A treatment method for chronic suppurative lacrimal canaliculitis using chalazion forceps

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Purpose: The purpose of this study is to evaluate the effectiveness of chronic suppurative lacrimal canaliculitis treatment using chalazion forceps. **Patients and Methods:** A prospective study was performed on consecutive patients who accepted the aid of chalazion forceps to treat chronic suppurative lacrimal canaliculitis. Two different treatment methods using chalazion forceps were performed according to the degree of lacrimal canaliculitis. Postoperatively, the patients received 0.5% levofloxacin eye drops four times per day and 0.5 g oral levofloxacin tablets once per day for 4 days. The follow-up period was more than 3 months. Lacrimal irrigation, the condition of the lacrimal punctum, and patients' symptoms were carefully evaluated. **Results:** In total, 32 patients met the criteria for chronic suppurative lacrimal canaliculitis. Included were 6 males and 26 females. Their average age was 51.7 ± 14.9 years (range; 19–80 years), and all had unilateral canaliculitis. The mean duration of the symptoms was 18.9 ± 9.8 months (range; 3–48 months). The mean follow-up time was 14.7 ± 7.8 months. The signs and symptoms resolved completely in all patients within 15 days, and no recurrence was observed. No patients reported epiphora after the treatment. **Conclusions:** The use of chalazion forceps is effective in treating chronic suppurative lacrimal canaliculitis. The forceps may offer an alternative treatment technology in the management of suppurative lacrimal canaliculitis.

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Chronic suppurative lacrimal canaliculitis is a chronic infection of the canaliculi and leads to pain, punctal pus, canaliculi swelling, epiphora, and recurrent conjunctivitis.[1-3] Treatment with topical or systemic antibiotics and intracanalicular antibiotic irrigation is often inadequate.[1] Different surgical techniques have been reported, and the most widely accepted surgical approach is canalicular curettage and/or canaliculotomy.[1,4] The removal of sulfur granules and canalicular content is the key to curing canaliculitis.[1,5] However, canalicular curettage and/or canaliculotomy in the management of chronic canaliculitis have the potential to cause canalicular obstruction or dysfunction and epiphora in 20–25% of patients.[1,6,7] Even more serious, Hatton and Durand reported a case of orbital cellulitis with abscess formation after the surgical management of canaliculitis.[8]

Basic principles in the treatment of suppurative lacrimal canaliculitis may include complete removal of concretions, controlling the infection, and maintaining the drainage of lacrimal canalicular. In recent years, some incision-sparing techniques have been reported in the treatment of canaliculitis. Lee *et al*.[9] performed canalicular curettage through the punctum to avoid disrupting the anatomical structure of the canaliculus with a success rate of 83.3%. However, this technique was used in few patients and is not suitable for all patients. Buttanri *et al*.[10] reported on nine canaliculitis patients treated using the incision-sparing technique with excellent results. However, the indications for the technique were poorly defined and nonspecific. Our previous study suggests the insertion of a Crawford tube may offer an alternative to surgery in the management of suppurative lacrimal canaliculitis.[11] It is difficult to choose appropriate treatment methods in clinical settings without canalicular endoscopy.

The results of using chalazion forceps, which includes compression of the canaliculus to express the sulfur granules, curettage, and irrigation of the canaliculus with antibiotic solutions, and the use of the forceps in combination with lacrimal intubation are reported.

Patients and Methods

This study was a prospective study of the patients with lacrimal canaliculitis managed at our hospital from January 2013 to January 2015. Diagnostic criteria were the presence of mucopurulent punctal discharge, a pouting punctum, eyelid thickening, and canalicular erythema. Only those patients with proven chronic canaliculitis lasting more than 3 months were included in the study. All patients in this study accepted conservative therapy at least 3 months before Crawford tube insertion. The course of disease and the history of previous treatment are shown in Table 1. This study was approved by

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Table 1: Profile of patients with suppurative lacrimal canaliculitis

Variable	All data
Patients	32
Age (mean±SD, years)	51.7±14.9 (19-80)
Gender (M/F)	6/26
Onset position (upper/lower)	8/25
Course of disease (months)	18.9±9.8 (3-48)
Treatment	
Simple compression	14
Compression combined lacrimal intubation	18
Follow-up time (mean±SD, months)	14.7±7.8
Time to tube removal (months)	4.1±1.8 (3-6)

the Ethics Committee of Second Affiliated Hospital of Zhejiang University School of Medicine and complied with the tenets of the Declaration of Helsinki. Informed consent was obtained from all patients after they received an explanation of the nature and possible consequences of the procedures.

