Decreased-linezolid Susceptibility Due to cfr in a Community-associated Methillin-resistant Staphylococcus aureus Clone (USA300) Strain

RE MENDES1, LM DESHANDE1, JE ROSS1, T TEKLE1, K CARROLL2, RN JONES1

1JMI Laboratories, North Liberty, IA; 2Johns Hopkins Hospital Microbiology Laboratory, Baltimore, MD

Abstract

Background: Cfr causes post-transcriptional modification in 23S rRNA (A2503), conferring resistance to several antimicrobial classes, including oxazolidinones and lincosamides. In the first clinical case of skin infection caused by a cfr-USA300 clone (SAU1848L), we report the first clinical case of skin infection caused by a cfr-USA300 strain (1848L) was recovered from a skin lesion at the bedside of a USA medical institution. The isolate was submitted to a central monitoring laboratory (JMI Laboratories, North Liberty, Iowa) as part of the 2009 SENTRY Antimicrobial Surveillance Program, approved by the US Food and Drug Administration (FDA), for performing standard biochemical tests and use of the Vitek® 2 system (bioMérieux; Hazelwood, Missouri).

Antimicrobial susceptibility testing: Antimicrobial susceptibility testing was performed by using broth microdilution methods, according to the Clinical Laboratory Standards Institute (CLSI; M100-A6, 2009) recommendations. Minimum inhibitory concentrations (MICs) were interpreted as described in M100-S20-U (CLSI, 2010). Retapamulin MIC results were interpreted according to CLSI M100-U. Minimum inhibitory concentrations for 23S rRNA (including G2576), L3, and L4 were determined by using the Vitek® 2 system (bioMérieux; Hazelwood, Missouri).

Plasmid analysis: Plasmid analysis was performed using the Plasmid MIDI kit (QIAGEN; Hilden, Germany). Plasmid transfer into wildtype S. aureus RN4220 was carried out by using the Plasmid MID kit ( Eid et al., 1989; Rohde et al., 2000). Plasmid DNA was completely digested using EcoRI and partially digested with S1 endonuclease. S1 partial-digested genomic DNA revealed the presence of a single plasmid band (approximately 32-kb), which was confirmed by standard biochemical tests and use of the Vitek® 2 system (bioMérieux; Hazelwood, Missouri).

Molecular typing: Figure 1 represents Lambda ladder PFGE marker also used as negative control (New England Biolabs, Ipswich, Massachusetts). S1 partial-digested genomic DNA of S. aureus clinical strain 1848L demonstrated wildtype staphylococcal clinical isolates in Mexico with linezolid resistance caused by cfr were recovered from animal sources. S. aureus cfr-positive PCR-positive for mecl (Table 1) and hybridization signals were observed on plasmid bands from both strains. PFGE profiles of Cfr-producing S. aureus showed that the Cfr-positive strains were classified into two different clonal complexes with several antibiograms.

Results

A 56-year-old man with a long history of a chronic neurologic condition due to optic neuritis, spasticity, and neuropathic pain was seen in an emergency department (ED). The patient had been on chronic immunosuppressant therapy for over a decade. He also had active rheumatoid arthritis (ED). The patient had been on chronic immunosuppressant therapy for over a decade. He also had active rheumatoid arthritis (ED). The patient had been on chronic immunosuppressant therapy for over a decade. He also had active rheumatoid arthritis (ED). The patient had been on chronic immunosuppressant therapy for over a decade. He also had active rheumatoid arthritis (ED). The patient had been on chronic immunosuppressant therapy for over a decade. He also had active rheumatoid arthritis (ED).

Conclusions

1. The first case report of a plasmid-borne cfr in a S. aureus strain belonging to the epidemic USA300 clone, which has become the predominant community-associated MRSA strain in USA, however, the finding of cfr in a community strain may be significant, since it could jeopardize the empiric therapy for skin infections.