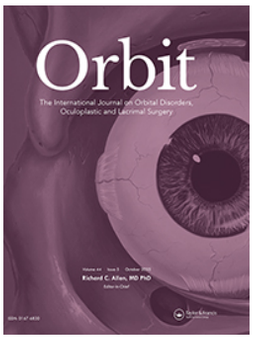

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CASE REPORT

A Case of Corynebacterium Bovis positive surgical site infection post-blepharoplasty

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ABSTRACT

Corynebacterium bovis is principally a zoonotic pathogen and a causative agent of bovine mastitis. To date, there are only 20 documented cases of *C. bovis* infection in humans in the literature, and only 6 have involved the eye or adnexal structures. No ophthalmologic cases have been demonstrated post-operatively. Here, we present the first case of *C. bovis* preseptal cellulitis and abscess formation following lower eyelid blepharoplasty. Her infection was difficult to control until microbial susceptibility results became available. The patient made a full recovery from her surgery despite this infection.

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Corynebacterium bovis; blepharoplasty; surgical site infection; culture-derived antibiotic therapy

Corynebacterium bovis is a catalase-positive, lipophilic, nonsporulating, Gram-positive club-shaped rod.[1–4] It is most well-known as a causative agent of bovine mastitis, as it naturally resides in the bovine udder.[5] Several members of the cornebacteriaceae family are common constituents of the conjunctiva in healthy adults, though *C. bovis* is not among this group.[6,7] It rarely causes disease in humans, with only 20 published cases in the literature.[5,8–18] To date, only 6 cases have involved the eye or adnexal structures, and none developed in the post-operative period following eye or eyelid surgery.[8–11] Here, we present the first case of *C. bovis* infection following lower eyelid blepharoplasty.

Case presentation

A 75-year-old female presented with a past surgical history of bilateral upper eyelid blepharoplasty, bilateral lower eyelid blepharoplasty, and rhytidectomy in 1999. Additionally, she underwent revisional bilateral lower eyelid blepharoplasty 17 years later, with multiple previous treatments with botulinum toxin and hyaluronic acid gel fillers.

She underwent revisional bilateral upper and lower eyelid blepharoplasty. The bilateral lower eyelid blepharoplasty was performed via a transconjunctival approach to address the lower eyelid fat pads with skin pinch excision of excess infraciliary skin. Post-operatively, the patient was started on bacitracin-polymyxin B ointment for external application at all incisions, topical neomycin-polymyxin B-dexamethasone eye drops, and oral cephalexin.

At post-operative week 1, she was healing as expected without signs of infection. Due to moderate post-operative chemosis, she was continued on neomycin-polymyxin B-dexamethasone eye drops for an additional 2 weeks. Two weeks postoperatively, the patient noted increased chemosis of the right eye for which she self-treated with a previous and unrelated oral prednisone prescription for three days. The progressive chemosis was attributed to neomycin allergy; she was therefore switched to a two-week course of topical tobramycin-dexamethasone drops.

One month post-operatively, the patient endorsed progressive pain and swelling of the left upper and lower eyelids. On exam, the left periorbital region was noted to have edema and erythema with a tender fluctuant mass near the left lateral canthus concerning for preseptal cellulitis and lower eyelid abscess [Figure 1]. The abscess was incised, drained and sent for aerobic, anaerobic, and fungal cultures. She was initiated on oral clindamycin 150 mg three times daily (TID) and bacitracin-polymyxin B ointment with plan for follow up in 2 days. During this next visit, minimal improvement was noted [Figure 2].