All surgical procedures were performed by a single experienced specialist lacrimal surgeon. The first step involved instilling one drop of a sterile 0.4% oxybuprocaine hydrochloride (Santen Pharmaceutical Co., Ltd., Osaka, Japan) eye drop as a local anesthetic. Next, the medial lower or upper eyelid was infiltrated with up to 1 ml of 2% lidocaine with 1:200,000 adrenalin. Diagnosis was confirmed with the expression of the sulfur granules and punctal discharge in the operation theater.

Next, the punctum of the affected canaliculus was dilated under local anesthesia. The ring diameter of the chalazion forceps was determined according to the amount of eyelid swelling. Two different treatment methods using chalazion forceps were performed according to the degree of lacrimal canaliculitis.

1. Simple compression [Fig. 1]. This group included the following patients: (i) The patients who received irrigation and had no reflux from the opposite canaliculus or punctum; (ii) the patients who suffered from canaliculitis because of previous punctal plug insertion. Starting just distal to the common canaliculus, treatment involved compression of the horizontal canaliculus along its entire length using chalazion forceps. Compression was repeated until no more sulfur granules appeared and the swelling of the canaliculus disappeared. A small-size chalazion curette was inserted into the canaliculus to evacuate any residual concretions
2. Compression combined with lacrimal intubation [Fig. 2]. This group included the patients who received irrigation due to a suspected lacrimal duct obstruction. Based on the simple compression, a management plan of lacrimal intubation using a silicone Crawford tube (Bausch and Lomb-Freda, Jinan, China) was devised. The inferior nasal meatus was treated with a pledget soaked in a solution of 0.4% oxybuprocaine hydrochloride (Santen Pharmaceutical Co., Ltd., Osaka, Japan) and 1% ephedrine hydrochloride. A Crawford silicone tube was passed from both the lower and upper puncta to the nasolacrimal duct and out the nose [Fig. 2d and e]. The two ends were tied beside the nose, the excess tube was cut-off, and the endpoint was left in the inferior nasal meatus for 3–6 months.

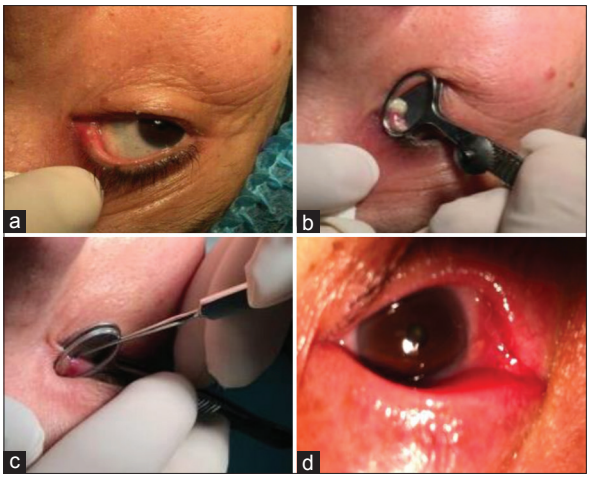

Figure 1: The procedures of simple compression. (a) Clinical signs: The lacrimal canaliculitis close to the punctum with previous punctal plug insertion; (b) using a chalazion forceps compressed along the entire length of the horizontal canaliculus to eliminate the sulfur granules from the canaliculus; (c) a small-size chalazion curette was inserted into the canaliculus to evacuate any residual concretions; (d) postoperative signs: The swelling of the punctum disappeared

Postoperatively, the patients received 0.5% levofloxacin eye drops (Santen Pharmaceutical Co., Ltd., Osaka, Japan) four times per day and 0.5 g oral levofloxacin tablets (Daiichi Pharmaceutical Co., Ltd., Tokyo, Japan) once per day for 4 days. Follow-ups occurred at day 1, week 1, month 1, month 3, and month 6. Follow-up continued for more than 3 months after removal of the Crawford tube.

Results

Patient details are summarized in Table 1. All patients had unilateral single canaliculus involvement. The lower canaliculus was more commonly involved than the upper canaliculus. Epiphora, discharge, irritation and recurrent or chronic conjunctivitis were common symptoms. All patients had symptoms for more than 3 months (18.9 ± 9.8 months, range; 3–48 months). All patients had a pouting punctum and erythema, as well as thickening of the medial eyelid. Seven patients had punctal regurgitation, which might have been induced by pressure over the involved canaliculus.

