

Management of Acute Bilateral Canaliculitis

Jamel Vaughn*

Optometrist at Ginter Eyecare Center, United States

*Corresponding Author: Jamel Vaughn, Optometrist at Ginter Eyecare Center, United States.

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Abstract

Lacrimal canaliculitis is a condition which affects the lacrimal drainage system and often causes pouting of the punctum, nasal conjunctivitis, swelling of the canaliculus, injection limited to the nasal aspect of the eyelid, and mucopurulent discharge expressed from the punctum. *Actinomyces israelii*, *Streptococcus*, *Staphylococcus* and other anaerobe or facultative anaerobe bacterial species are often the cause of inflammation within the canaliculus. This condition can be managed with conservative treatment such as topical and oral antibiotics, digital massage and warm compresses. Dilation and irrigation of the lacrimal drainage system is also considered to eliminate any remaining bacteria. In more advanced cases a number of surgical procedures can be performed such as canaliculotomy, punctoplasty, and curettage of canaliculus concretions. Finally, microbe culturing of discharge expressed through the punctum is a very effective course of action in the treatment and management of these patients.

Keywords: *Lacrimal Canaliculitis; Canaliculus; Actinomyces israelii; Punctum; Streptococcus; Staphylococcus; Anaerobe; Facultative Anaerobe; Canaliculotomy; Punctoplasty; Curettage*

Introduction

Lacrimal canaliculitis is a condition that disrupts the lacrimal drainage system due to inflammation of the canaliculus [1,2]. Frequently this condition is caused by an infection involving *Actinomyces israelii* but can also be attributed to other bacterial species such as *Staphylococcus*, *Streptococcus* and other anaerobes or facultative anaerobes [1,3,4]. Secondary causes, some of which can occur proximally or distally include punctal stenosis, nasolacrimal duct obstructions and complications involving the use of punctal plugs [1,4-7]. Clinical signs include mucopurulent discharge or concretions expressed from the punctum, injection localized to the nasal aspect of the eyelid, swelling of the canaliculus, pouting of the punctum, and conjunctivitis restricted to the nasal palpebral and bulbar conjunctiva [2,5]. Patients often report symptoms of tenderness limited to the nasal aspect of the eyelid, eyelid redness, mucus discharge, and a red, irritated eye [2]. Utilizing the slit lamp; the anterior segment is evaluated for signs of conjunctivitis and punctum discharge with applied pressure [2].

Management of canaliculitis usually starts with conservative measures such as topical and oral antibiotics, digital massage, and warm compresses [1,2,4,5]. During the initial office visit pressure is applied to the lacrimal canaliculus in order to remove obstructing concretions or discharge within the lacrimal drainage system [1,2]. Furthermore, dilation and irrigation with either saline solution or antibiotic solution and microbe culturing of discharge expressed through the punctum should be considered [1,2,4]. In certain cases surgical treatment is utilized to remove concretions that allow bacteria to remain within the canaliculus [1,8-10]. Commonly performed procedures include punctum dilation and curettage of the concretions, punctoplasty, and canaliculotomy [4,8-10].

Case Report

A 33 year old Caucasian female presented to our clinic with a chief complaint of eyelid soreness in the corner of each eye which started the day before. The patient reported that the lower eyelid in each eye had developed redness, tenderness, discomfort, and the area around the tear duct had become swollen which seemed worse in the right eye. There was no discharge reported recently although the patient voiced that there may have been discharge at one point or another. There was no reported illness but the patient described a similar event, which occurred about 2 years prior; other ocular history was unremarkable. The patients' medical history included migraine headaches and colitis. She had no known animal or environmental allergies, but did have a drug allergy to clindamycin and penicillin. Her medications included Topamax, which were for the migraines headaches experienced. Family history reported was unremarkable, and the patient worked as a business manager.

