Case Report

First clinical case of *Corynebacterium auriscanis* isolated from localized dog bite infection

Jeanine M. Bygott,¹ Henry Malnick,² Jayesh J. Shah,² Marie A. Chattaway³ and J. Andreas Karas¹

Correspondence

Jeanine M. Bygott
jmbygott@doctors.org.uk

¹Clinical Microbiology & Public Health Laboratory, Health Protection Agency East of England, Papworth Hospital, Cambridge, UK

²Laboratory of HealthCare Associated Infection, Health Protection Agency Centre for Infections, London, UK

³Molecular Identification Services Unit, Health Protection Agency Centre for Infections, London, UK

Received 26 November 2007

Accepted 18 February 2008

Corynebacterium auriscanis has only previously been isolated from dogs and to our knowledge no cases of zoonotic transmission to humans have been reported. A case of a leg wound infection following a dog bite in a previously healthy human patient is described and confirms this organism to be a potential human pathogen.

Case report

A previously healthy 24-year-old female was bitten by a dog, not known to her and not obviously unwell, on her lower calf. She promptly attended the local hospital, where the wound was cleaned and dressed. No prophylactic antibiotics were prescribed. She presented to her general practitioner 5 days later with a 2 cm diameter painful superficial wound with a haemoserous discharge. Significant local bruising was noted. A wound swab taken at this visit failed to yield any growth. Oral amoxicillin/clavulanic acid was prescribed for 7 days. The patient returned to her general practitioner 3 weeks later complaining of increasing tenderness at the site and a purulent discharge. Another course of oral amoxicillin/clavulanic acid was prescribed and a wound swab was taken, from which was isolated a pure heavy growth of a Gram-positive rod resembling a coryneform organism.

Disc diffusion sensitivity testing was performed on Iso-Sensitest agar (Oxoid), supplemented with 5 % defibrinated horse blood and 20 mg β -nicotinamide adenine dinucleotide I^{-1} , after overnight incubation at 35 °C and with 5 % CO_2 . Using the British Society of Antimicrobial Chemotherapy (BSAC) criteria for coryneform organisms (Andrews, 2001), the isolate was found to be susceptible to ciprofloxacin and vancomycin and resistant to penicillin. In the absence of other standardized breakpoints for coryneforms, antibiotic susceptibility was determined using the BSAC criteria for *Streptococcus* spp. other than *Streptococcus pneumoniae* and the isolate was reported to be susceptible to erythromycin, tetracycline and linezolid and resistant to amoxicillin and amoxicillin/clavulanic acid. The MIC for amoxicillin/clavulanic acid was found to be ≥ 256 mg l^{-1} by Etest.

The patient was treated with a succession of antibiotics including a week of oral ciprofloxacin plus oxytetracycline

then oral erythromycin. However, 6 weeks after the initial injury, a 4 cm abscess was clinically evident. This was incised and drained and culture again yielded a pure heavy growth of a Gram-positive rod. Infection completely resolved following debridement and a further course of oral oxytetracycline.

Since the isolate failed to be identified at the hospital laboratory, it was referred to the Health Protection Agency's Centre for Infections for further testing. An API CORYNE identification strip (bioMérieux) gave the profile number 4100104, indicating a 70 % match with *Corynebacterium bovis*. Fatty acid methyl esters were analysed by gas chromatography using the standard procedure of Sherlock Microbial Identification System's CLIN database (MIDI). The results showed that the isolate was similar to six different species of *Corynebacterium*. Further identification was obtained by a 16S rRNA gene sequence search on GenBank, which showed that the isolate matched at 99.6 % similarity three isolates of *Corynebacterium auriscanis* (the type strain was not in GenBank at the time). The fatty acid profile differed slightly from that published for NCTC 13391 (Collins *et al.*, 1999) perhaps due to the use of trypticase sheep blood agar (BBL) instead of Columbia horse blood agar. The fatty acids (>1 %) detected were as follows (type strain in parentheses): $\text{C}_{16:0}$, 44 % (47 %); $\text{C}_{18:1\omega 9\text{c}}$, 35 % (36 %); $\text{C}_{18:0}$, 7 % (5 %); $\text{C}_{17:0}$, 6 % (4 %); $\text{C}_{14:0}$, 1 % (1 %). The isolate matched the type strain (GenBank accession no. DQ996392) at a similarity level of 100 %.

Discussion

The genus *Corynebacterium* contains many species that are recognized pathogens of both humans and animals, and the use of molecular genetic methodologies has facilitated

the delineation of many novel species in recent years. *C. auriscanis* – a derivation of ‘ear of the dog’ – was described by Collins *et al.* (1999), who reported six strains of a previously undescribed catalase-positive coryneform bacterium from clinical specimens from dogs and characterized by phenotypic and molecular genetic methods. The specimens included isolates from canine otitis externa, pyoderma, an infected interdigital cyst and a vaginal swab. Most of these isolates were recovered from mixed cultures. To our knowledge, no human infections have been previously described in the literature. It is possible that prior use of amoxicillin/clavulanic acid may have selected out this rare organism from the site of infection in this patient. Various species of *Corynebacterium* (including *Corynebacterium minutissimum*, *Corynebacterium jeikeium*, *Corynebacterium pseudodiphtheriticum* and *Corynebacterium afermentans*) have previously been isolated from 12

out of 50 infected dog bites by Talan *et al.* (1999). The case described here illustrates the possibility of zoonotic transmission of *C. auriscanis*.

References

- Andrews, J. M. (2001).** The development of the BSAC standardized method of disc diffusion testing. *J Antimicrob Chemother* **48** (Suppl. 1), 29–42.
- Collins, M. D., Hoyles, L., Lawson, P. A., Falsen, E., Robson, R. L. & Foster, G. (1999).** Phenotypic and phylogenetic characterization of a new corynebacterium species from dogs: description of *Corynebacterium auriscanis* sp. nov. *J Clin Microbiol* **37**, 3443–3447.
- Talan, D. A., Citron, D. M., Abrahamian, F. M., Moran, G. J. & Goldstein, E. J. (1999).** Bacteriologic analysis of infected dog and cat bites. Emergency Medicine Animal Bite Infection Study Group. *N Engl J Med* **340**, 85–92.