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Case Report

Ochrobactrum anthropi Infection of the Hand

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Ochrobactrum anthropi is an opportunistic, low-virulence pathogen occasionally associated with human infections and found largely in immunocompromised patients and those with intravascular devices. We report the case of a healthy 70-year-old man who presented with an infection of the hand, who had no history of trauma but had been gardening for 4 months. Despite surgical debridement and empirical antibiotics, the infection could not be controlled. Cultures revealed *O anthropi*. Antibiotic treatment was adapted to intravenous cefepime for 15 days and the infection was finally controlled after a second surgery. Oral cotrimoxazole was continued for another 2 weeks. *Ochrobactrum anthropi* infection of the hand must be considered not only in immunosuppressed patients but also in healthy patients without intravascular devices. Local debridement and empiric antibiotic may be insufficient. Antibiotic therapy should follow susceptibility testing, but usually includes a broad-spectrum intravenous beta-lactam such as imipenem–cilastatin or cefepime, or oral cotrimoxazole or ciprofloxacin.

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Ochrobactrum anthropi is an opportunistic, low-virulence pathogen that is occasionally associated with human infections. This gram-negative, nonfermentative, aerobic bacillus is mesophilic and peritrichously flagellated.¹ It is widely distributed in soil, plants, and water sources.² In addition, the pathogen has been isolated from clinical samples such as pus from various sites and normally sterile body fluids including blood and urine from patients with an *O anthropi* infection.² Most reported infections were in immunocompromised patients or patients with intravascular devices.^{3–8} This case report describes an *O anthropi* infection of the hand in an otherwise healthy, nonimmunocompromised patient.

Case Report

A healthy 70-year-old man was referred to our emergency department because of worsening pain, redness, and swelling of

the palmar aspect of the right thumb. Symptoms had started 4 days earlier. The patient was treated initially by his general practitioner for a gout attack, followed by a 5-mm skin incision 2 days earlier because an infection was suspected. A detailed patient history revealed that he had been gardening for the past 4 months but had no history of trauma. The patient denied recent fever, chills, night sweats, weight loss, or the use of medication. There was no history of immunosuppression or malignant tumor.

Upon clinical examination, the patient was afebrile and the palmar aspect of the thumb was swollen, red, and warm to the touch. Direct palpation provoked tenderness from the palmar aspect of the metacarpophalangeal joint to the thenar eminence, with no signs of flexor tenosynovitis distally (Fig. 1). Laboratory tests indicated a leukocyte count of 13.9 g/L (reference normal range, 4–10 g/L) and a C-reactive protein level of 27.4 mg/L (reference normal range, <3.0 mg/L). Conventional radiographic imaging showed no fractures or signs of osteomyelitis.

Because of increasing redness, pain, and pus secretion despite the incision made 2 days before by the patient's general practitioner, we performed an urgent incision through a Bruner approach, with irrigation and debridement of the soft tissue. There was no fluctuation or tenderness on the dorsal aspect of the thumb at the initial presentation, so we employed only a palmar approach.

Declaration of interests: No benefits in any form have been received or will be received by the authors related directly or indirectly to the subject of this article.

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Figure 1. Initial presentation of the thumb with redness, swelling, and turbid wound discharge.

Intraoperative findings revealed a white turbid liquid in the subcutaneous tissue. The neurovascular bundles and tendon sheath were not involved. At the end of the surgery, the wound bed was clean and devitalized tissue was removed, such that no revision surgery was planned. Consequently, the wound was closed over suction drains. Empirical intravenous treatment with amoxicillin–clavulanic acid was initiated after surgery. A revision surgery was performed 4 days later because of continued uncontrolled infection. Pus was found to be tracking dorsally and in the first web space; therefore, an additional dorsal approach was made. On the same day, culture results of subcutaneous tissue from the first operation revealed *O anthropi*. Pathogen inoculation was suspected to have occurred while gardening. After consultation with an infectious disease specialist, antibiotic treatment was adapted accordingly, and intravenous cefepime (2 g 3 times/d) was initiated. Two days after the second operation, the wound was clean and showed healthy soft tissues without pus (Fig. 2).

After 15 days of intravenous treatment, the patient was discharged home with dry wounds. Oral treatment with cotrimoxazole (960 mg 3 times/d) was continued for another 2 weeks to treat a complicated skin and soft tissue infection. Occupational therapy was initiated to help restore thumb function, soften the scars, and stretch the first web space.

Three months after the last operation, the patient showed no signs or symptoms of recurrence and was satisfied with the function of the hand (Fig. 3). An immunosuppressive state was excluded by a negative human immunodeficiency virus serology test, a normal blood cell count, normal blood sugar levels, and normal renal function.