Four days later, cultures returned with heavy growth of *Corynebacterium bovis*, as well as light growth of coagulase-negative staph. Given the rarity of a *C. Bovis* infection of the eyelid, the case was discussed with Infectious Disease and additional susceptibility testing was ordered to guide antibiotic management. The patient was started on oral amoxicillin/clavulanate 875/125 mg twice daily (BID) and

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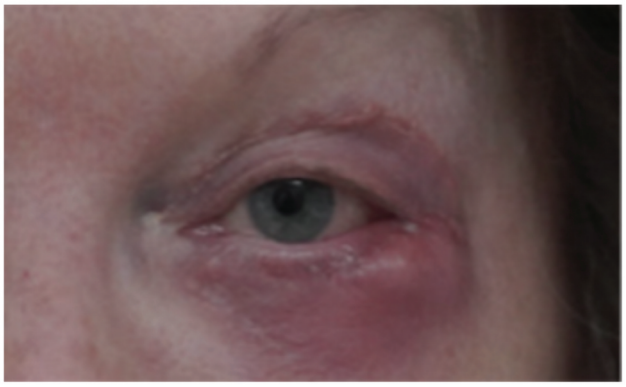

Figure 1. Left eye periorbital edema, erythema, and lower eyelid mass one month post-operatively.

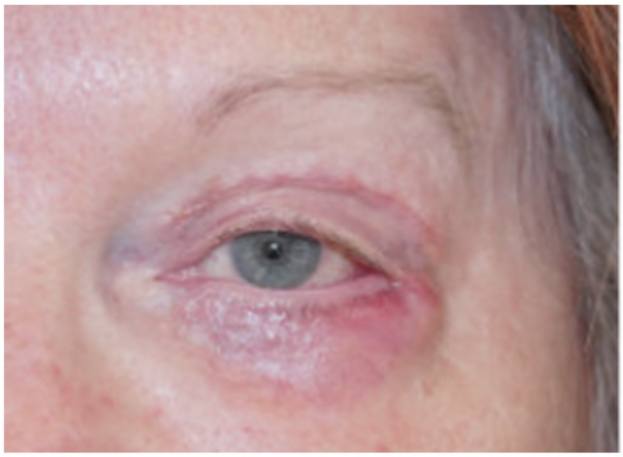

Figure 2. Minimal improvement of left eye periorbital edema, erythema, and lower eyelid mass.

instructed to increase her clindamycin to 300 mg TID. Despite 2 weeks of dual antibiotic therapy, she had incomplete treatment response. Her antibiotic regimen was changed to oral trimethoprim/sulfamethoxazole 800/160 mg BID for 1 week, based on susceptibility testing, which resulted in rapid resolution of the cellulitis [Figure 3]. Notably, susceptibility testing did demonstrate resistance to clindamycin and only intermediate susceptibility to penicillin derivatives [Table 1].

In total, the patient received 6 days of oral clindamycin 150 mg TID, 14 days of oral clindamycin 300 mg TID, 14 days of 875/125 mg of oral amoxicillin/clavulanate BID, and 7 days of oral trimethoprim/sulfamethoxazole 800/160 mg BID. After completing a total of 27 days of treatment with systemic antibiotics, the infection resolved with rapid and notable improvement after initiation of trimethoprim/sulfamethoxazole [Figure 4]. Despite this infection, the surgical reconstruction was successful.

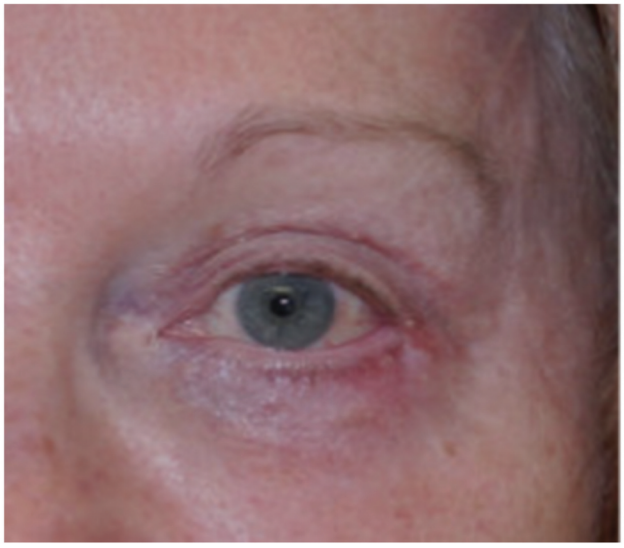

Figure 3. Post-operative month 2 photograph, one week after culture-driven trimethoprim/sulfamethoxazole therapy. Note the rapid resolution of the left eyelid edema and erythema. No abscess is evident. The eyelids continue to heal from her bilateral upper and lower eyelid blepharoplasty, and the surgical reconstruction was successful.

