

First case of a dog bite wound infection caused by *Streptococcus minor* in human

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Abstract

We report the first case of human infection caused by *Streptococcus minor* in a 51-year-old immunocompetent woman admitted for dog bite injuries. At present, the role of *Streptococcus minor* in bite wound infections is unknown. Further studies on virulence factors are needed to elucidate its pathogenicity mechanisms.

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Keywords: Dog bite injuries, pathogen identification, patient treatment, *Streptococcus minor*, wound infection

Original Submission: 21 June 2016; **Revised Submission:** 1 August 2016; **Accepted:** 5 August 2016

Article published online: 12 August 2016

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Introduction

Streptococcus minor was described in 2004 as a new species isolated from the tonsils of dogs, cats and cattle as well as from the intestinal tract of dogs [1]. Although staphylococci and streptococci are commonly involved genera in bite-infected wounds [2], no cases of human infection by *S. minor* have been reported in the literature. Here we report a case of a dog bite wound infected with *S. minor*.

Case presentation

A 51-year-old woman was admitted for a dog bite injury to her right hand. The patient's medical history revealed a urinary bladder cancer 3 years ago, currently in remission. She presented with inflammation, redness, heat and pus production at the bite wounds (Fig. 1). Clinically, the patient was afebrile (temperature 36.6°C), and no signs of systemic infection were

observed. Biologic investigations revealed an inflammatory syndrome with a C-reactive protein value of 46 mg/L (normal value, <5 mg/L) associated with a light leukocytosis of 10.880 cells/ μ L (normal range, 4 to 10×10^3 cells/ μ L). Urgent surgery was proposed but was refused by the patient despite warnings of the risk of sepsis and necrosis. The wounds were washed with povidone-iodine, and intravenous empiric antibiotic therapy was initiated (cefazolin 2 g/d). One set of peripheral blood cultures (including aerobic and anaerobic conditions) was performed, and no growth was observed after 5 days of incubation. Wound samples were also taken for aerobic and anaerobic microbiologic cultures. Microscopic examination of the Gram-stained wound samples was negative for microorganisms. Aerobic culture from pus wounds after 48 hours on Columbia agar (Becton Dickinson, Franklin Lakes, NJ, USA) yielded a pure growth of unpigmented, regular, translucent and α -hemolytic colonies of Gram-positive *Streptococcus*. No other organisms, including anaerobes, were found.

Identification as *Streptococcus minor* was achieved using matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS; Bruker Daltonics, Bremen, Germany), with an excellent score of 2.428. Sequencing of 16S rRNA gene (96GA3730 XL; Thermo Fisher Scientific Life Sciences, Waltham, MA, USA) confirmed the identification of *S. minor* with 100% of identity and demonstrated the usefulness of MALDI-TOF MS for identifying this organism. The



FIG. 1. Infected dog bite on right hand after hospital admission.

antimicrobial testing showed susceptibility to penicillin, clindamycin, erythromycin and trimethoprim–sulfamethoxazole. The isolate was resistant to moxifloxacin. The patient left the hospital the same day and received 10 days of oral antimicrobial therapy with amoxicillin–clavulanate acid at 850/125 mg three times a day. Under this antibiotic regimen, the patient recovered well. Five days later, patient examination revealed no clinical signs of infection or radiologic signs of bone injury.

Discussion

Infections caused by *S. minor* are probably underestimated because of the organism's facultative anaerobic nature, requiring a CO₂-enhanced atmosphere, and the difficulty in identifying to the species level α -hemolytic streptococci with current laboratory techniques. Moreover, in contrast to other streptococci generally identified in zoonotic infection, such as *Streptococcus canis* (group G) involved in several cases of

septicaemia and one case of infective endocarditis [3,4], *S. minor* does not react with Lancefield groups A, C, D, F or G antisera [5]. Although the pathogenicity of this organism is still unknown, this case suggests that *S. minor* can lead to serious local infections. This study also demonstrates the usefulness of MALDI-TOF MS for identifying this organism.

To our knowledge *S. minor* has never been isolated from humans but is part of the commensal flora from dogs, suggesting strong causality. Unfortunately, in this case, the dog bite had occurred a while ago, and the dog was not available for further testing in order to compare the homology of both the patient's and dog's isolate strains and to confirm the origin and the pathogenicity of *S. minor*. Further investigation on the oral dog flora and on *S. minor*'s virulence factors is necessary to confirm its implication and elucidate its pathogenic mechanisms.

Conflict of Interest

None declared.

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