Fourteen patients received simple compression treatment, three of which had a history of punctal plug insertion. Five patients reported eyelid edema on the 1st day after the treatment. The signs and symptoms resolved completely in all patients within 15 days, and recurrence was not observed in any patient. We did not observe any complications, and no patients reported epiphora after the procedure.

Eighteen patients received compression combined with lacrimal intubation, one of whom had canaliculitis involving both the upper and lower canaliculus. No patient suffered from epiphora after the insertion of the Crawford tube. The Crawford tube was placed 3–6 months after the operation (mean: 4.1 ± 1.8 months). The mean follow-up time was 14.7 ± 7.8 months. At the last follow-up, all patients were

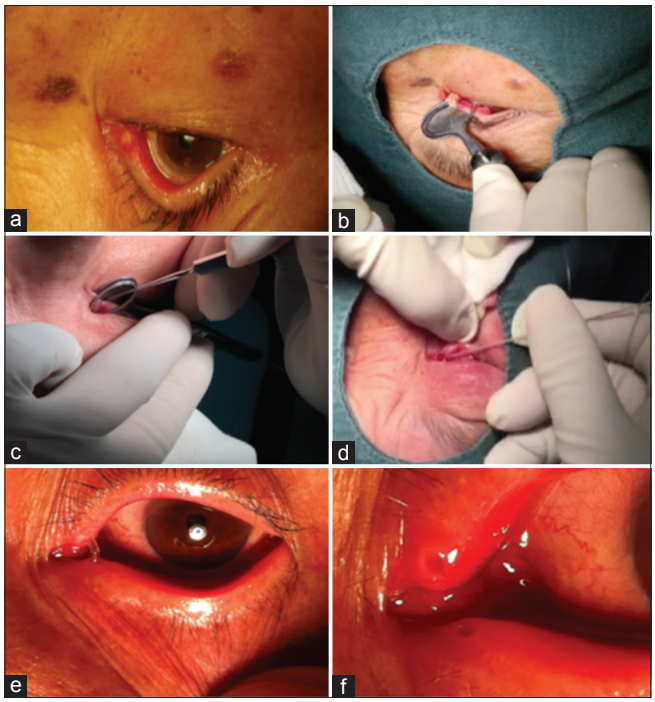

Figure 2: The compression combined with lacrimal intubation. (a) Clinical signs: Lacrimal canaliculitis with suspected lacrimal duct obstruction; (b and c) use of a chalazion forceps and a small-size chalazion curette to completely remove the granules; (d and e) a Crawford silicone tube was passed from both the lower and upper punctum to the nasolacrimal duct and out the nose; (f) postoperative signs: The swelling of the canaliculus disappeared and the punctums dilated

symptom-free with complete resolution, and none needed canalicular curettage or a canaliculotomy. One patient suffered punctum granulation combined with punctum dehiscence [Fig. 3] and was cured after subsequently undergoing granulation excision.

Discussion

Lacrimal canaliculi results from a suppurative infection or from nonsuppurative causes, including a variety of viral infections.[12,13] During canaliculitis, the accumulation of actinomyces species aggregated filamentous bacteria, and debris leads to the formation of sulfur granules in the dilated canaliculus. Canaliculitis is apt to persist or recur without complete removal of these granules, and antibiotics alone are insufficient to eradicate the source.[1,4] The challenges in treating chronic suppurative lacrimal canaliculitis are well known, including a poor response to topical antibiotic therapy.[14] Surgical intervention by means of a canaliculotomy and curettage is one way of removing the sulfur granules and is considered the gold standard of canaliculitis treatment.[15] However, a punctoplasty with canalicular curettage has the potential to cause damage and scarring of the lacrimal drainage system. These modalities may also lead to stenosis of the lacrimal canalicular and even orbital cellulitis. Constant efforts have been made in the past to obviate the need for surgery by intracanalicular delivery of fortified antibiotics or by performing less invasive surgical procedures to spare the punctum.

