Eikenella corrodens keratitis: case report

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SUMMARY  Eikenella corrodens is a Gram-negative facultative anaerobe which is part of the normal human oropharyngeal flora and an opportunist pathogen of mucous membrane tissues. We report a case of secondary E. corrodens ulcerative keratitis with hypopyon in a 39-year-old male with herpes simplex keratitis. To the best of our knowledge this is the first reported case of E. corrodens as a pathogen in bacterial keratitis.

In 1948 Henriksen described a previously unreported anaerobic Gram-negative bacillus that grew in an unusual pitting pattern on agar. Rather than growing on the surface agar colonies of this organism formed depressions in the media. Because of its growth pattern Holm gave this newly discovered organism the name 'corroding bacillus'. It was not until 1958 that Eiken described a thorough study of the organism, recording the colonial growth patterns and further defining its biochemical properties. From this research he proposed that the bacteria be placed in the genus Bacteroides and gave it the name Bacteroides corrodens. Further work by Henriksen and Jackson et al. revealed that a subgroup of B. corrodens was in fact not strictly anaerobic. Immunological and nucleotide base pair analysis of this subgroup uncovered properties not consistent with the characteristics of Bacteroides. Subsequently this group was removed from the Bacteroides genus and renamed Eikenella corrodens in the family Brucellaceae.

Eikenella corrodens appears to be part of the normal flora of the human oropharynx. Khairat examined 100 blood cultures one minute after a tooth extraction. He isolated Eikenella from 16 of these cultures; in three cases Eikenella was the sole isolate. Brooks et al. isolated Eikenella from 13 out of 40 gingival cultures in clinically uninfected people. These results suggest that Eikenella frequently colonises the human upper respiratory tract and that it is capable of invading the blood stream. The first work to document the pathogenic capabilities of this organism was done by Marsden and Hyde, who reported six cases of Eikenella corrodens infection in children, including two cases of brain abscesses secondary to sinusitis, two gastrointestinal abscesses, a human bite, and a case of sinusitis. In another study at Boston City Hospital retrospective analysis revealed 72 cultures positive for Eikenella during 1971–2. Of these isolates 46 were obtained from sputum of bronchial washings, 11 throat or nasopharyngeal cultures, 8 various wounds, 3 abscesses, 2 human bites, a middle ear aspirate, and a tooth socket. This review suggests that Eikenella, in addition to frequently being part of the normal flora of the human respiratory tract, can act as an opportunist pathogen with a predilection for mucous membranes of the respiratory system and gastrointestinal tract.

In the ophthalmic literature Schwartz et al. have reported two cases of Eikenella infection in orbital cellulitis. In one case the cellulitis was secondary to sinusitis and in the other case there was an infection of an ocular prosthesis after orbital exenteration. Jones and Robinson, in a review of anaerobic ocular infections, reported a case of endophthalmitis following penetrating keratoplasty with positive cultures for Staphylococcus epidermidis and Bacteroides corrodens (sic), and also a case of chronic dacryocystitis with a mixed culture that included Eikenella corrodens. In an unreported case we have also treated a 72-year-old female with chronic dacryocystitis with cultures positive for two strains of Eikenella in mixed flora. To the best of our knowledge this is the first reported case of Eikenella corrodens keratitis.

Case report

A 39-year-old male with a history of recurrent herpes simplex keratitis of his left eye since 1967 presented to his ophthalmologist on 20 February 1986 with a
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complaint of discomfort in the left eye. He was
diagnosed as having a dendritic lesion on his left
cornea and given topical trifluridine every
three hours and scopolamine 0.25% three times a
day; no antibiotics were given. The patient returned
to the doctor three days later complaining of a
marked increase in pain and decreased visual acuity.
He was noted to have developed a corneal ulcer with
hypopyon and was referred to the Palo Alto Veterans
Administration Hospital for treatment.

