CASE REPORT

**Actinobaculum massiliae**: a new cause of superficial skin infection

David J. Waghorn*

Department of Microbiology, Wycombe Hospital, Queen Alexandra Road, High Wycombe, Bucks HP11 2TT, UK

Accepted 6 August 2003

**KEYWORDS**
Actinobaculum massiliae; Skin infection

**Summary** Actinomycete-like organisms are well-recognised members of normal mucosal flora but some strains are thought to contribute to commensal skin flora too. From here they may become pathogenic. The actinomycete family has undergone significant taxonomic revision in recent years. A new species, *Actinobaculum massiliae*, closely related to *Actinomyces* spp., was first discovered in 2002. This case describes only the second human infection and the first reported skin infection due to this organism, whose normal habitat is currently unknown.

© 2003 The British Infection Society. Published by Elsevier Ltd. All rights reserved.

**Introduction**

Although *Staphylococcus aureus* is the most common bacterium associated with skin abscess formation, a variety of other bacteria can play a pathogenic role. Actinomycete-like organisms are well-recognised members of normal mucosal flora. More recently, it has been proposed that some strains may contribute to normal skin flora and from there may become pathogenic. This report describes only the second human infection caused by *Actinobaculum massiliae* and the first skin related infection associated with this newly described organism, closely related to *Actinomyces* spp.

**Case report**

A normally fit 53-year-old woman presented to her general practitioner (GP) with a small lump on her anterior chest wall, between her breasts. The lump had been present for a few months but recently it had increased in size and had become uncomfortable. Three weeks earlier the patient had been seen with an infected sebaceous cyst in the vulval area. At that time, she had been prescribed a course of oral erythromycin 250 mg four times daily for 7 days but no microbiological specimens were taken. The patient reported that the antibiotic had no effect on the lump on her chest.

The lump on the chest wall was diagnosed as a boil. A small volume (2–3 ml) of thick pus was aspirated by the GP and sent to the local microbiology laboratory. The patient was prescribed empirical metronidazole 400 mg three times daily. Gram-stain of the pus did not reveal any definite organisms but after two days culture, small 1–2 mm colonies had grown on the blood agar plate incubated anaerobically, showing resistance to metronidazole. After three days, colonies gave a ‘fried-egg’ appearance with slightly raised centres and Gram-stain revealed small Gram-negative
bacilli. Further routine laboratory tests confirmed growth in either anaerobic or capnophilic conditions but biochemical tests failed to identify the organism. Identification was finally confirmed by the Anaerobic Reference Unit, Public Health Laboratory Service, where DNA sequence analysis was performed on the variable region of the 16S rRNA gene. Results yielded 99% homology with database sequencing for the organism, *A. massiliae*. Resistance to metronidazole and in-vitro sensitivity to penicillin, erythromycin, tetracycline and clindamycin were also confirmed.

Following aspiration, the patient’s symptoms settled despite empirical use of an inappropriate antibiotic and no further treatment was required.

**Discussion**

Skin normally provides an effective defence against microbial invasion. It is colonised by a wide variety of organisms including many different genera of bacteria and yeasts, which themselves help to maintain its function and integrity. The composition of skin microflora is influenced by many factors including age, sex, body location and climate in addition to the use of topical substances such as soaps. Clinical infection can occur following skin damage, loss of local immunity and changes to the resident commensal flora. If this takes place around hair follicles, the follicles can become inflamed and form a nidus of infection.1

*Staphylococcus aureus* is the most common pathogen associated with skin abscesses or boils but anaerobes are also responsible for a significant proportion of infections. In view of the chronicity of the patient’s lesion and apparent lack of spreading inflammation, *S. aureus* may have seemed a less likely pathogen to the GP and led to the choice of empirical metronidazole therapy after aspiration.

In recent years, there have been changes in the taxonomic classification of organisms previously placed in the *Actinomyces* genus. A new genus, *Actinobaculum*, was first proposed in 1997 after the organism *Actinomyces suis*, known to cause metritis in pigs, was found to have significant genotypic and phylogenetic differences from other *Actinomyces* spp.2 The newly named *Actinobaculum suis* was immediately followed by a second species, *Actinobaculum schaalii*. This member of the new genus was the first to be associated with human infection when reported as a cause of chronic pyelonephritis in an elderly man.2

A variety of *Actinomyces* spp. have long been associated with the normal endogenous flora of mucous membranes and infection may follow if there is disruption to the mucosal barrier. The presence of *Actinomyces* spp. or similar organisms as part of normal skin flora has rarely been described but recently two new species, namely *Actinomyces radingiae* and *Actinomyces europaeus*, have been associated with chronic soft tissue abscesses of the breast, chest and back and skin abscesses of the neck and genital area, respectively.3 This has led to the proposal that skin may be a normal niche for these and some other similar bacteria.

The species *A. massiliae* was first reported in 2002 when the only other case of human infection with this organism was described in an elderly woman with recurrent cystitis.4 Massilia is the ancient world name for Marsielle where the organism was first isolated. Descriptions of the three *Actinobaculum* spp. so far reported are consistent with the phenotypic appearance of the isolate recovered here. Although staining revealed Gram-negative bacilli, these organisms are easily decolourised. Optimal growth in anaerobic or a CO2 supplemented atmosphere, together with a 'fried-egg' colonial appearance are also recognised features.2

This case is only the second reported human infection and the first skin infection with *A. massiliae*. Whether it contributes to resident commensal skin flora or represents exogenous acquisition is unknown as the normal habitat of this organism has yet to be determined.

**References**


