Cases with uncharacteristic bacteria in canaliculitis

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ABSTRACT

Canaliculitis is not considered to be a common condition and can be frequently misdiagnosed. The condition can also be challenging to eradicate. Canaliculitis accounts for 2–4% of lacrimal disease and is most often associated with Actinomyces israelii, Staphylococcus, and Streptococcus. *However, cases can occasionally be caused by uncharacteristic bacteria. We herein report three unique cases of canaliculitis that each required probing and irrigation of the infected lacrimal duct to culture bacteria following resistance to initial antibacterial treatment. Each case resulted in a different microbe; the cultures of the expelled purulent material grew* Eikenella corrodens, Parvimonas micra*, and* Corynebacterium jeikeium *respectively. All three cases occurred in rural West Texas women with ages of 68, 70, and 40 years-old. These cases highlight the importance of recognizing the possible involvement of uncharacteristic bacteria for the proper management of canaliculitis and using appropriate lacrimal procedures when empiric therapy is ineffective.*

Keywords: Canaliculitis, Lacrimal gland, Antibiotic resistance, Lacrimal procedures

INTRODUCTION

Canaliculitis is inflammation of the lacrimal canaliculus. It is not considered to be a common condition and can be frequently misdiagnosed. The condition can be challenging to eradicate. Canaliculitis accounts for 2–4% of lacrimal disease and is most often associated with *Actinomyces israelii, Staphylococcus, and Strepococcus*[1]; however, it is rarely caused by other bacteria, such as *Eikenella corrodens,*[2] *Parvimonas micra,*[3] and *Corynebacterium jeikeium.*[4] Here we report three unique cases of canaliculitis, each requiring probing and irrigation of the infected lacrimal duct along with culture of purulent discharge, following resistance to initial antibacterial treatment. The cultures of the expelled purulent material in these three cases grew *Eikenella corrodens*, *Parvimonas micra,* and *Corynebacterium jeikeium* respectively.

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CASE PRESENTATIONS

CASE 1

A 68-year-old woman presented to the ophthalmology clinic due to a “tear duct infection” in the right eye that she first noticed 2 months ago. Prior to her presentation at the clinic, the patient had been previously treated with two rounds of oral Augmentin, with no noticeable improvement in her condition. The patient had a past medical history of keratoconjunctivitis sicca and glaucoma for which she took Xiidra® (lifitegrast ophthalmic solution) prn, as well as Combigan® (brimonidine/timolol) bid OU and Lumigan® (bimatoprost ophthalmic solution 0.01%) qhs OU. On examination the patient had a visual acuity of 20/20 OD, and 20/50-2 OS. There was a small area of edema and erythema medial to the non-inflamed punctum, tenderness around the lacrimal sac, and purulent material that wasn’t expressible from the punctum. The presumed diagnosis for the patient was a medial left lid infection, possibly involving the lacrimal system, and highly suspicious for canaliculitis. Since the patient had previously attempted two rounds of Augmentin, she

was instead started on a 10-day trial of oral Bactrim®. Follow up was scheduled after the completion of the antibiotic course.

The patient returned three weeks later reporting a new onset of discharge OD with the apparent lack of clinical response to oral Bactrim® and denied any significant eye pain. On examination the patient had a visual acuity of 20/30 OD, and 20/80 OS. Canalicular massage revealed purulent material from the right lower lacrimal punctum as well as pain with palpation. Again, persistent canaliculitis was suspected and the patient then received lacrimal probing and curettage. The lacrimal procedures revealed greenish discharge that was sampled and cultured. The system was then well irrigated, and the patient was started on Tobradex® (Tobramycin/Dexamethasone) ointment to be applied every night for 1 week. The cultures of the sampled purulent material collected during her procedure eventually grew *Eikenella corrodens* and the patient was advised to continue with the application of Tobradex® ointment each night.

The patient returned three weeks later for follow up after her procedure. The patient stated that her visual acuity was good, and she continued to use Tobradex® at night. On examination the patient had a visual acuity of 20/25 OD, and 20/40 OS. Clinical examination revealed that the infection was clinically resolved without any residual discharge, swelling, or redness. She was told to discontinue the Tobradex® and had no further concerns or issues.

Case 2

A 70-year-old woman was referred to the ophthalmology clinic for chronic canalicular infection OS. The patient had been symptomatic for 3–4 years prior to presentation. Her main symptoms included matted eyelashes in the morning, green pus oozing out of the tear duct, excessive tearing in the morning, and mild discontinuous discomfort. At examination, her left interior punctum oozed a pus with a bad odor and medial swelling was present. Visual acuity was 20/30 OU. She had a previous history of punctual plugs OU that had been removed. The patient could not recall the date of the punctual plug placement nor removal. The patient's only eye medication was refresh drops QID OU. At this time, she was scheduled for a punctum and canalicular exploration with culture.