On our initial examination the patient had a visual
aucity of 20/20 OD, with adnexa and anterior and
posterior segments of the right eye completely within
normal limits. His left eye had an acuity of counting
fingers at 30 cm. Slit-lamp examination revealed 1+
conjunctival injection and chemosis; the cornea had a
2.5x2.75 mm paracentral epithelial defect, with
dense underlying stromal white infiltrate extending
to mid stroma, overlying the site of the original
dendritic lesion. The anterior chamber had a 1 mm
hypopyon. There was no vitreous reaction, and
funduscopic examination showed a normal appear-
ance. The patient was admitted to hospital. Prior to
antibiotic therapy corneal scrapings were obtained
and plated on chocolate, blood, and Sabouraud's
agar and thioglycolate broth media. Empirical
therapy of topical cefazolin 100 mg/ml and tobra-
mycin every half hour, and parenteral cefazolin 1 g
every eight hours was initiated. On the patient's
fourth day in hospital the cultures grew on blood agar
a single organism identified as Eikenella corrodens. It
was sensitive to amikacin, ampicillin, cephamandole,
cefoxitin, cephalothin, chloramphenicol, genta-
micin, nitrofurantoin, tetracycline, tobramycin,
trimethoprime-sulphamethoxazole, and ticarcillin.
On this regimen the epithelial defect healed by
hospital day eight. On day 10 in hospital the topical
cefazolin and parenteral cephalazolin were discon-
tinued, and the patient was discharged from the
hospital on topical tobramycin. By day 16 of treat-
ment the infiltrate had resolved, and 56 days after the
patient's initial presentation he had only a faint
central stromal scar. Visual acuity had returned to
20/20. He did not receive steroids at any time during

treatment.

Discussion

In recent years the role of anaerobic organisms in
ocular infection has come under increased investiga-
tion. Jones and Robinson10 in a review of anaerobic
ocular infections report five cases of keratitis. The
anaerobic isolates were, in the first case, Proprioni-
bacterium avidum, in the second case Actinomycetes
viscosus, and in the third case both Proprioni-
bacterium acnes and Peptococcus vanabilis. Cases 4
and 5 both grew Propionibacterium acnes. Four of
the five patients had pre-existing epithelial ulceration
and stromal inflammation predisposing to opportu-
nistic infection. The antecedent ocular disease in
the first case was pseudomonal keratitis, the second
case had both herpes zoster and herpes simplex
keratitis, the third case had herpes simplex stromal
keratitis, the fourth case had had a penetrating
keratoplasty, and the fifth had cicatricial pemphig-
goid. It is of note that two of Jones and Robinson's
patients had pre-existing herpes simplex keratitis,14
as did our patient.

Eikenella corrodens is a Gram-negative bacillus
and facultative anaerobe that grows reliably only
on blood agar. The optimal growth of the organism
is dependent on a haematin concentration of 50 to
250 μg/l of media. Primary isolation is enhanced by a
5–10% carbon dioxide atmosphere Eikenella does
not grow well in liquid media unless they are enriched
with sheep serum or cholesterol.8

During the past two decades the role of E.
corrodens as an opportunistic pathogen in infections
of the upper respiratory and gastrointestinal mucous
membranes has been well documented.15 There is no
evidence that Eikenella is a part of the normal
conjunctival flora. Perkins et al.16 cultured, both
aerobically and anaerobically the conjunctivae of 273
eyes with conjunctivitis and of 96 normal persons and
did not record any Eikenella isolates. However, this
organism typically is slow growing and frequently
requires 24 to 48 hours of incubation before the
characteristic pitting colony pattern can be identified.
This long period of incubation could cause Eikenella
in a mixed flora to be overlooked.

This case reinforces the need to consider faculta-
tive anaerobic pathogens in keratitis cases, particu-
larly in patients with compromised corneas that may
be predisposed to opportunistic infection.

References

1 Henriksen SD. Studies in Gram-negative anaerobes. II. Gram-
negative anaerobic rods with spreading colonies. Acta Pathol
2 Holm P. Studies on the etiology of human actinomycosis. I. The
‘other microbes’ and their importance. Acta Pathol Microbiol
3 Eiken M. Studies on an anaerobic rod-shaped, Gram-negative
microorganism: Bacteroides corrodens, n.sp. Acta Pathol
4 Henriksen SD. Corroding bacteria from the respiratory tract. 1.
5 Henriksen SD. Corroding bacteria from the respiratory tract. 2.
Bacteroides corrodens. Acta Pathol Microbiol Scand. 1969; 75:
91–6.
6 Jackson FL, Goodman YE, Bel FR, et al. Taxonomic status of
facultative and strictly anaerobic 'corroding bacilli' that have
been classified as Bacteroides corrodens. J Med Microbiol 1971;
4: 171–84.
7 Hill LR, Snell JJS, Lapage SP. Identification and characterization

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