



Case report

Eikenella corrodens in a patient with septic arthritis: A case reportMarrigje Jacoba Kreuger^{a,*}, Anteneh Eshetu^{a,b}, Ebenezer Gezahegn Fanta^a^a Nordic Medical Centre, Addis Ababa, Ethiopia^b Department of Internal Medicine, Division of Infectious Diseases, College of Health Sciences, Addis Ababa University, Addis Ababa, Ethiopia

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ABSTRACT

Eikenella corrodens, a Gram-negative bacterium, is typically associated with fight-bite injuries and, in rare cases, with infective endocarditis. Infection may arise either through direct inoculation or through invasion of oral mucosa with subsequent bacteraemia. This bacterium is an unusual cause of infection in immunocompetent patients without direct injury. There are no studies published from Ethiopia on identification of *Eikenella corrodens* in humans. In this case report, we describe a patient with a septic arthritis and tibia bone abscess where *Eikenella corrodens* was identified. Recognition of septic arthritis was delayed and identification of the microorganism was challenging. This influenced the choice and duration of treatment and has likely affected the patient's outcome. This case report emphasizes the significance of recognizing rare pathogens in complex cases, considering slow-growing microorganisms and anticipating treatment challenges when uncommon microorganisms are involved.

Introduction

Eikenella corrodens is a fastidious, facultative anaerobic Gram-negative coccobacillus and is in general regarded as a pathogen of low virulence in humans. As part of the mouth and oropharynx commensals, the head and neck are the most common sites of *Eikenella* infections in adults and children, although severe soft tissue infections with underlying osteomyelitis are also described [1]. Infections caused by this bacterium tend to relapse, especially when collections are not drained or when duration of antimicrobial therapy is insufficient [2]. *Eikenella corrodens* is part of the "HACEK" organisms: rare bacteria associated with endocarditis [3]. As it is found in the canine and feline mouth, this pathogen has been also detected in dog or cat bite wounds [4].

Colonies of *Eikenella corrodens* can be detected within 24 hours of incubation at 35–37°C in 5 % CO₂ where tiny, pinpoint colonies (0.2–0.5 mm) with "bleach-like" odor may be found on a blood or chocolate agar plate. This bacterium usually does not grow on MacConkey agar. Prolonged incubation for 2–3 days may be required before colony size increases sufficiently for the colonies to become visible (1–3 mm), especially when only aerobic incubation is performed [1].

We report, for the first time from Ethiopia, a case of a septic arthritis with associated bone abscess due to *Eikenella corrodens*. We discuss the possible route of exposure in this patient and difficulties in detection and treatment of this pathogen.

Case presentation

A 43-year-old male patient with a history of alcohol use and recurrent gout flares presented in April 2023 with a painful left ankle joint and limited mobility of the foot for 4 weeks, without any prior trauma. He reported pain during mobilization and swelling of the ankle joint. There was no fever or purulent discharge. Additionally, the patient mentioned that his dog lived in his house and slept in the same bed. The patient had no other chronic conditions, such as type II diabetes mellitus, and was assessed as immunocompetent. He had recently been admitted elsewhere with acute kidney injury (AKI) associated with excessive NSAID use. During that admission he also received antibiotics, including meropenem. The reason for this broad antibiotic treatment was not documented, but according to the patient, it was given for suspected cellulitis. The AKI had resolved upon presentation to our hospital. The vital signs were a temperature of 36.7 °C, blood pressure of 130/95 mmHg, and pulse rate of 109/min. His body mass index (BMI) was 35. There was a warm, tender and tense swelling over the left ankle and surrounding tissue, extending to the proximal foot. Laboratory tests showed the following: Hgb 12.4 g/dL (N:12–18 g/dL), WBC 13.200 (N:5.000–10.000), with 41.7 % neutrophils and 52.8 % leukocytes, platelets 485.000 (N: 150.000–400.000), CRP 20 mg/L (N:<10 mg/L), ESR 50 mm/hr (N:<15 mm/hr). Creatinine was 0.8 mg/dL (N:0.7–1.2 mg/dL) and urea 11 mg/dL (N:6–24 mg/dL). HIV rapid

* Corresponding author.