One month later, a lacrimal punctum snip incision was performed on the left eye. The skin and subconjunctivae were injected with 2% lidocaine and epinephrine and the skin was prepped with Betadine® (povidone-iodine). The left punctum was dilated with a punctual dilator. The canaliculus was found to have several apparent lacrimal stones and purulence. After the canaliculus was irrigated and curetted, the purulence was sent for culture. The eye was cleansed with saline and tobramycin–dexamethasone was applied. She was prescribed Maxitrol® (Neomycin-Polymyxin b-Dexamethasone ointment) 3.5 mg/g-10,000 unit/g-0.1% for the left eye at bedtime.

One day after the procedure, the patient returned to clinic with complaints of twinkle lights and jagged flashes of light OD, floaters OS, and headaches. She had seen the twinkle lights occasionally in the mornings prior to the procedure, and this was the third episode of floaters in her lifetime. The jagged flashes of light appeared during the punctum exploration, prompting her to follow up. A bilateral OPTOS revealed mild vitreous floaters with no retinal tears.

One week after the procedure, culture revealed *Parvimonas micra,* and clindamycin 300 mg q8 for 7 days was prescribed. During a phone call to discuss the culture results, the patient stated that she was doing significantly better and had no visual complaints.

Nineteen days after the procedure, the patient was seen in clinic for a post operative appointment. She described her vision as good and said she was doing well. Her only complaint was of moderate dry eye on windy days. Her visual acuity was 20/20 OU. The left eye had the appearance of clinical resolution with no swelling, erythema, tenderness, nor purulence. At this time, her Maxitrol® was halted and she was told use artificial tears as needed.

Case 3

A 40-year-old woman presented to the ophthalmology clinic with a 6-month history of discharge in

the mornings from her left eye (OS) that was focused in the inner corner. The discharge rarely appeared in the afternoon. She also complained of redness, and occasional dry eye, but had no other complaints. She had a history of blepharitis on her left lower lid, punctal stenosis OS with cyst and occlusion, as well as a snip punctoplasty and irrigation OS about 18 months prior to presentation with no other significant past medical history. She was instructed to use daily warm compresses on the left eye and return as needed for follow up.

Three months later she was urgently referred by her primary care physician for possible canaliculitis. She stated that the warm compresses were not beneficial for her, and she proceeded to receive probing, irrigation, and curettage of the left upper lid punctum and canaliculus with 23 g canula after dilation. It was irrigated without difficulty. A sample of the purulent discharge was sent to the lab for culture. She was prescribed Cefalexin 500 mg TID by mouth for 7 days along with Maxitrol® ointment to be used at night.

She returned a few days later for follow up on her lacrimal procedure. Her vision was still good overall, but the purulent discharge had continued despite the current empiric treatment regimen, and her infection did not appear to be responding to the antibiotics. The culture results from the sample of the discharge were then received and was positive for *Corynebacterium jeikeium*. The patient was given a sample of Vigamox® to use TID. She was instructed to continue using Maxitrol® ointment, and her oral antibiotic regimen was switched to Ciprofloxacin HCl 500 mg tablet twice a day by mouth. She returned two days later stating that she was feeling better, denied pain and tearing, and was showing clinical resolution.

Discussion

Canaliculitis can be categorized as either primary or secondary. Primary canaliculitis is inflammation of the lacrimal canaliculus, usually caused by an infection, as in these cases. Secondary canaliculitis is most commonly caused by punctual canalicular plug insertion or canalicular intubation. Symptoms are usually unilateral. Patients may present with tearing, purulent discharge, prominent punctum, or swelling of the medial canthal. These presentations of symptoms can seem to mimic those of chronic conjunctivitis, inflamed chalazion, or acute dacryocystitis.[1] Once the diagnosis of primary canaliculitis has been made, these cases show the importance of considering uncharacteristic bacteria such as *Eikenella corrodens*, *Parvimonas micra*, and *Corynebacterium jeikeium* as the causes of infection.

