny is used to treat extensive canalicular stenosis; although, the procedure is time consuming and difficult to perform.[2] Sisler and Allarakhia (1990) proposed using a minitrephine for canalicular trephination in which recanalization is performed by removing the obstructive tissue within the canalicular lumen using the commercially available minitrephine.[3]

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We describe a technique of lacrimal trephination using a peripheral intravenous catheter to treat canalicular obstruction.

MATERIALS AND METHODS

A 20-gauge peripheral intravenous catheter assembly was integrated with a blunt soft flexible plastic catheter and an introducer needle with 0.95-mm inner diameter and 32-mm length (Surflo®, Terumo®, Tokyo, Japan). The lacrimal trephination using an intravenous catheter and stent intubation to treat lacrimal obstruction was performed in five patients from January 2009 to March 2010 by the same technique. The medical records of all patients were retrospectively reviewed for age at presentation, gender, laterality, cause, level of obstruction, presence or absence of nasolacrimal duct obstruction and outcome of surgery. Our study and data collection were carried out with approval from the Siriraj Institutional Review Board.

Surgical Technique

Nasal packing was routinely performed using cotton pledgets soaked in a mixture of 4% lidocaine and 3%

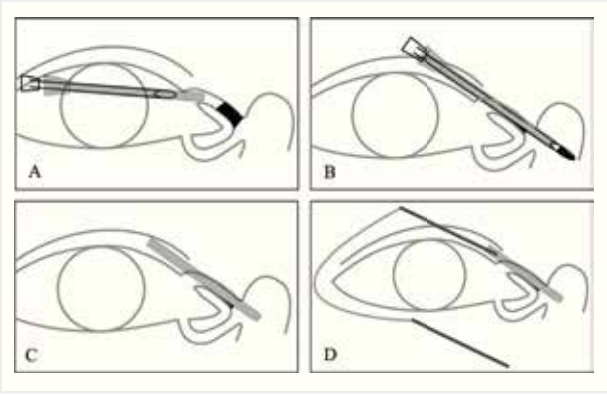

Fig 1A. The sharp needle tip is retracted into the plastic sleeve and the blunt end of the plastic sleeve is introduced into the punctum.
Fig 1B. The introducer needle is advanced through the obstruction site followed by the plastic sleeve.
Fig 1C. The hub of the catheter is cut after the introducer needle is removed.
Fig 1D. A silicone stent is intubated through the sleeve.

ephedrine solution. The surgeries were performed under local or general anesthesia. The level of obstruction was confirmed intraoperatively by measuring the distance from the punctum to the obstruction site on a Bowman probe. Before inserting the catheter into the punctum, the introducer needle was loosened and the sharp tip of the needle was retracted into the plastic sleeve. With the needle tip inside the sleeve, the lubricated blunt soft catheter tip could be inserted into the punctum without traumatizing the canalicular lumen (Fig 1A). After punctal dilation, the blunt end of the plastic sleeve housing the needle was introduced into the punctum and advanced carefully within the canaliculus until a "soft stop" was felt. The introducer needle then was advanced to penetrate the obstruction toward the medial wall of the lacrimal sac (hard stop) followed by the plastic sleeve (Fig 1B). This step must be performed carefully to prevent creating a false passage. Then the introducer needle was removed, and the plastic sleeve was left inside the canaliculus. The hub of the catheter was cut and irrigation could be performed through the cut end of the sleeve to assess the patency of the nasolacrimal duct (Fig 1C). A silicone stent (outer diameter, 0.64 mm) was passed through the sleeve and retrieved through the nasal cavity (Fig 1D). The plastic sleeve was removed by sliding it back through the free end of the stent.

RESULTS

Five patients (4 women; mean age, 48.6 years) with canalicular obstruction underwent lacrimal trephination by our technique (Table 1). The silicone stents were intubated in all patients and were removed at the 6-month follow-up visit. Three of the five cases had common canalicular obstruction, and two had distal canalicular obstruction at 9 mm and 8 mm, respectively. The causes of obstruction were idiopathic in four cases and developed after radiation in one case. Three patients (Patients 1,3 and 5) who had nasolacrimal duct obstruction underwent external DCRs with double-flap anastomosis technique. The mean follow-up time was 10.8 months. Outcomes were measured objectively based on the patency of the canaliculus with probing and irrigation. To assess the subjective outcome, the patients were asked whether the epiphora improved postoperatively. Four patients reported improved epiphora, and the canaliculi were patent after stent removal on irrigation. One patient (Patient 4) did not report improvement and multiple-site obstruction was found post-operatively. Complications included a prolapsed silicone stent and punctal laceration developed in one patient (Patient 5).

DISCUSSION

Sisler and Allarakhia (1990) proposed the use of a minitrephine to treat canalicular obstruction. The scar tissue within the canaliculus is removed by manual rotation of a microtrephine, which is a 21-gauge stainless steel tube with a 0.81-mm outer diameter and a 16-mm shaft

TABLE 1. Causes of canalicular obstruction and treatment outcome

Patient	Age/ Gender	Side	Cause	Level of obstruction	Presence of NLDO*	Outcome of surgery		Follow-up time (months)
						Objective	Subjective	
1	66/F	Right	Idiopathic	Common canaliculus	Yes	Patent	Improved	11
2	43/F	Left	Idiopathic	Lower canaliculus (9 mm)	No	Patent	Improved	15
3	30/M	Right	Idiopathic	Common canaliculus	Yes	Patent	Improved	7
4	50/F	Right	Post- radiation	Common canaliculus	No	Obstruction upper (5 mm) and lower (5 mm)	Not improved	12
5	54/F	Left	Idiopathic	Upper canaliculus (8 mm)	Yes	Patent	Improved	9

*NLDO = Nasolacrimal duct obstruction

length, with a sharpened cutting end. Improved epiphora was observed in four (80%) of five patients who underwent trephination.[3]

In the current report, we have described a technique in which we used a 20-gauge intravenous catheter (0.80 mm) for canalicular trephination. With the sharp end of the needle retracted inside the plastic sleeve, the catheter could be inserted safely into the punctum without traumatizing the canalicular lumen. The introducer needle was used to cut the scar tissue after the blunt end of the plastic sleeve reached the obstruction. A small-caliber bicanalicular stent (0.64 mm) could be passed easily through the plastic sleeve. Khoubian and colleagues (2006) reported the effect of the level of canalicular obstruction using a commercial canalicular trephine (BD Visitec, Franklin Lakes, NJ). The results showed that trephination and stent intubation were effective, particularly in cases with distal obstruction.[4] In the current series, all cases had distal obstruction; four cases with idiopathic obstruction were symptom-free after stent removal and patent with irrigation. However, one case with obstruction after radiation had progressive fibrosis postoperatively. The cause of canalicular obstruction might affect the outcome of trephination. Minor complications included a prolapsed stent and punctal laceration. The limitations of our study were a low prevalence of this condition and a small sample size.

In conclusion, a 20-gauge intravenous catheter, which is readily available in the operating room, may be used as an alternative to treat canalicular obstruction.

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