E-mail address: mariskakreuger@gmail.com (M.J. Kreuger).<https://doi.org/10.1016/j.idcr.2025.e02222>

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diagnostic testing was performed at another facility prior to admission, and the result was negative. The patient was admitted to our hospital with an initial assessment of left leg cellulitis, while septic arthritis of the ankle joint was also considered. X-ray of the ankle showed signs of joint arthritis with tibia periosteal reaction (Fig. 1). Ultrasound of the ankle joint showed multifocal soft tissue inflammatory changes with increased vascularity, without visible fluid collection or effusion. Ultrasound-guided aspiration of fluid from the ankle joint for culture and fluid analysis was attempted but failed. Blood cultures were not obtained as there were no clear signs of sepsis, and their availability in this setting was inconsistent. Patient was prescribed meropenem 1 g intravenously 3 times daily, vancomycin 1 g intravenously twice daily and clindamycin 300 mg oral three times daily, for 10 days. The combination of these drugs was prescribed considering his recent hospitalization and antibiotic exposure elsewhere, with the aim of ensuring good tissue penetration. The duration was limited to 10 days based on imaging and clinical improvement, at which point we were not convinced of joint involvement.

Patient was discharged improved, but returned one week later with similar complaints of pain at the ankle joint and an MRI scan was ordered. The MRI scan suggested a distal tibia abscess, for which surgical drainage from the joint and the bone was done. During the surgery, both the distal tibia and ankle joint were accessed and approached anteriorly. This allowed for drainage of pus from the bone through drilling at multiple places, as well as the removal of infected fluid from the ankle joint. Bone and joint were thoroughly irrigated, a surgical drain was left in place and removed a few days later during re-inspection of the joint. The drained pus was sent for aerobic culture. Culture did not reveal any growth in 72 hours, but grew *Eikenella corrodens* on blood agar and chocolate agar after prolonging the incubation time to 120 hours. Identification and antimicrobial susceptibility of the *E. corrodens* isolate was done using the TDR-300B Plus Automated Microorganism Analysis system (Mindray). This *E. corrodens* isolate was susceptible to ciprofloxacin, levofloxacin, trimethoprim-sulfamethoxazole, tigecycline, intermediate susceptible to meropenem, and resistant to cephalosporins

including ceftriaxone and cefepime, to piperacillin-tazobactam, ampicillin-sulbactam, and amikacin.

The patient showed significant clinical improvement with two weeks of oral trimethoprim-sulfamethoxazole combined with four weeks of oral ciprofloxacin. Antibiotics were chosen based on the sensitivity report, and treatment duration was determined according to the diagnosis of septic arthritis. The patient started to ambulate with partial weight bearing and progressed to full weight-bearing. He was seen every other week, with good clinical progress. Control X-ray taken approximately one month after the drainage showed improvement, with no signs of bone abscess or sequestrum. Evidence of prior bone drilling and arthritic changes were present, but without significant joint space narrowing (Fig. 2). However, ankle pain restarted after several weeks of follow-up. A new X-ray demonstrated radiological worsening, with increased joint space narrowing and more well-defined talar lucency (Fig. 3). The patient was referred for an MRI scan and ultimately underwent ankle joint fusion with intramedullary nail at another hospital due to distal tibia and ankle joint destruction.

The patient passed away a few months later from an unrelated cause.

Discussion

Septic arthritis and bone abscesses are often caused by *Staphylococcus aureus* and *Streptococcus* species, but uncommon bacteria as *Eikenella corrodens* have also been described as causative agents [5]. This case report describes an unusual bacterium with low virulence causing septic arthritis of the ankle joint and associated tibial bone infection. In our patient, the dog likely introduced the bacteria by licking the site. This unusual exposure pathway could explain why the bacterium was found in an immunocompetent host without fight or bite injury.

Growth of *E. corrodens* can be obscured by faster-growing bacteria in polymicrobial samples or reported as a negative culture when standard incubation times are insufficient for this slow-growing organism [1]. The latter is the case for our patient. Therefore, consideration of slow-growing organisms when cultures are negative and requesting

