

DOI: 10.4274/mjima.galenos.2019.2019.35
Mediterr J Infect Microb Antimicrob 2019;8:35
Erişim: <http://dx.doi.org/10.4274/mjima.galenos.2019.2019.35>

Severe Wound Infection due to *Acinetobacter baumannii* After a Human Bite

İnsan Isırığı Sonrası *Acinetobacter baumannii*'ye Bağlı Gelişen Ağır Bir Yara Enfeksiyonu

© Gökhan KARAHAN¹, © Ali İlgin OLUT², © Levent KÜÇÜK³, © Halil ERKAN²

¹İzmir Bozyaka Training and Research Hospital, Clinic of Orthopedic Surgery, İzmir, Turkey

²İzmir Bozyaka Training and Research Hospital, Clinic of Infectious Diseases and Clinical Microbiology, İzmir, Turkey

³İzmir Ege University Hospital, Clinic of Orthopedic Surgery, İzmir, Turkey

Keywords: Human bite infections, closed-fist bite, imipenem, cefoperazone/sulbactam, morbidity

Anahtar Kelimeler: İnsan ısırığı enfeksiyonları, kapalı-yumruk tipi ısırık, imipenem, sefoperazon/sülbaktam, morbidite

Dear Editor,

Human bites—although seemingly innocuous—are potentially dangerous wounds and may cause significant morbidity. Wounds that break the skin can be especially dangerous because of the variety and concentration of bacteria and viruses in saliva. Human saliva is known to contain as many as 50 species of bacteria and viruses. Hence, human bites are prone to cause infections at the site of the bite injury as well as to pose a potential risk for transmission of systemic diseases^[1].

Human bites can be classified depending on the mechanism of injury: "occlusion bites" and "closed-fist bites" (fight bites). Occlusion bites occur when the teeth are sunk into the skin. Clenched-fist injuries occur when a closed-fist impacts another individual's teeth, leaving an injury over the dorsal aspect of the third, fourth, or fifth metacarpophalangeal (MCP) joints. These are known to be among the worst human bites, and even a seemingly minor injury may lead to a serious infection and damage to the underlying joints, tendons, or bones^[2]. Unfortunately, most people ignore these wounds or have judicial hesitations and do not seek medical attention until the onset of pain, swelling, or purulent discharge that occur usually in more advanced infections^[3].

Herein, we present a 45-year-old male patient with a severely necrotic and infected wound on the dorsum of the left hand with cellulitis spreading to the elbow that occurred two weeks after a closed-fist bite injury. The bacterial cultures yielded a very unusual pathogen, *Acinetobacter baumannii*, as the causative agent. Despite appropriate antibiotic treatment and debridement, the disease course was awful, and the patient's recovery resulted in severe sequelae.

A 45-year-old male taxi driver presented to our emergency department with a severely necrotic and infected wound on the dorsum of the left hand. He had a necrotic 4x3x2 cm wound above the fourth and fifth MCP joints, with a dark scar tissue extending through the wrist and cellulitis extending through the left elbow (Figure 1). There was no putrid smell to suggest an anaerobic infection. He had a history of punching someone in the face two weeks before. He said that he did not seek medical attention due to personal and legal hesitations. Then, his hand started to get progressively red and swollen, and necrosis appeared on the left side of the dorsum of his hand. He said that he used some ointments and oral analgesics during that time. After the necrosis expanded and a white-yellowish discharge appeared from the wound, he decided to apply to an emergency unit.

Cite this article as: Karahan G, Olut AI, Küçük L, Erkan H. Severe Wound Infection due to *Acinetobacter baumannii* After a Human Bite. Mediterr J Infect Microb Antimicrob. 2019;8:35.



