Case Report

Septicaemia caused by *Arcanobacterium haemolyticum* smooth type in an immunocompetent patient

Karolina Hedman and Annelie Brauner

Department of Microbiology, Tumor and Cell Biology, Division of Clinical Microbiology, Karolinska Institutet and Karolinska University Hospital, Solna, 171 76 Stockholm, Sweden

*Arcanobacterium haemolyticum* is a rarely reported human pathogen but can cause wound infections in elderly patients with immunodeficiency and pharyngotonsillitis in adolescents and young adults. *A. haemolyticum* septicaemia originating from a wound rarely occurs and mainly affects immunocompromised patients. Here, we report a case of *A. haemolyticum* septicaemia in an immunocompetent patient with no underlying diseases.

Introduction

*Arcanobacterium haemolyticum* is known to cause wound infections in immunocompromised patients (Linder, 1997) and pharyngotonsillitis in adolescents and young adults (Mackenzie et al., 1995). Even less commonly, the bacteria can cause osteomyelitis, brain abscesses (Vargas et al., 2006) and endocarditis (Alos et al., 1995; Wong et al., 2011). Only a few isolated cases of septicaemia caused by *A. haemolyticum* smooth type have been reported in patients with no underlying diseases (Tan et al., 2006). When identified using traditional culture methods, *A. haemolyticum* is often regarded as part of the normal skin flora if detected on the first day of culture. We would therefore like to emphasize its possible relevance as an infective agent in immunocompetent patients.

Case report

A 62-year-old man underwent surgery of the arch of the foot with osteosynthesis to treat a case of pes planus. Postoperatively he developed a wound infection caused by *Staphylococcus aureus* and Group G β-haemolytic streptococci. The infection was successfully treated and the wound healed. Apart from foot pain and neuropathy, the patient was healthy with no diabetes, no drug abuse and no known immunodeficiency. Two years post-surgery he was admitted to Karolinska University Hospital where he presented with high fever, unstable blood pressure and a swollen foot with an infected wound. His C-reactive protein level peaked at 182 mg l⁻¹. He had no rash and no respiratory symptoms.

Initially, he was treated with cefuroxim intravenously. After 1 day, the wound culture revealed growth of *S. aureus*. *A. haemolyticum* was detected in the wound culture as well as in the blood culture after 2 days. On the third day, the patient was discharged with a 1 week course of oral clindamycin. In the follow-up examination, 1 week later, C-reactive protein had decreased to 10 mg l⁻¹.

Discussion

*A. haemolyticum* is a facultatively anaerobic, catalase-negative, reverse-CAMP-positive, Gram-positive rod. Humans are thought to be the main environmental reservoir of this micro-organism and it is not usually a respiratory colonizer. Two biotypes have been identified: rough type, which is almost exclusively isolated from the airways, and smooth type that is predominantly isolated from wound infections (Carlson et al., 1994). The two biotypes can be identified visually on horse blood agar plates after 48 h of incubation and can be further identified using the API Coryne system (bioMérieux). Smooth type colonies have smooth glistening surfaces, entire edges and moderate to strong β-haemolysis action, while rough type colonies have rough surfaces, irregular edges, weak or non-existing β-haemolysis action and sometimes display a dark discoloration around the colonies. The rough type can also be defined by its β-glucuronidase (β-GUR) activity and its ability to ferment sucrose and/or trehalose, whereas the smooth type is β-GUR negative and can be positive or negative regarding its fermentation of sucrose/trehalose (Carlson et al., 1994). Modern techniques such as 16S rRNA gene sequencing have been used as a more specific method of identification for *A. haemolyticum*, compared to traditional culture methods (Garcia-de-la-Fuente et al., 2012). MALDI-TOF MS has also been described as a good and very fast method for the identification of *A. haemolyticum* (Vila et al., 2012). Whether these methods will replace currently used culture techniques in the future remains to be seen.

*A. haemolyticum* isolated from wound infections is most often found together with Group A, C or G β-haemolytic streptococci, *S. aureus* or *Corynebacterium diphtheriae*.

Abbreviation: β-GUR, β-glucuronidase.
Pharyngotonsillitis caused by *A. haemolyticum* is accompanied by a characteristic skin rash developing within 1–4 days. *A. haemolyticum* is also known to be a co-pathogen in Lemierre’s syndrome together with *Fusobacterium necrophorum*.

At the Karolinska University Laboratory we analyse about 50,000 blood cultures annually and among those, 12–13% show bacterial growth. During the previous 15 years we have only found two other cases of septicaemia caused by *A. haemolyticum*. The first case was an otherwise healthy 20-year-old man with pharyngotonsillitis and Lemierre’s syndrome accompanied by a maculo-papulous rash and growth of *A. haemolyticum* rough type and *F. necrophorum* in blood culture. The second case was a 55-year-old immunocompromised man with multiple diseases, including diabetes mellitus, as well as poor dental status and foot wounds. *A. haemolyticum* smooth type was detected in blood culture and was considered to have spread from the wounds.

The current case of infection with *A. haemolyticum* smooth type, which displayed typical biochemical features for this micro-organism, spread from a wound infection and caused septicaemia in an immunocompetent non-diabetic patient. It was detected in three out of four of the blood cultures and in the wound culture together with *S. aureus*.

**Conclusion**

We would like to emphasize that *A. haemolyticum* smooth type can cause severe disease and even septicaemia not just in immunocompromised patients but also in immunocompetent non-diabetic patients. When performing wound cultures it is important not to settle with the primary pathogen found the first day of culture but to carefully look for slow-growing pathogens, such as *A. haemolyticum*, in order not to delay appropriate antibiotic treatment.

**References**