Discussion

Several corynebacteria are well established as causes of disease in humans.[1,2] *C. diphtheria* is the most well-known of this group.[4] Non-diphtheria corynebacteria are known amongst the biomedical community as diphtheroids. They are either aerobic or facultatively anaerobic bacteria and constitute part of the normal microflora of the skin and mucous membranes in humans.[1,6] When isolated from clinical specimens, they may be considered as contaminants.[4,19] However, there is recent strong evidence supporting diphtheroids as an important cause of human disease, including multidrug-resistant and nosocomial infections.[1,3,4,6,19]

C. bovis is principally a zoonotic pathogen.[20] It is a common cause of bovine mastitis and was first discovered by Evans in 1916 from aseptic cow's milk.[20,21] Indeed, the resulting decreased bovine milk production is an important cause of economic strain in dairy farms.[20,22] Recently, it was demonstrated that genetic

Table 1. C. bovis susceptibility testing (MIC = mean inhibitory concentration; S = susceptible, I = intermediate, *R* = resistant).

Antibiotic	MIC (ug/mL)	Susceptibility
Ceftriaxone	≤4	S
Meropenem	≤2	S
Penicillin	1	I
Vancomycin	1	S
Linezolid	≤2	S
Clindamycin	>2	R
Trimethoprim-Sulfamethoxazole	2/38	S

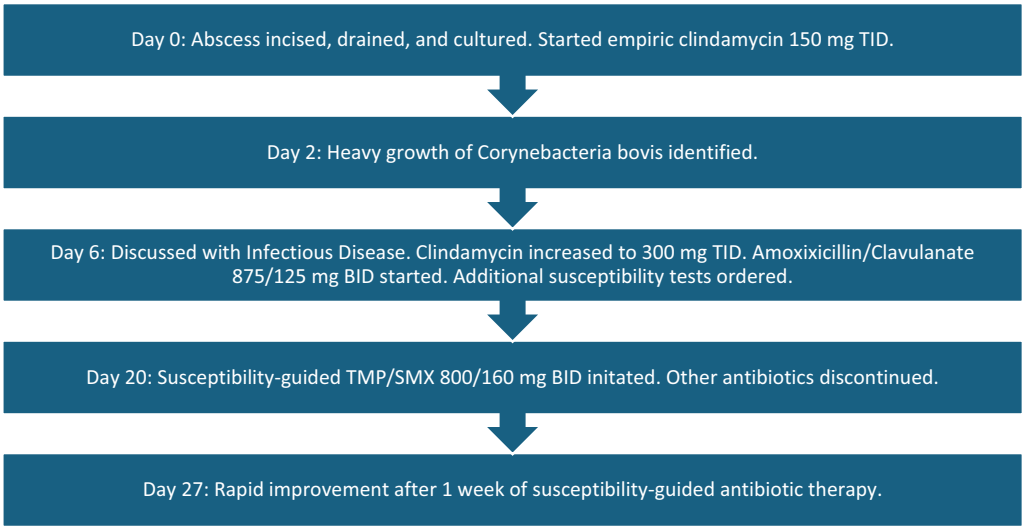

Figure 4. Systemic antibiotic therapy timeline. *Day 0 = Initial presentation of post-operative infection at post-operative month 1. *TMP/SMX = trimethoprim/sulfamethoxazole