Presenting corrected visual acuities were 20/25 and 20/20 in the right and left eye respectively. Confrontation fields were normal in all quadrants OU and extraocular muscle motility and versions were full. External exam revealed pupils equal, round, and reactive to light OU; facial symmetry; and swelling of the lower nasal aspect of the eyelid was noted in each eye. Pressure was applied to the affected area along the eyelid in each eye using a sterile cotton tip applicator to evaluate for any discharge as well as tenderness. Additionally, sodium fluorescein was instilled using a 1 mg strip to evaluate for any corneal or conjunctiva involvement. Slit-lamp exam revealed moderate injection along the eyelid near the lower punctum and canaliculus OU, eyelid swelling OU, localized tenderness with palpation OU, and a crusted mucus appearance around each lower punctum with no discharge noted after applying pressure. Further slit-lamp findings included clear and intact cornea noted OU; normal superficial tear film qualities OU; quiet bulbar conjunctiva; scattered papillae noted in the lower tarsal palpebral conjunctiva OU; anterior chamber clear without cells or flare OU; Irises were flat and blue OU; and intraocular lenses were clear OU. Posterior segment findings using a 78D lens with slit-lamp were unremarkable, clear vitreous body OU; well perfused optic nerve head exhibiting good rim tissue OU; normal retinal vessels OU; and flat/even macula OU.

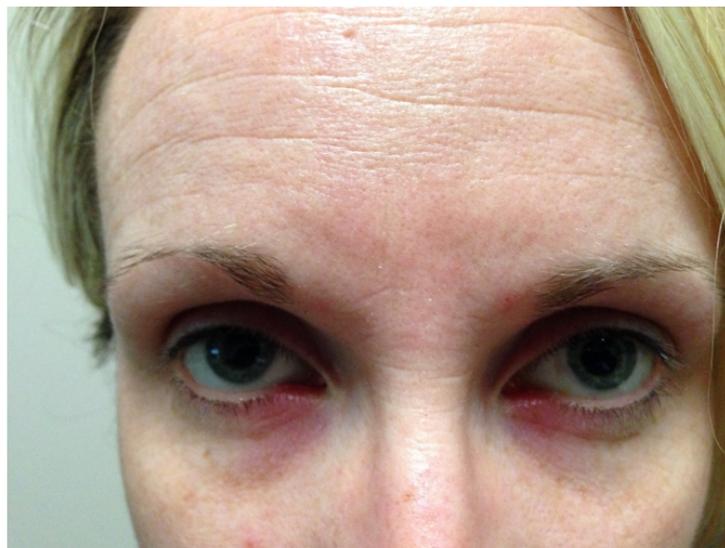


Figure 1: Patient presentation at initial office visit.

The differential diagnosis that could be considered in this case include: Dacryocystitis, Chalazion, Nasolacrimal duct obstruction, Hordeolum.

- Dacryocystitis usually presents with an increased amount of swelling along the lacrimal sac and increased tenderness around the lower nasal aspect of the eyelid. Often times the patient will present to the office with a fever as well.
- A chalazion will present as a palpable firm nodule, which can occur anywhere along the eyelid. This condition causes tenderness with applied pressure and involves the meibomian glands within the eyelid.
- Nasolacrimal duct obstructions commonly present with insignificant conjunctival injection and increased tearing. Generally there will be no tenderness reported around the medial canthus. Nasolacrimal duct obstructions often occur congenitally and within the first 2 months of life.
- A hordeolum is an acute infection internally within the meibomian gland or externally within the glands of Zeis. This condition causes swelling of the affected area along the eyelid.

There was no significant swelling noted along the lacrimal sac and the patient denied any recent illness. There was no observed meibomian gland involvement creating a nodule, nor was there an abscess palpated along the external eyelid or internally within the meibomian glands. Furthermore, the patient was diagnosed with canaliculitis of the lower canaliculus in each eye given the mucus noted around the puncta, tenderness along the medial canthus, eyelid erythema and lower tarsal conjunctival involvement. Using a sterile cotton tip applicator, pressure was applied to each canaliculus to express any remaining bacterial secretions. The patient was prescribed 100 mg of doxycycline to be taken by mouth two times a day for ten days. One drop of Besivance (besifloxacin 0.6%) was instilled in office and the patient was instructed to use the drop three times a day in each eye for one week. Moreover, it was advised to do warm compresses four times a day on each eye. The patient was instructed to return to the office in one week for follow up and was advised to report if symptoms did not improve.