Address for Correspondence/Yazışma Adresi: Ali İlgin Olut MD, İzmir Bozyaka Training and Research Hospital, Clinic of Infectious Diseases and Clinical Microbiology, İzmir, Turkey

Phone: +90 532 264 34 72 E-mail: iolut@yahoo.com ORCID ID: orcid.org/0000-0003-4129-6453

Received/Geliş Tarihi: 17.10.2019 Accepted/Kabul Tarihi: 30.12.2019

©Copyright 2019 by the Infectious Diseases and Clinical Microbiology Specialty Society of Turkey
Mediterranean Journal of Infection, Microbes and Antimicrobials published by Galenos Yayınevi.

Published: 01.02.2019

He was administered a single prophylactic 1 g dose of intramuscular ceftriaxone in our emergency unit. Afterwards he was taken to the operating room for an emergency wound exploration and wound irrigation. Gram staining of the wound swab showed dominantly Gram-negative microorganisms; wound and tissue cultures were performed, and the patient was hospitalized to receive broad-spectrum antimicrobial therapy with imipenem 4x500 mg/day.



Figure 1. Infected necrotic wound above the fourth and fifth metacarpophalangeal joints, with a dark scar tissue extending through the wrist and cellulitis

The microorganism was identified in the microbiology laboratory of our hospital with the automated methods of BD Phoenix ID/AST (BD Diagnostic Systems, Sparks, MD, USA) in addition to classical methods. As we do not perform routine anaerobic cultures, anaerobic bacteria results could not be obtained. Antibiotic susceptibility tests were also performed with the same system and evaluated according to the European Committee on Antibacterial Susceptibility Training criteria^[4]. On the third day, both wound and three tissue biopsy cultures yielded *A. baumannii* that was resistant to carbapenems, quinolones, and all cephalosporins including cefepime and sensitive to tigecycline, cefoperazone-sulbactam, and trimethoprim-sulfamethoxazole. The antibiotic treatment was switched from imipenem to cefoperazone-sulbactam 3x2 g/day that continued for another four weeks. The patient underwent three more operations. In the second operation that was performed three days later, infection-related necrosis was observed in the fifth finger, and the fifth finger was amputated (Figure 2). Weekly debridements were performed after amputation; regression was observed after the third debridement, and the skin was covered with graft by the third operation, but wrist drop persisted (Figure 3).

Human bites constitute a minor percentage of all mammalian bites but reported to comprise up to 20% in some reports^[5]. Of the two types, clenched-fist injuries are considered more



Figure 2. A) Diffuse skin, subcutaneous, fascial involvement during the first admission and emergency debridement/after debridement. B) Fifth finger infection and necrosis and fifth finger amputation and redebridement. C) Skin necrosis and extensor muscle necrosis, debridement, and wrist drop



Figure 3. Flap application after consecutive wound exploration and irrigations

dangerous as they are more prone to serious infections and reported in 7.7-56% of all human bites^[6]. Approximately 20-25% of human bites develops infection. The risk increases in deep wounds with marked tissue destruction, edema, and poor perfusion and wounds on the hands that involve bones, joints, or tendons^[5-7]. Relevant pathogens in the setting of human bite wounds include normal human oral and skin flora: oral streptococci, staphylococci, *Eikenella corrodens*, *Haemophilus* spp., and anaerobes such as *Prevotella* and *Fusobacterium*^[5-8].

In a multicenter prospective study of 50 patients with infected human bites, the deep culture bacteriology was as follows: aerobes and anaerobes in 54% of wounds, aerobes alone in 44%, and anaerobes alone in 2%. *Streptococcus anginosus* (n=26), *Staphylococcus aureus* (n=15), *E. corrodens* (n=15), *Fusobacterium nucleatum* (n=16), *Prevotella melaninogenica* (n=11), *Veillonella* spp. (n=12), and *Haemophilus* spp. (n=11) were the most commonly isolated pathogens^[6]. In a study by Visser and Visser^[9], 38 patients with infected human and animal bites over a 27-month period were analyzed. Of those, 25 were human bites while 56% were caused by Gram-positive bacteria and 46% Gram-negative bacteria. *Streptococcus* spp. was the most common Gram-positive isolate in 36%, and *Proteus* spp. was the most common isolate in 12% of all cases. Interestingly in one of 11 dog bite cases, *Acinetobacter* spp. was isolated. Another interesting finding was, although many practice guidelines advise on the use of amoxicillin-clavulanic acid as the most appropriate choice in almost all bite wounds, they stated that only 20% of dog bites and 63% of human bites would have responded to this treatment.