Discussion

Ochrobactrum anthropi is an opportunistic, aerobic, gram-negative, low-virulence pathogen that is only occasionally associated with human infections, many of which are nosocomial.^{2,8} The first human infection with *O anthropi* was described in 1980 in a debilitated patient with a pancreatic abscess.⁴ Other case reports of *O anthropi* infections in immunocompromised patients have been described (ie, patients undergoing chemotherapy; patients with Crohn disease, pancreatitis, or diabetes mellitus; and preterm infant with congenital anomalies).^{3,5,6,8,9}

Alnor and colleagues³ described the ability of *O anthropi* to adhere to foreign bodies (ie, silicon tubes) and form biofilms, similar to Staphylococci, which dominate in implant-associated infections.³ Some clinical cases of *O anthropi* were associated with implants and involved predominantly vascular catheters.^{2,3,5,7–10} Other implant-associated *O anthropi* infections included biliary sepsis associated with bile drainage and chest tube–associated pleural empyema after partial lobectomy.¹¹ *Ochrobactrum anthropi* meningitis with subacute presentation developed in 3 patients after implantation of a contaminated dural (pericardial allograft) graft.¹² Two of those patients developed secondary cranial bone flap osteomyelitis and one experienced a relapse of infection along a ventriculoperitoneal shunt track. The infection was successfully eradicated only after removal of the dural graft and shunt.¹²

Infections in healthy patients without implants, as in the current case, are rare. Osteochondritis of the foot was caused by *O anthropi* after a nail puncture wound in a young, healthy patient and was successfully treated with surgical irrigation and debridement as well as intravenous cotrimoxazole with gentamicin.¹³ In another case, a young, healthy patient developed osteomyelitis of the lateral cuneiform bone 10 years after a nail had punctured the rubber sole of his sports shoe. Therapy included incision and drainage, removal of several solid pieces of rubber from the inner portion of the bone, and oral ciprofloxacin and cephadrine for 6 weeks, which led to the resolution of symptoms.¹⁴ Vaidya et al¹⁵ described an *O anthropi* infection in a healthy patient after complicated appendicitis and laparoscopic appendectomy. The case of *O anthropi* infection reported here is unique in that there was no evidence of trauma or macroscopic evidence of a retained foreign body to provide access for the infection. There is no uniformly recommended antimicrobial treatment for *O anthropi* infections, and it is not known whether a combined treatment is associated with a better outcome.¹⁶ However, in the series of 15 patients reported by Yu et al,⁹ monotherapy with an aminoglycoside or an appropriate beta-lactam was sufficient. Thoma et al¹⁷ determined antibiotic susceptibilities of 103 *Ochrobactrum* isolates to 19 clinically relevant antimicrobial agents. Strains were highly resistant to most beta-lactam antibiotics, which is consistent with the reported expression of an AmpC beta-lactamase.¹⁸ All were susceptible to ciprofloxacin and 100 of 103 were susceptible to cotrimoxazole (97%).¹⁷ Susceptibility to gentamicin, imipenem, and cefepime–ceftazidime has been documented as well.¹⁹ Removal of implants such as vascular catheters or dural grafts in combination with surgical debridement in cases of extensive soft tissue and/or bone involvement is necessary to eradicate infection successfully.¹²

Although most reported cases in the literature are related to immunosuppression and vascular catheters or other implants, the current case demonstrates that infection with *O anthropi* can develop in an otherwise healthy patient without implants. Inoculation of the environmental pathogen might have occurred during gardening. Treatment includes not only adequate debridement of the infected tissue but also removal of implants and foreign bodies, and optimized antibiotic treatment. Empiric treatment usually includes amoxicillin–clavulanic acid, which covers the most common pathogens in wound infections (ie, *Staphylococcus aureus* and Streptococci). The lower virulent environmental pathogens can still be treated when isolated; therefore, broadening of empiric antibiotic treatment is not recommended. This was shown in our patient, in whom an infection of the hand was locally uncontrolled with ineffective empiric antibiotic treatment despite adequate debridement. Antibiotic therapy should follow susceptibility testing, but it usually includes a broad-spectrum intravenous beta-lactam such as imipenem–cilastatin or cefepime, or oral treatment with cotrimoxazole or ciprofloxacin.



Figure 2. Intraoperative photograph reveals the extent of the second surgery and debridement in our clinic, but no macroscopic signs of infection.

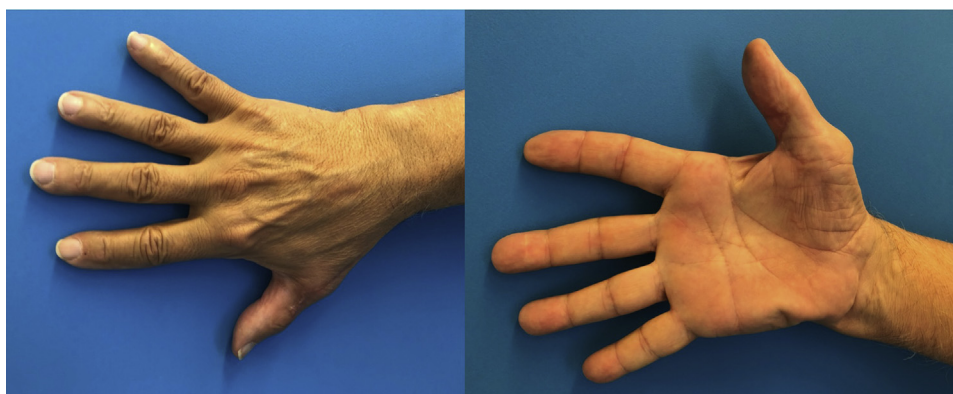


Figure 3. Clinical presentation 3 months after the last surgery, showing complete healing of the wounds.

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