Follow up

The patient returned to the office 1 week later for follow up and reported an improvement in redness, tenderness, and discomfort. The patient also reported taking the oral medications as prescribed. Her corrected visual acuity was 20/25 OD and 20/20 OS. Confrontation fields were normal in all quadrants OU and extraocular muscle motility and versions were full OU. External exam revealed pupils equal, round, and reactive to light OU; and eyelids were clean and free of defects OU. Slit-lamp exam revealed improved injection along the eyelid near the lower punctum and canaliculus OU, no eyelid swelling or localized tenderness with palpation OU, and no discharge noted with applied pressure using a sterile cotton tip applicator OU; clear and intact corneas were noted OU; normal superficial tear film qualities OU; quiet bulbar conjunctiva OU; trace scattered papillae noted in the lower tarsal palpebral conjunctiva evaluated with sodium fluorescein which was instilled using a 1mg strip OU; anterior chambers were clear without cells or flare OU; Irises were flat and blue OU; and lenses were clear and normal for her age. Posterior segment findings using a 78D lens with slit-lamp remained unremarkable, clear vitreous body OU; well perfused nerve head exhibiting good rim tissue OU; normal retinal vessels; and flat and even macula OU.



Figure 2: Patient presentation at one week follow up office visit.

The patient ultimately responded well to treatment and was instructed to continue taking 100 mg of doxycycline by mouth two times a day for the remainder of the ten day treatment regimen. Additionally, the patient was advised to continue warm compresses four times a day for an additional four days and Besivance (besifloxacin 0.6%) ophthalmic drops were discontinued. Finally, the patient was advised to contact the office immediately if symptoms returned and education was provided regarding the possibility of dilation and irrigation in the future.

Discussion

Lacrimal canaliculitis or inflammation of the canaliculus is a condition that disturbs the lacrimal drainage system [1,2]. According to recent studies, lacrimal canaliculitis is one of the most misdiagnosed diseases [1]. Often times this condition will cause chronic or recurrent conjunctivitis, most likely from infectious discharge expressed through the punctum [3]. Commonly the inflammation observed is caused by a bacterial infection involving *Actinomyces israelii*, but can also be attributed to other bacterial species such as *Staphylococcus* and *Streptococcus* [1,4]. Moreover, anaerobes and facultative anaerobes account for a large percentage of bacterial species involved in this condition [1,4]. Although a bacterial culture was not performed in the discussed patient, staphylococcus was believed to be most likely attributed to her condition.

Clinical biomicroscopic signs include mucopurulent discharge or concretions expressed from the punctum, injection or erythema localized to the nasal aspect of the eyelid, swelling of the canaliculus, pouting of the punctum, and conjunctivitis restricted to the nasal palpebral and bulbar conjunctiva [2,5]. In a recent study it was found that about 30 percent of patients with lacrimal canaliculitis presented with multiple canaliculi involvement [4]. The lower canaliculus in each eye was affected in the discussed patient. Furthermore, at presentation the patient may complain of tenderness limited to the nasal aspect of the eyelid, eyelid redness, mucus discharge, and a red, irritated eye [2]. Eyelid tenderness, eyelid redness and mild irritation were all reported in the discussed patient.

The lacrimal canaliculus consist of a 2 mm vertical portion and an 8 mm horizontal portion linked by a slight dilation known as the ampulla [1,5,6]. Additionally, the superior and inferior canaliculus form a common connection to the nasolacrimal sac [1,5,6]. Moreover, the canaliculus is made up of elastic tissue and bordered by orbicularis muscle fibers [6]. Infections involving *Actinomyces Israelii*, *Streptococcus* and *Staphylococcus* species, fungal, viral and other bacterial anaerobes within the lacrimal drainage system have all been found to cause this condition [2,4,5]. Furthermore, secondary causes such as punctal stenosis, nasolacrimal duct obstructions along with complications of punctal plug insertion have been found to encourage anaerobe bacterial growth [1,4,5,7].

Studies have shown that women are affected by lacrimal canaliculitis about five times more than males. Additionally, there have been no reported racial or ethnic background association [1,4]. The mean affected age calculated by a recent study was 59 years of age, but the condition has been reported in a large range of ages [1]. Due to the fact that the condition is underreported and often misdiagnosed, there is enormous difficulty in obtaining information regarding prevalence [1].