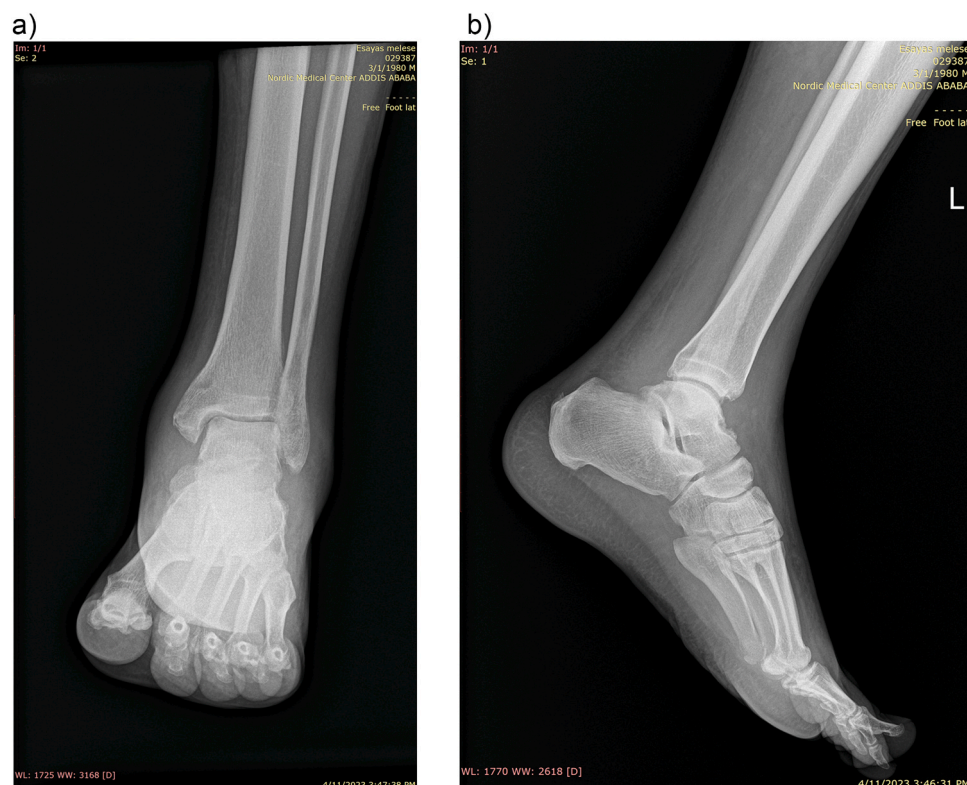


Fig. 1. Ankle X-ray obtained on first presentation of the patient which showed signs of joint arthritis with tibia periosteal reaction. a) AP view. b) Lateral view.

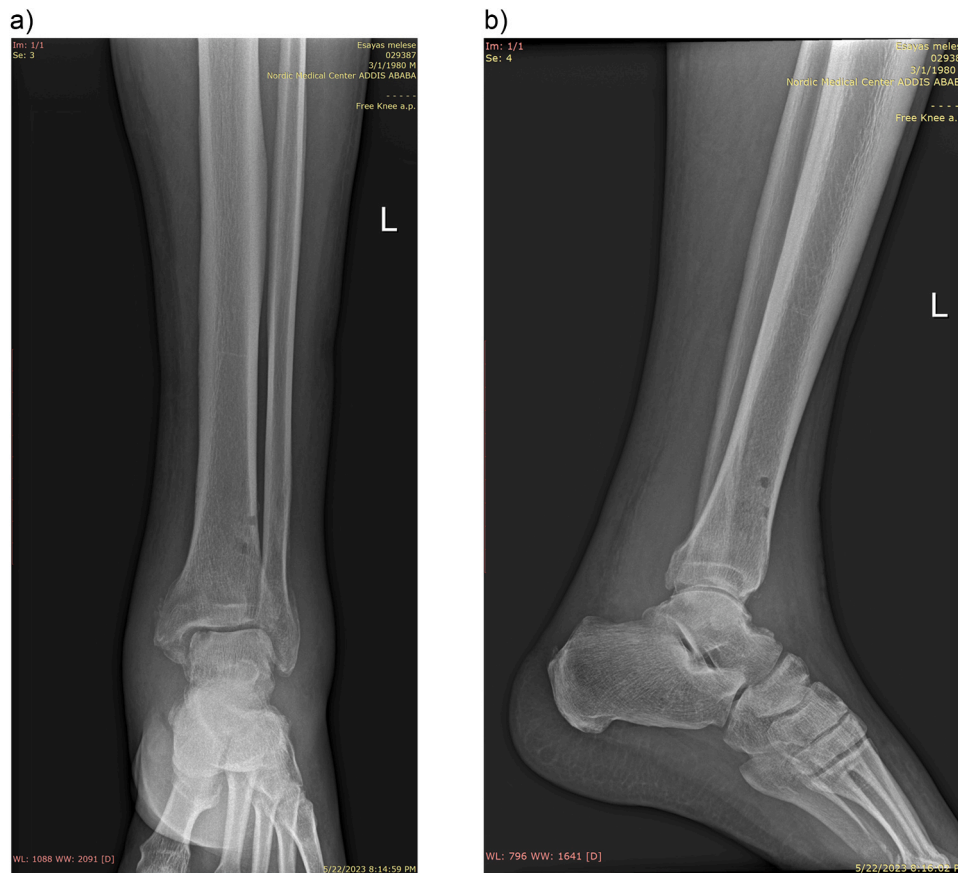


Fig. 2. Ankle X-ray obtained during follow-up, approximately one month after drainage of the ankle abscess. X-ray shows no signs of bone abscess or sequestrum. Signs of prior bone drilling and arthritis are present, without significant joint space narrowing. a) AP view. b) Lateral view.