As the likelihood of infection after a human bite cannot be underestimated, the question of antimicrobial prophylaxis arises. In a Cochrane Intervention Review about antibiotic

prophylaxis for mammalian bites, the experts concluded that the use of prophylactic antibiotics was associated with a statistically significant reduction in the rate of infection after bites by humans but not after bites by cats or dogs. They did not point to any specific antimicrobial choice but refer to the study of Zubowicz and Gravier^[10] that established that hand bites had a higher infection risk compared with other sites. The experts stated that "Although the data is limited, mammalian bites to the hands, and especially human bites, should be treated with aggressive washout and debridement, followed by a course of antibiotics for between two to five days and delayed primary or secondary wound closure".

Herein, we reported a closed-fist bite injury that was admitted to medical care two weeks after the incident, so the patient had not received any prophylaxis. We do not know if our case had any hospital contact before. Before first debridement, the patient received 1 g of ceftriaxone without any anaerobic activity. The wound and tissue cultures revealed a very unexpected agent for this type of injury-*A. baumannii*-that was resistant to imipenem, which was our empirical choice in management. Although previously reported in a dog bite, we did not find any case of human bite infection caused by this pathogen in the literature. Despite appropriate antibiotic treatment and consecutive debridements, the disease course was awful, and the patient's recovery resulted in severe sequelae. Our case emphasizes the importance of early intervention of human bite injuries as negligence may result in serious morbidities for the patients.

Ethics

Ethics Committee Approval and Informed Consent: Bozyaka Training and Research Hospital, Human Research Ethics Committee (Medical) approved the study. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The informed consent to write and to publish this case presentation was received.

Peer-review: Externally and internally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: L.K., G.K., Concept: L.K., G.K., Design: A.I.O., Data Collection or Processing: L.K., G.K., Analysis or Interpretation: A.I.O., Literature Search: A.I.O., H.E., Writing: A.I.O.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Perron AD, Miller MD, Brady WJ. Orthopedic pitfalls in the ED: Fight bite. *Am J Emerg Med.* 2002;20:114-7.
2. Patzakis MJ, Wilkins J, Bassett RL. Surgical findings in clenched-fist injuries. *Clin Orth Rel Res.* 1987;220:237-40.
3. De Smet L, Stoffelen D. Clenched fist injury: a pitfall for patients and surgeons. *Acta Orthop Belg.* 1997;63:113-7.
4. EUCAST European Committee on Antimicrobial Susceptibility Testing. Redefining susceptibility testing categories S, I and R, version 9.0, 2019. Last accessed date: 16.10.2019. Available from: <https://www.eucast.org/newsiandr/>
5. Norton C. Animal and human bites. *Emerg Nurse.* 2008;16:26-9.
6. Talan DA, Abrahamian FM, Moran GJ, Citron DM, Tan JO, Goldstein EJ; Emergency Medicine Human Bite Infection Study Group. Clinical presentation and bacteriologic analysis of infected human bites in patients presenting to emergency departments. *Clin Infect Dis.* 2003;37:1481-9.
7. Bula-Rudas FJ, Olcott JL. Human and Animal Bites. *Pediatr Rev.* 2018;39:490-500.
8. Rothe K, Tsokos M, Handrick W. Animal and Human Bite Wounds. *Dtsch Arztebl Int.* 2015;112:433-42.
9. Visser A, Visser HF. Biting off more than you can chew: Microbiological flora isolated from human and animal bite wounds. *SA Orthop J.* 2012;11:43-8.
10. Zubowicz VN, Gravier M. Management of early human bites of the hand: a prospective randomized study. *Plast Reconstr Surg.* 1991;88:111-4.