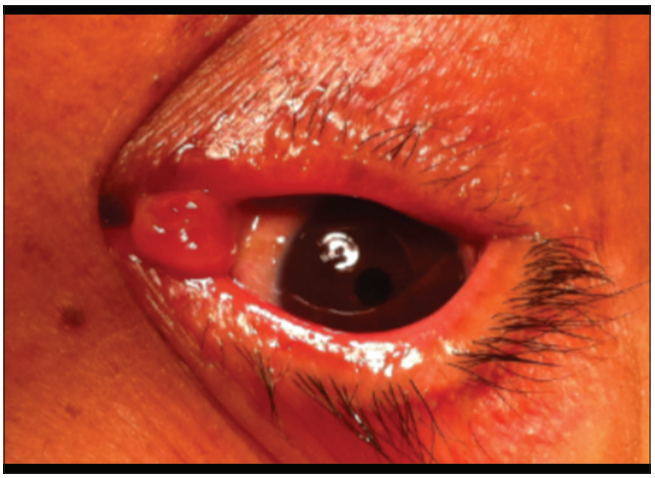

Figure 3: Punctum granulation and punctum dehiscence

In this study, we used the chalazion forceps alone or in combination with lacrimal intubation to treat the chronic suppurative lacrimal canaliculitis. Two different treatment methods were performed according to the degree of lacrimal canaliculitis. Those patients who received irrigation and had no reflux from the opposite canaliculus or punctum and those who suffered from canaliculitis because of previous punctal plug insertion received compression alone. The canaliculus was compressed along the entire length of the horizontal side from the proximal to the distal region with chalazion forceps. Compression was repeated to completely clear the sulfur granules. For those patients who received irrigation and were suspected of having a lacrimal duct obstruction, we performed compression and lacrimal intubation. After complete elimination of the sulfur granules and canalicular content, a Crawford tube was inserted to clear away pus, eliminate the abscess cavity by filling up the lacrimal canalicular and maintain the drainage of the lacrimal canalicular. Our results showed the signs and symptoms resolved completely in all patients within 15 days, and recurrence was not observed in any of the patients. This demonstrates that the use of chalazion forceps is effective in the treatment of chronic suppurative lacrimal canaliculitis.

The plug insertions in the canaliculus may also aggregate filamentous bacteria and debris, leading to sulfur granule formation and the risk of canaliculitis.[16-18] The risk of canaliculitis may gradually increase following the increasing use of intracanalicular plug insertions to treat dry eyes. In this study, three patients suffered from canaliculitis because of previous smart plug insertions. Previous studies also illustrate that irrigation is not always effective in removing these intracanalicular plugs.[16,17] In this study, the canaliculus was compressed along its horizontal side from the proximal to the distal region with chalazion forceps. The plugs can be pushed out easily without further damage to the canaliculus. This study may offer an alternative to surgery in the management of suppurative lacrimal canaliculitis caused by intracanalicular plugs.

Our previous study suggests that the Crawford tube may help to ensure long-term success in treating chronic suppurative lacrimal canaliculitis.[11] However, simply

employing Crawford tube insertion alone cannot eliminate the sulfur granules and canalicular content completely. In this study, patients with suspected lacrimal duct obstruction received compression combined with lacrimal intubation. After complete elimination of the sulfur granules and canalicular content, Crawford tube insertion was performed to clear away pus, eliminate the abscess cavity by filling up the lacrimal canalicular and maintain the drainage of the lacrimal canalicular in combination with topical and oral antibiotic therapies to control the infection, yielding excellent results. The key to successful treatment may relate to eliminating the sulfur granules and canalicular content, the Crawford tube filling up the lacrimal canalicular, and the tube helping to clear away pus and the possible canalicular remains. Our treatments essentially corrected the nondrainage or poor drainage of tears by eliminating the sulfur granules and canalicular content, breaking the vicious cycle of poor drainage, infection, hypoxia, and poor drug penetration. The constant drainage of tears makes the environment rich in oxygen, and the oxygen dissolved in the tears helps clear the infection.[19] This also results in an adequate concentration of topical antibiotics reaching the site of infection. This treatment has the advantage of eliminating the risk of iatrogenic canalicular scarring and preserving lacrimal pump function.

The technique of using the chalazion forceps in managing chronic suppurative lacrimal canaliculitis is quick, relatively painless, noninvasive, and generally without significant risk to the patient. In this study, one patient suffered punctum dehiscence and no other serious complications, such as persistent corneal erosion, bacterial keratitis, or lid infection were found.

Conclusions

The use of chalazion forceps may offer an alternative treatment technology in the management of suppurative lacrimal canaliculitis.

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Conflicts of interest

There are no conflicts of interest.

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