

Mini-invasive Therapy for Primary Chronic Canaliculitis without Damaging Lacrimal Punctum

Zhenkai Liu¹, Wenhao Jiang², Yingjie Ma³, Wencan Wu³ and Bo Yu³

¹Department of Ophthalmology, Renmin Hospital, Hubei University of Medicine, Shiyan, Hubei, China

²Department of Ophthalmology, The Fourth Affiliated Hospital of Zhejiang University School of Medicine, Yiwu, Zhejiang, China

³Department of Orbital & Oculoplastic Surgery, National Clinical Research Center for Ocular Diseases, Eye Hospital, Wenzhou Medical University, Wenzhou, Zhejiang, China

ABSTRACT

This study aimed to introduce a mini-invasive surgical approach without damaging lacrimal punctum for treating primary chronic canaliculitis (PCC). A retrospective analysis of 35 patients (35 eyes) suffering from PCC were recruited in the study. The surgery method is described briefly below: After making a conjunctival incision about 3-mm in length along the horizontal canaliculus at about 3-mm to the nasal of punctum, a curette of 2-mm diameter was used to evacuate the concretions through the incision of canaliculus. After evacuating all concretions, a silicon tube was inserted into the lacrimal duct through canaliculus to nasal cavity. With a follow-up of 12 months, all patients had resolution of symptoms of inflammation and no recurrent case was found. The anatomical success was achieved in 34 cases (97.1%). The functional success was achieved in 32 cases (91.4%).

Key Words: Primary chronic canaliculitis, Mini-invasive, Silicone tube.

How to cite this article: Liu Z, Jiang W, Ma Y, Wu W, Yu B. Mini-invasive Therapy for Primary Chronic Canaliculitis without Damaging Lacrimal Punctum. *J Coll Physicians Surg Pak* 2023; **33(06)**:702-704.

Primary chronic canaliculitis (PCC) is an uncommon infection lacrimal disease which takes up 2-4% of lacrimal diseases. It is characterised by redness, punctal or canalicular oedema, as well as purulent discharge from the punctum under pressure. Canaliculitis is usually coupled with canalicular concretions. Concretions occur possibly due to the higher recurrent rate and conservative therapy failure using topical or systemic antibiotics in canaliculitis patient. Thus, the surgical procedure was necessary for these patients to remove these concretions. Canaliculotomy is considered as the optimal standard in surgical treatment.¹ Nevertheless, canaliculotomy, as an invasive procedure, destroys the normal anatomical structure of the canaliculus and punctum and carries a higher risk for lacrimal pump dysfunction, canalicular obstruction, as well as epiphora in 20-25% of patients postoperatively.^{2,3} Thus a modified surgery technique which can completely remove all the concretions in the canaliculi and minimally affecting the tear drainage function of the canaliculi is needed. In this study, the authors introduce a mini-invasive surgical approach that does not damage punctum for treating PCC.

A retrospective analysis of 35 patients (35 eyes) presented as PCC were referred to the Department of Orbital and Oculoplastic Surgery, Eye Hospital of Wenzhou Medical University during June 1st, 2014 and July 30th 2019. The patients included 9 males and 26 females, with an average age of 49.0±12.92 years. Five of them were superior canaliculitis while others were inferior ones, sixteen of them affected left eyes. The study obtained ethical approval from the Institutional Review Board and the informed consent of all subjects.

A single surgeon (Dr. BY) took charge of all procedures. After local anaesthesia, punctum was squeezed to confirm the diagnosis. The affected punctum was dilated with a punctum dilator. Then a lacrimal passage probe was inserted into the horizontal canalicular and the length was about 6 mm. A vertical conjunctival incision was made to the horizontal canalicular at about 3mm to the nasal of punctum, and then a 3-mm long horizontal incision was made along the eyelid margin for opening the canaliculus guided by the probe (Figure 1A). A curette of small size (2-mm) was used to evacuate the concretions through the two sides of the incision (Figure 1B). A silicon tube was inserted into the lacrimal duct through canaliculus to the nasal cavity (Figure 1C). 8-0 vicryl was used to repair the incision with one stitch.

Follow-up time points were set in 1 week, 4 weeks and 2, 3, 6, 12 months of post-operation, followed by once a year. The skin stitch was removed on day 7 after surgery. The surgeon removed the silicon tube about 2 months after surgery. Failure of the surgery was labelled when the mucopurulent punctal regurgitation or concretions extruding was not improved,

Correspondence to: Dr. Bo Yu, Department of Orbital and Oculoplastic Surgery, National Clinical Research Center for Ocular Diseases, Eye Hospital, Wenzhou Medical University, Wenzhou, Zhejiang, China
E-mail: yubo312@126.com

Received: August 24, 2022; Revised: January 04, 2023;
Accepted: January 09, 2023
DOI: <https://doi.org/10.29271/jcpsp.2023.06.702>

and/or the lacrimal system could not be irrigated. Success of the surgery was defined anatomical and punctum irrigation could be achieved through the lacrimal system and functional success *i.e.* no epiphora or purulent discharge from the punctum after surgery and flowing irrigation could not be achieved through the lacrimal system respectively.