and host differences among different *C. bovis* bacteria play a major role in their pathogenicity, as murine isolates have increased genomic virulence factors compared to cows and humans infected with *C. bovis*.[3] Unlike other diphtheroids, *C. bovis* is not part of the normal human flora.[6,7,9] Therefore, *C. bovis* should not be thought of as a contaminant. To date, only 20 cases of *C. bovis* infection in humans have been reported in the literature.[5,8–18] Gabay et al[12] described a case of post-operative intracranial abscess secondary to *C. bovis*. In their report, they summarized all prior documented cases of human *C. bovis* infections.[12] More recently, *C. bovis* infection following autologous fat grafting in breast augmentation was reported.[13]

Six prior cases of *C. bovis* infection involving the eye or adnexa have been reported.[8–11] Dutly et al[8] described the first ocular case in a 14-month-old boy with purulent conjunctivitis, successfully treated with topical bacitracin-polymyxin B; the child lived near cattle.[8] Chow et al[9] reported three additional ocular cases from a single institution. The first was a 49-year-old man with a recurrent purulent lower eyelid cyst, treated with incision, drainage, oral amoxicillin-clavulanate, and tobramycin eye drops. The second was a 25-year-old man with bilateral keratoconjunctivitis and a palpebral conjunctival cyst; cultures confirmed *C. bovis* after months of ineffective ofloxacin therapy, though further treatment was not described. The third was a 33-year-old man with acute left eyelid pain and swelling, who recovered fully after erythromycin ointment and oral trimethoprim-sulfamethoxazole.[9] Elsheikh et al[10] described a case of *C. bovis* corneal abscess on a background of viral keratitis leading to corneal perforation and requiring a Gunderson flap; the patient had no light perception prior to surgery and confirmed cattle exposure.[10] Lastly, Meeuwes and Wolfs[11] reported febrile preseptal cellulitis in an 8-month-old girl with *C. bovis* cultured from ocular swabs, successfully treated with IV and oral amoxicillin-clavulanate. The infection was suspected to be related to contact with the family dog.[11]

Though other cases describe ocular and adnexal infection secondary to C. bovis, ours is the first documented case of *C. bovis* preseptal cellulitis and abscess development following a lower blepharoplasty in a patient with no known cattle exposure. Of the 21 known cases, 33% involved the eye, possibly related to the lipophilic nature of the bacterium with an affinity for oil secreting glands of the eyelid.[6,7,20,22] Infection is a known complication of blepharoplasty, albeit rare given the abundant blood supply of the[23] eyelids.[24] It is possible the patient's post-operative steroid use increased her susceptibility to *C. bovis*. Aoki et al[6] demonstrated that pathogenic corynebacteria are more likely to infect the eye in patients on chronic topical steroids, though this association was noted in patients on maintenance therapy following corneal transplantation and no cases of preseptal cellulitis or *C. bovis* were found in their study.[6] Our patient denied recent contact with cows or other animals. Her infection was difficult to control until microbial susceptibility results became available.

Blepharoplasty remains a mainstay of both cosmetic and functional surgery to address dermatochalasis despite the risks, including infection. *C. bovis* rarely infects humans. However, it can cause surgical site

infections, including preseptal cellulitis and eyelid abscess following blepharoplasty, as demonstrated in our novel case. A known exposure to cattle or other animals seems probable, though this contact has not consistently been established. Cultures and microbial susceptibilities were useful in controlling this patient's infection.

Author contributions

CRediT: **Patrick R. Ingraffia:** Conceptualization, Investigation, Project administration, Visualization, Writing – original draft, Writing – review & editing; **Pooja Parikh:** Conceptualization, Investigation, Project administration, Resources, Visualization, Writing – review & editing; **Liane Dallalzadeh:** Conceptualization, Investigation, Project administration, Resources, Visualization, Writing – review & editing; **Ronald Mancini:** Conceptualization, Investigation, Project administration, Resources, Supervision, Writing – review & editing.

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