Detailed case history should be taken regarding prior occurrence of similar symptoms, any discharge noted from the tear duct, eyelid tenderness, or eye irritation recognized [1,2]. The patient is evaluated using slit-lamp examination; utilizing a sterile cotton tip applicator, pressure is applied to the lacrimal sac and moved towards the punctum while evaluating for discharge [2]. Moreover, sodium fluorescein was also used to assess any signs of conjunctivitis in the discussed patient. Additionally, microbe culturing of discharge expressed through the punctum should be considered if the practicing professional has the capabilities of doing so [1,2,4]. If in fact culturing of punctum discharge is performed; urgent collection and transportation to the lab is imperative to render improved results as delayed collection and handling can have an undesirable effect [1]. Unfortunately, culturing was not performed during the discussed case.

Differential diagnoses of canaliculitis are those that either affect the lacrimal drainage system distally, or those that share the same appearance but are discovered in different regions of the eyelid. Dacryocystitis, chalazions, hordeolums, and nasolacrimal duct obstructions

could all be considered as differential diagnoses [1,2,5]. Careful examination of the involved area along the eyelid is essential when ruling out chalazions, internal hordeolums, and external hordeolums [2]. In the event of a chalazion or hordeolum a characteristic palpable nodule is located along the eyelid, but usually does not occur with discharge or involve the punctum in any way [2]. Furthermore, nasolacrimal duct obstructions often lead to inflammation within the lacrimal drainage system along with symptoms very similar to canaliculitis [2]. Often times nasolacrimal duct obstructions are a result of progressive nasolacrimal stenosis or congenital findings seen in the first 2 months of a child's life [2]. Typically, this condition does not occur with tenderness or erythema along the nasal aspect of the eyelid [2]. A deeper infection may occur although rare, such as preseptal cellulitis or dacryocystitis [2]. Moreover, dacryocystitis involves the distal end of the lacrimal drainage system resulting in swelling and inflammation of the lacrimal sac [2,5]. The affected area in this case exhibits more swelling, tenderness, and pain when compared to canaliculitis [2,5].

Management of canaliculitis customarily begins with conservative therapy such as topical and oral antibiotics, digital massage, and warm compresses [1,2,4,5]. Before any topical or systemic medications are prescribed, pressure is applied to the lacrimal canaliculus allowing for the removal of obstructing concretions or discharge through the punctum [1,2]. In rare cases involving causative fungal infections; antifungal drops and antifungal solution irrigation are used in the care of the patient [2]. Additionally, in causative viral infections involving the herpes virus; antiviral treatment is vital [2]. It has been reported that patients who present with acute canaliculitis have higher success rates with conservative therapy [1]. In the discussed patient conservative therapy with oral and topical antibiotics proved to work well. Furthermore, dilation and irrigation with either saline solution or antibiotic solution can also be performed in addition to the customary conservative treatment [1,2]. If irrigation of the lacrimal drainage system is utilized, then the procedure is done with the patient in the upright position ultimately allowing the solution to drain from the nose rather than the nasopharynx [2]. A recent study reported that patients needing this procedure were on average treated with irrigation 4.5 times with good resolution of inflammation within the canaliculus [1]. Although this was not performed in the discussed patient it was mentioned as a possible treatment option in the future.

In certain cases surgical intervention is necessary to remove concretions which allow bacteria to linger within the canaliculus [1,8-10]. Punctum dilation and curettage of the concretions, punctoplasty, and canaliculotomy are commonly performed in patients to prevent recurrence [4,8-10]. A recent study showed that removal of all concretions would ultimately provide a cure and prevent recurrence in chronic cases of canaliculitis [9]. Punctoplasty along with punctum dilation open and allow curettage of the canaliculus while a canaliculotomy allows for improved access inside the canaliculus [1]. In the discussed patient this was the second reported incidence in two years, making surgical intervention a possibility in the future but not likely due to the acute nature of her condition.

Conclusion

As an often misdiagnosed condition, lacrimal canaliculitis could become a lingering problem for some patients. If available, microbe culturing of expressed discharge could allow for an improved treatment and management regimen. *Actinomyces israelii* is often the cause, but other anaerobes and facultative anaerobes such as staphylococcus have been shown to cause this condition. Additionally, attempted removal of concretions within the lacrimal drainage system ultimately improves the chances of preventing recurrence over time. Conservative measures utilizing topical antibiotics and oral antibiotics are often used initially. Furthermore, dilation and irrigation using a sterile saline solution or an antibiotic solution may perhaps be utilized in the management of these patients. Finally, it is important to note that surgical intervention is also a possibility in order to remove any remaining concretions.

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