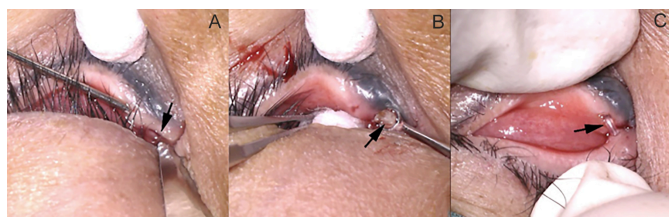


Figure 1: The surgical procedure. (A) After making the conjunctival incision was made vertically to the horizontal canalicular at about 3mm to the nasal of punctum, a horizontal incision, being 3mm in length, was made along the eyelid margin to open the canaliculus under the guide of the probe. **(B)** A curette of small size was used to evacuate the concretions through the incision of canaliculus. **(C)** A silicon tube was inserted into the lacrimal dust through canaliculus to nasal cavity.

A minimum follow-up of 12 months was required after surgery. Anatomical success was found in 34 cases (97.1%) according to the setting criteria and no recurrent case was found. Functional success was achieved in 32 cases (91.4%). One case was found to have canalicular obstruction 1 month after the silicone tube removal so that failed to achieve anatomical and functional success. Two cases failed to achieve functional success who had recurrent postoperative epiphora occasionally with unobstructed lacrimal irrigation.

The treatment of PCC is still controversial. Since the obstruction created by canalicular dacryoliths could impair tear drainage meanwhile hindering the treatment penetration, recurrences are common after conservative treatment using topical and systemic antibiotics.⁴ Surgical procedure was considered to be necessary to treat this disease. Researches have confirmed canaliculotomy as a safe and effective therapeutic schedule and the resolution rate reaches about 80%. However since punctum was cut along the posterior wall during the surgical procedure, canalicular lumen scarring and narrowing, lacrimal pump dysfunction, as well as canalicular fistulas would occur after surgery.^{3,5}

In order to minimise the risks above, several modifications were made during the surgical procedure. In order to preserve lacrimal pump function, instead of traditional opening the canalicular by cutting the punctum, the authors made a vertical conjunctival incision to the horizontal canalicular at about 3 mm to the nasal of punctum. Then a horizontal incision, being 3-mm in length, was made along the eyelid margin to open the canaliculus. A small-size curette of 2-mm diameter was used to scrape off the concretions from the incision. In order to remove the concretions completely, excochleation was performed from two different directions (incision to punctum and incision to lacrimal dust). This procedure could minimise the recurrence by complete removal of concretions. A silicon tube was inserted

into the lacrimal duct through canaliculus to nasal cavity to prevent narrowing and scarring of the canalicular.

The location of the incision was chosen about 3 mm nasal to the canalicular because: Being too close to the punctum may lead to punctum and proximal lacrimal duct tear after silicone tube intubation. Being too close to the inner canthus (far from punctum) may add to the difficulty of the surgical procedure because epicanthus in oriental obstructs the surgical view.

With a minimum follow-up of 12 months, anatomical success was achieved in 97.1% cases, functional success was achieved in 91.4% of patients. Only one case with the canalicular obstruction about 3 months post-operation (1 month after tube removal) failed to achieve anatomical and functional success. It was a 56-year woman with normal eyelid position and normal punctum but with a history of repeated canalicular squeezing before surgery. This repeated squeezing may injure canalicular lining, finally causing scarring. This scarring maybe the reason of the failure of surgery. Another two cases had recurrent epiphora occasionally with unobstructed lacrimal irrigation. One of them was found slight laceration of the inferior punctum after surgery. This enlarged punctum may impair the function of lacrimal pump which may related with the failure of functional success. No abnormal finding was observed in the other patient.

Nevertheless, limitations existed in this paper. The small sample size limited the result generalisation. Large-sampled controlled prospective research with traditional canaliculotomy are needed to further prove the effectiveness and safety of this new surgical procedure for PCC.

ETHICAL APPROVAL:

This study was approved by the Ethics Committee of The Eye Hospital of Wenzhou Medical University (2019-212-K-189).

PATIENTS' CONSENT:

Because this study was retrospective, the condition of patients' consent was waived.

COMPETING INTEREST:

The authors declared no competing interest.

AUTHORS' CONTRIBUTION:

ZL, WJ: Data sorting and analysis work, writing original draft, and revising the manuscript.

YM, WW: Design of the article, collecting clinical data, and further revision.

BY: Topic selection, design of the article, collecting clinical data, and writing the manuscript.

All the authors have read and approved the final version of the manuscript.

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