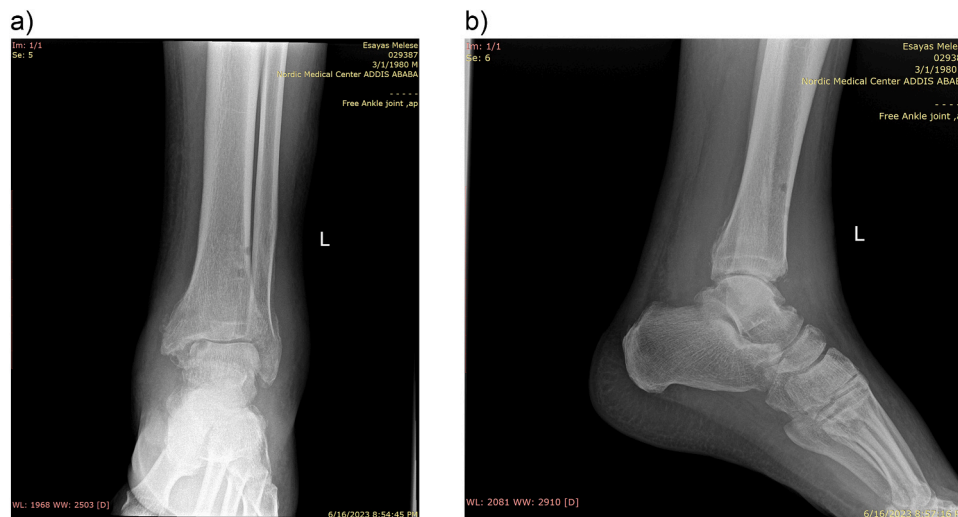


Fig. 3. Last ankle X-ray obtained during follow-up, approximately two months after drainage of the ankle abscess, when ankle pain recurred. This X-ray demonstrated radiological worsening with increased joint space narrowing and more well-defined talar lucency. a) AP view. b) Lateral view.

prolonged incubation can reveal unexpected pathogens.

Depending on the location of infection, infections due to *Eikenella corrodens* are difficult to cure [3,6]. Treatment often involves both antibiotics and surgical interventions. The bacterium is usually susceptible to fluoroquinolones, penicillins, azithromycin and some cephalosporins and intrinsically resistant to clindamycin, metronidazole and erythromycin. Beta-lactamase production in *Eikenella corrodens* is uncommon [1,3]. Therefore, the observed carbapenem and ceftriaxone resistance in

our patient is unexpected. The patient received broad spectrum antibiotics (including meropenem) without appropriate source control during the initial hospitalizations, which may have contributed to acquired resistance. Furthermore, septic arthritis is usually treated with 3–4 weeks of antibiotics, sometimes up to 6 weeks [5]. The presence of *Eikenella corrodens*, inadequate source control and an initially shorter course of antibiotics than required, likely affected the healing process and the development of bone damage in our patient.

As *E. corrodens* is part of the HACEK group, a collection of rare bacteria associated with endocarditis, an echocardiogram would have been appropriate, but was unfortunately not performed in this case.

Conclusion

To the best of our knowledge, this is the first report from Ethiopia on detection of *Eikenella corrodens* in a septic arthritis with bone abscess. It is a rare but important pathogen that can even infect immunocompetent hosts. Exploration of unusual exposure ways and prolonged incubation of the pus was crucial in detection of this unusual pathogen. A combination of surgical drainage and appropriate antibiotic therapy was necessary for management of this case.

CRediT authorship contribution statement

Kreuger Marrigje Jacoba: Writing – original draft, Investigation, Conceptualization. **Eshetu Anteneh:** Writing – review & editing, Methodology, Conceptualization. **Fanta Ebenezer Gezahegn:** Writing – review & editing, Methodology, Conceptualization.

Consent

Informed consent for publication of this case report was obtained from the patient.

Ethical approval and consent

Institutional permission for publication was obtained from Nordic Medical Centre and patient consent for publication of this case report was obtained from the patient while he was still alive.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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