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CASE REPORT

Elderly infection in the community due to ST5/SCC*mec*II methicillin-resistant *Staphylococcus aureus* (the New York/Japan clone) in Japan: Panton–Valentine leukocidin-negative necrotizing pneumonia

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New York/Japan clone

An 89-year-old man suffered from and died of necrotizing pneumonia with rapid progression and cavity formation due to methicillin-resistant *Staphylococcus aureus* (MRSA). He was at no risk for hospital-acquired MRSA infection. His MRSA exhibited genotype ST5/*spa*2(t002)/*agr*2/SCC*mec*II/coagulaseII and was negative for Panton–Valentine leukocidin, indicating the New York/Japan clone (the predominant epidemic hospital-acquired MRSA clone in Japan). However, this strain expressed the cytolytic peptide (phenol-soluble modulin or δ-hemolysin) genes at high level, similar to USA300 (the most common community-acquired MRSA in the United States), indicating a variant of the New York/Japan clone with an important feature of community-acquired MRSA.

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Introduction

Methicillin-resistant *Staphylococcus aureus* (MRSA) has been a common nosocomial pathogen since 1961[1]; this class of MRSA is now called hospital-acquired MRSA (HA-MRSA). HA-MRSA generally possesses staphylococcal cassette chromosome *mec* (SCC*mec*) type I, II, or III and is multidrug-resistant.[1,2] The traditional healthcare-associated risk for acquisition of MRSA includes surgery, residence in a long-term care facility, dialysis, indwelling percutaneous medical devices and catheters, and age (50—60 years and older).[3—6]

Previous studies[7—12] and our unpublished data (in 2006—2011) suggested that multilocus sequence type (ST) 5/SCC*mec*II MRSA (the epidemic New York/Japan clone) is currently the predominant clone in hospitals in Japan; this clone in Japan is also characterized by the carriage of SaPIm1/n1 (with the *tst*, *sec*, and *sel* genes) and enterotoxin gene cluster (*egc*; with the *seg*, *sei*, *sem*, *sen*, and *seo* genes) and multiple-drug resistance (including levofloxacin or fosfomycin resistance). The New York/Japan clone (Japanese type with SaPIm1/n1) has also been isolated from Taiwan.[13]

Another class of MRSA, designated community-acquired MRSA (CA-MRSA), emerged in the community from 1997 to 1999.[1,5,14] CA-MRSA generally carries SCC*mec* type IV or V, is resistant to β-lactam agents only or to some agents belonging to limited classes, and often produces Panton—Valentine leukocidin (PVL),[1,5,14] which causes apoptosis and necrosis in human polymorphonuclear cells or monocytes.[15] CA-MRSA infections are associated mainly with skin and soft tissue infections (SSTIs), but occasionally with invasive infections such as bacteremia (and sepsis) and necrotizing pneumonia in healthy individuals, especially children and adolescents (such as athletes) or even the elderly[1,3—5,14]; median ages of CA-MRSA and HA-MRSA patients are 23 and 68 years, respectively.[3]

ST8/SCC*mec*IVa MRSA USA300, the most common CA-MRSA clone in the United States, is one of the most well-characterized CA-MRSA[2,16]; USA300 is positive for PVL and the arginine catabolic mobile element (ACME), and produced a greater amount of cytolytic peptide [phenol-soluble modulins (PSMs) or δ-hemolysin (Hld)] than HA-MRSA.[16]

In Japan, the New York/Japan clone (HA-MRSA) has also been spreading in the community, among healthy children and pediatric outpatients,[17] and even on public transport[18]; however, the association of this New York/Japan clone (nasal or public transport MRSA) with diseases in the community has not been reported. In this report, we describe the first necrotizing pneumonia case caused by the New York/Japan MRSA clone in the community in Japan. In this study, CA-MRSA and HA-MRSA were classified according to a previous definition[4]; CA-MRSA is defined as MRSA isolated from outpatients with no history of hospitalization within at least the past year and who presented with no other established risk factors for HA-MRSA infections (except age).

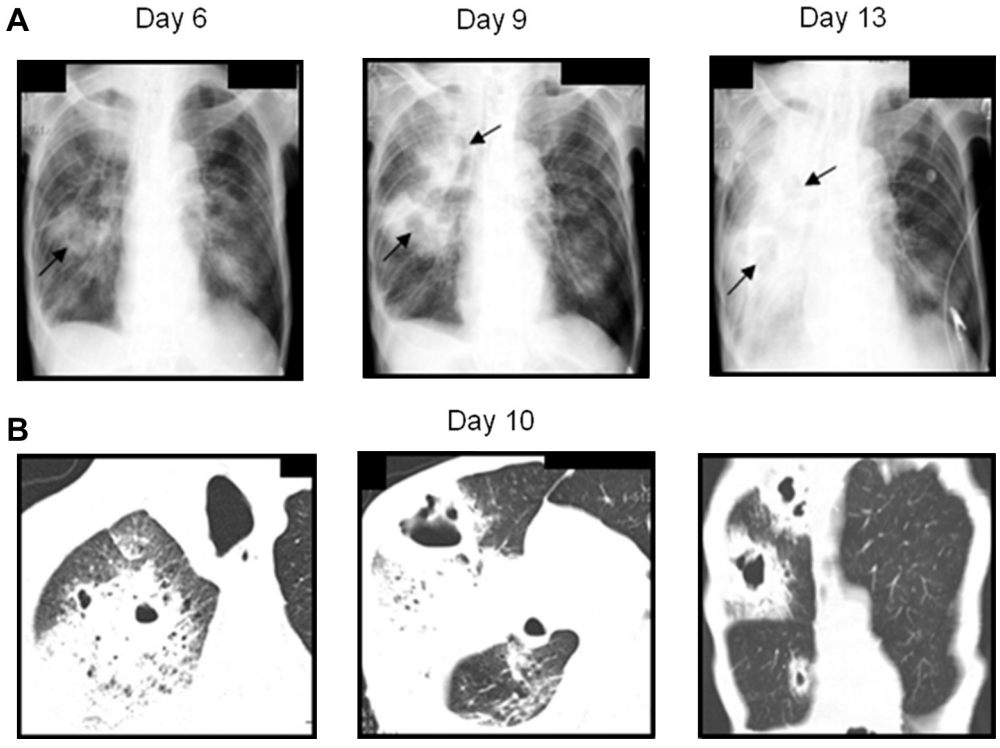

Figure 1. (A) Chest X-ray on days 6—13 and the (B) transaxial and coronal sections of chest CT on day 10 of a patient with community-acquired necrotizing pneumonia. In (A), arrows indicate pulmonary infiltrates with multiple cavity lesions in the right middle lung field; they showed fast radiological progression (days 6—13). Bilateral pulmonary infiltrates in the lungs are also seen. In (B), multiple cavity lesions within the consolidation are seen in the right upper and middle lobes.