

## Case Report

# Necrotizing fasciitis due to *Streptococcus mitis* caused by accidental human bite

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### Abstract

Human bite wounds are more prone to infection than animal bites, which may cause necrotizing soft tissue infections such as myositis, fasciitis. Both aerobic and anaerobic microorganisms may be responsible, including *Streptococcus spp.*, *Staphylococcus aureus*, *Peptostreptococcus spp.* Necrotizing fasciitis is characterized by serious tissue destruction and systemic toxicity with high morbidity and mortality. We report a patient with *Streptococcus mitis* associated necrotizing fasciitis on the upper extremity resulting from an accidental human bite, which caused nearly fatal infection. Prophylactic antibiotic treatment should be given after a human bite to prevent infection. If the infection signs and symptoms develop, rapid diagnosis, appropriate antibiotic and surgical therapy should be administered immediately. *Streptococcus mitis* is a viridans streptococcus, usually known as a relatively benign oral streptococcus. To our knowledge, this is the first necrotizing fasciitis case due to *Streptococcus mitis* after human bite.

**Key words:** Necrotizing fasciitis; human bite infections; *Streptococcus mitis*; wound infection.

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### Introduction

Necrotizing fasciitis (NF) is a rapidly progressive infection of skin and soft tissue with high mortality rate, median 32.2% (ranges 8.7 to 76%) [1,2]. Prognosis is poor, if the patients have comorbidities such as diabetes mellitus, immunosuppression etc. Rapid diagnosis and appropriate management of this life threatening disease is very important to reduce the mortality and morbidity. NF should be thought in a differential diagnosis if the patient has pain disproportionate to clinical findings [3,4]. Empirical antibiotherapy with broad-spectrum antibiotics and aggressive debridement are the main principles of the therapy. There are a few cases of NF resulting from human bites in the literature [4-8]. Both aerobic and anaerobic microorganisms may be responsible, including *Streptococcus spp.*, *Staphylococcus aureus*, *Peptostreptococcus spp.* In the present article, we report NF associated with *Streptococcus mitis*, developed due to the accidental human bite which

resulted in extremity amputation. *Streptococcus mitis* is a viridans streptococcus, involved in oral commensal flora and usually known as a relatively benign oral streptococcus. To our knowledge, this is the first necrotizing fasciitis case due to *Streptococcus mitis* after human bite.

### Case Report

A 53-year-old man was admitted to the emergency department with signs of cellulites four days after an accidental bite of his daughter, on the second finger of his right hand. He had a history of uncontrolled diabetes mellitus and congestive heart failure (ejection fraction; 30%). On admission, his symptoms were pain, swelling, hyperemia on his hand dorsum and minimal purulent drainage from bite wound. He had no history of antimicrobial prophylaxis as he didn't go to hospital after the injury. On physical examination, he was clinically stable and had a temperature of 36.5 °C. There was a hyperemia on the dorsum of right

hand. Minimal purulent discharge was observed from the wound. Laboratory parameters revealed; elevated white blood cell count (17,000 / mL) and 85% neutrophils, higher glucose level (289 mg/ dl). Other laboratory parameters were in normal range. There were no signs of abscess, fractures, osteomyelitis, septic arthritis and gas shadows on the radiography. He was also examined by a plastic surgery surgeon and the wound was not required any debridement or intervention. Tetanus prophylaxis was administered. After receiving culture, he was given amoxicillin-clavulanate 2x1 g / day and ciprofloxacin 2x500mg / day orally was administered and he was advised to have a check-up after 2 days.

On the polyclinic examination of the patient, there was a progression on the wound. He had an edema and hyperemia on the hand dorsum up to the 5 cm distal part of the forearm. In addition, 3x3 cm necrotic tissue was observed on the hand dorsum. He experienced pain and limited finger movements. He was admitted to the infectious disease clinic and piperacillin-tazobactam 3x4,5 g / day iv and daptomycin 4 mg / kg / day iv were administered. On the first day of admission, wound culture yielded growth of penicillin sensitive *Streptococcus mitis*. Isolate was identified by conventional method: the strain was alpha-hemolytic, catalase negative, Gram-positive coccus morphology arranged in chains, optochin resistant, trimetoprim-sulphamethoxazole (SXT) susceptible and insoluble in bile; it was also defined as *Streptococcus mitis* with BrukerBiotyper MALDI-TOF MS (Matrix-assisted laser desorption/ionization- time of flight mass spectrometry). Automated antimicrobial susceptibility tests were performed by the Phoenix Automated System. NF was thought in differential diagnosis and the patient was sent to plastic surgery for debridement of the wound. He was urgently transferred to the operating room for surgical exploration of the injury. Necrotic muscle tissue was debrided which extended up to deep fasciae layers (Figures 1 and 2). The incision was lengthened to the forearm muscles and tendons to excise all necrotic fasciae layers and tendons. Deep muscle abscess was drained. On the histopathological investigation; active chronic signs of inflammation, necrotic muscle tissue and micro abscess were detected, no sign of microorganism could be observed. On the follow up, despite the several debridements, it was not possible to close a defect with functional surgical intervention. A total of seven debridements were applied and since the bone tissue was not well vascularized, necrotic bone tissue debridement was applied, too. Amputation was

performed on the third level of the distal forearm by orthopedic surgery in order to protect the patient's vital functions on the patient's 25<sup>th</sup> day of admission. He could not be extubated after the surgery and admitted to intensive care unit (ICU). On the first day of admission, he was extubated and intermittent non-invasive mechanic ventilation (NIMV) was applied. Due to massive pleural effusion due to heart failure, he was re-intubated and ventilated by invasive mechanical ventilation. Also, bilateral thorax drainage tubes were applied and after his ventilation was evaluated as adequate, he was extubated and NIMV was administered as needed. On the 10<sup>th</sup> day of ICU admission, he was discharged from ICU, conscious, cooperated, oriented with the Glasgow Coma Scale value of 15 and without need of NIMV. On the follow up, antibiotic therapy was stopped since there were no signs of infection around the operation site and he was discharged from hospital.