E. corrodens is a facultatively anaerobic Gram-negative rod-shaped bacteria that is most often found in the oropharynx and respiratory tract. It is a member of HACEK (*Haemophilus spp*., *Aggregatibacter spp*., *Cardiobacterium hominis*, *E. corrodens*, and *Kingella kingae*), a group of bacteria that is commonly associated with infective endocarditis. The *Parvimonas* genus contains one species, *P micra*. It is a Gram-positive anaerobic coccus and can be found in the normal flora of the human gastrointestinal tract and gingival crevice. It is associated with periodontitis, especially in elderly patients.[5] *Corynebacterium jeikeium* is characteristically a multidrug-resistant, Gram-positive, rod-shaped, catalase-positive, and aerobic species of *Actinomycetota* in the genus *Corynebacterium*. It causes severe infection in hospital patients, predisposed by malignancy, neutropenia, and AIDS.[6]

Eikenella corrodens is usually susceptible to several different antibiotic regimens, including a variety of beta lactams, trimethoprim–sulfamethoxazole, tetracyclines, aminoglycosides, and fluoroquinolones.[1,7,8] Although β-lactams, fluoroquinolones, or aminoglycosides would also be the effective antibiotic coverage of P *micra*, resistance is common.[5,9] However, *C jeikeium* is resistant to many of these antibiotics, including β-lactams, aminoglycosides, erythromycin, and tetracycline. Vancomycin is generally the most active antibiotic against *C jeikeium*[6,9] (Table 1).

There has only been one other reported case of canaliculitis caused solely by *Eikenella corrodens,* which occurred nearly 30 years ago.[2] That case had many similarities to our case 1. That patient presented with a prominent punctum on the left upper eyelid with erythema and edema of the medial aspect of the upper eyelid and was diagnosed with superior canaliculitis resistant to multiple topical medications. The

Table 1. Summary of Clinical Course

Case Number	Duration of Symptoms	Treatments Attempted Prior to Culture	Species Identified	General Antibiotic Susceptibility	Details of Curative Procedures and Medications
1	3 months	2 rounds of oral Augmentin; 10 days of Bactrim	*Eikenella Corroden*	Beta lactams, trimethoprim–sulfamethoxazole, tetracyclines, aminoglycosides, and fluoroquinolones	Lacrimal probing and curretage with culture and Tobradex
2	3–4 years	Maxitrol ointment	*Parvimonas micra*	β-lactams, fluoroquinolones, aminoglycoside; resistance common	Punctum and canalicular exploration with culture and clindamycin
3	9 months	Warm compresses; Oral Cefalexin and Maxitrol ointment	*Corynebacterium Jeikeium*	Vancomycin, Variable resistance to fluoroquinolones	Probing and irrigation of punctum; Vigamox, Maxitrol ointment, and oral Ciprofloxacin HCl

patient then underwent an extended three-snip punctoplasty, and a small canalicular stone was removed for culture which eventually revealed *Eikenella corrodens* as the responsible bacterium before successful treatment.[2,8,9]

The *Parvimonas micra* bacterium was first known as *Peptostreptococcus micros* until it was transferred to the *Micromonas* genus in 1999 and known as *Micromonas micros*. The *Micromonas* genus was then replaced by *Parvimonas* in 2006.[10] The *Peptostreptococcus* genus is uncommonly found as the cause of canaliculitis,[11] and the micros species is even more uncommon and to the best of our knowledge has not been reported as a cause of canaliculitis. *P micra* is typically susceptible to antibiotic regimens targeting Gram-positive and anerobic bacteria, such as penicillin and beta lactamase inhibitor (amoxicillin-clavulanate) or clindamycin. However, empiric treatment can often be unsuccessful due to antibiotic resistance.[10,11]

Canaliculitis caused by *Corynebacterium* can closely resemble *Actinomyces*, the most common cause of canaliculitis. This is represented in a case series that compared these similarities while reporting the presumably first seen case of canaliculitis caused by *Arcanobacterium (Corynebacterium) haemolyticum*.[12] Although bacterium from the *Corynebacterium* genus have been reported as an uncommon cause of canaliculitis,[13] to the best of our knowledge, this is the first reported case caused specifically by the *C jeikeium* species. Since infection with *C jeikeium* is typically hospital-acquired, and more commonly found in immunocompromised patients, this bacterium can be notoriously hard to treat due to antibiotic resistance.[6,9,14]

In each of these cases, empiric therapy was unsuccessful due to antibiotic resistance or abscess formation. When systemic empiric therapy is unsuccessful in canaliculitis, Gram staining and culture of the discharge following incision and drainage has a crucial role in determining a suitable treatment. (Table 1).

Conclusion

In summary, we present these three unique cases of uncharacteristic, resistant bacteria isolated in canaliculitis. It is important to recognize the presence of such organisms for the proper management of canaliculitis, and to proceed to incision and drainage when empiric therapy is ineffective.

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Statement of Ethics: Written consent was obtained from the patients to publish the information in this series of cases.

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