## Discussion

Human bite injuries have a risk for the development of deep skin and soft infections such as necrotizing fasciitis, myositis, osteomyelitis. Infection

**Figure 1.** Right upper extremity after second debridement (on the 14th day of admission).



**Figure 2.** Right upper extremity after seventh debridement (on the day of amputation).



rate due to the human bite was around 18% of which are the third most common type of bites [9]. The possible causative pathogens are *Streptococcus spp.*, *Staphylococcus aureus*, *Eikenella*, *Fusobacterium*, *Peptostreptococcus*, *Prevotella*, and *Porphyromonas spp* [10]. Fever, hyperemia, tenderness, pain, swelling, purulent drainage constitute the findings of the bite wound infection. Most of the patients are neglecting these wounds until signs of infections occur. Antibiotic prophylaxis should be given to all patients with human bite [10]. If there is a purulent drainage on physical examination, cultures should also be obtained before the antibiotic therapy. Our case had a necrotizing fasciitis infection with *Streptococcus mitis* that was grown on the culture of the wound. Since the patient didn't go to the health care facility after the injury, he couldn't use prophylactic antibiotherapy that should have coverage against oral flora microorganisms. *Streptococcus mitis* belongs to viridans group streptococcus, a member of oral flora, usually known as a relatively benign *streptococcus*. However, it can cause an invasive disease such as bloodstream infections in immunosuppressive patients [11]. To our knowledge there is no reported necrotizing fasciitis case due to *Streptococcus mitis* in the literature. NF should be thought in a differential diagnosis if the patient has pain disproportionate to clinical findings [3,4]. Additionally, radiography is important which should be performed to determine the complications such as septic arthritis, gas shadows for necrotizing fasciitis or osteomyelitis.

Necrotizing fasciitis is a very important complication resulting from human bite. Although it is a rare condition, rapid multidisciplinary approach is necessary for the management of this life-threatening complication. If the patient has comorbidities like diabetes mellitus, immunosuppressive condition, renal failure, mortality rate increases [1]. Since our patient has diabetes mellitus and congestive heart failure with the ejection fraction 30%, the infection becomes more progressive. In addition, management of the patient was more difficult due to the hemodynamic instability. Although, appropriate antibiotic treatment was given and serial debridements were applied, extremity amputation was inevitable to save his life.

Furthermore, administration of tetanus prophylaxis should be kept in mind for patients with human bites who did not complete the primary immunization. Tetanus toxoid should also be applied to those who have completed a primary vaccination series but did not receive a booster during the previous five years [12].

In conclusion, human bite wounds are prone to infection with the microorganism of oral flora. For this reason, prophylactic antibiotic treatment should be given after human bite to prevent infection. If the infection signs and symptoms develop, rapid diagnosis, appropriate antibiotic and surgical therapy should be applied instantly.

## References

- Misiakos EP, Bagias G, Patapis P, Sotiropoulos D, Kanavidis P, Machairas A (2014) Current concepts in the management of necrotizing fasciitis. *Front Surg* 1: 36.
- Anaya DA, Dellinger EP (2007) Necrotizing soft-tissue infection: diagnosis and management. *Clin Infect Dis* 44: 705–710.
- Bisno AL, Cockerill FR, Bermudez CT (2000) The initial outpatient physician encounter in group A streptococcal necrotizing fasciitis. *Clin Infect Dis* 31: 607- 608.
- Sikora CA, Spielman J, Macdonald K, Tyrrell GJ, Embil JM (2005) Necrotizing fasciitis resulting from human bites: A report of two cases of disease caused by group A *Streptococcus*. *Can J Infect Dis Med Microbiol* 4: 221-224.
- Wienert P, Heiss J, Rinecker H, Sing A (1999) A human bite. *Lancet* 354: 572.
- Yamaoka M, Furusawa K, Kiga M, Iguchi K, Hirose I (1990) Necrotizing buccal and cervical fasciitis. *J Craniomaxillofac Surg* 18: 223-224.
- Behar DM, Edelshtein S, Ben-Ami H, Mansano R, Edoute Y (2000) Human bite on penile shaft from oral sex as a portal of entry for streptococcal toxic shock syndrome. *Isr Med Assoc J* 2: 945-947.
- Danino AM, Malka G (2004) A lethal necrotizing fasciitis after human bite. *Plast Reconstr Surg* 113: 2234-2235.
- Morgan M (2005) Hospital management of animal and human bites. *J Hosp Infect* 61: 1-10.
- Stevens DL, Bisno AL, Chambers HF, Dellinger EP, Goldstein EJ, Gorbach SL, Hirschmann JV, Kaplan SL, Montoya JG, Wade JC, Infectious Diseases Society of America (2014) Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the infectious diseases society of America. *Clin Infect Dis* 59: 147.
- Mitchell J (2011) *Streptococcus mitis*: walking the line between commensalism and pathogenesis. *Mol Oral Microbiol* 26: 89-98.
- Baddour LM (2014) Soft tissue infections due to human bites. Available at <http://www.uptodate.com>, Accessed June 24, 2013.

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