30%–50% of immunosuppressed patients with coccidioidomycosis (3). Disseminated coccidioidomycosis typically involves the skin, meninges, or bone (3); however, intraocular involvement has also been described (1). A review of the literature shows 25 reported cases of intraocular coccidioidomycosis. When present, intraocular involvement is associated with serious consequences, frequently leading to eye enucleation; 1 case series described eventual enucleation in 50% of reported patients who did not die from disseminated coccidioidal infection (2).

For the patient in our report, in the setting of reported trauma and negative metastatic work-up results, it is unclear whether ocular disease resulted independently as an exogenous infection or from endogenous lymphatic and/or hematogenous spread from the patient’s lung. Diagnosis of coccidioidal endophthalmitis can be difficult, often relying on serum or nonocular tissue evaluation (4). Intraocular coccidioidal involvement usually occurs with widespread infection (5). Thus, even with apparent isolated ocular findings, evaluation for disseminated disease is warranted, including a careful history and physical examination, CT chest scan, bone scan, intracranial imaging, and lumbar puncture. Evaluation for immunosuppression, including HIV status, is warranted.

The optimal systemic antifungal therapy for intraocular coccidioidal infection is unclear, although fluconazole is the drug of choice for extravulmonary coccidioidomycosis, including meningitis (3). Fluconazole has good ocular penetration; however, voriconazole also achieves excellent intraocular levels (6) at lower 90% minimum inhibitory concentration levels (7). Furthermore, Gabrielian and Hariprasad (8) described an immunocompetent patient with treated and stable nonocular disseminated coccidioidomycosis who showed development of new vitritis and chorioiditis 8 weeks into high-dose fluconazole therapy; his intraocular disease resolved within 2–4 weeks of transition to voriconazole.

The patient in our report received systemic voriconazole for 4 weeks plus repeated intravitreal voriconazole injections on follow-up. It is possible that this initial therapy had an effect on his positive outcome and the avoidance of eye enucleation. The optimal length of therapy is unclear; however, this patient will receive prolonged treatment (>1 year) with high-dose fluconazole, followed by a slow taper guided by serologic testing and regular ophthalmologic examination. Future research should evaluate which antifungal therapy is superior and the appropriate duration of treatment.

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Michael L Cheng, Matthew Leibowitz, and Edward Ha

Author affiliation: University of California, Los Angeles, California, USA

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References


Address for correspondence: Edward Ha, 757 Westwood Plaza, Suite 7501, Los Angeles, CA 90095, USA; email: eha@mednet.ucla.edu

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Human MRSA Isolates with Novel Genetic Homolog, Germany

To the Editor: Methicillin-resistant Staphylococcus aureus (MRSA) represents a major cause of hospital-, community-, and livestock-acquired infections that are increasingly difficult to manage (1–3). Detection and identification of MRSA by culture and nucleic acid–based methods is challenged by heterogeneous penicillin-binding protein 2a (PBP2a) expression and variability of the staphylococcal cassette chromosome (SCCmec) elements. Recently, a new SCCmec element (XI) carried in bovine and human isolates was described (4,5). This SCCmec element contains a novel mecA homolog, designated mecA4_LGA251, that is not detectable by usual mecA-specific PCR approaches and PBP2a agglutination tests. García-Álvarez et al. reported this novel mecA homolog exhibited 70%
identity at DNA level to the mecA gene, and suggested these strains were transmitted from livestock to humans (4).

To search for isolates possessing the novel mecA_{LGA251} we screened S. aureus databases for those entries describing oxacillin/cefoxitin-resistant phenotypes that were negative for mecA by PCR (6) or harbored S. aureus protein A gene (spa) types known to be associated with the occurrence of mecA_{LGA251} (4,5). The databases of the University Hospital Münster contain S. aureus spa typing results of S. aureus isolates obtained from hospital admission screenings and specimens from patients treated at University Hospital Münster. Moreover, they include isolates derived from human and animal subjects, respectively, of 2 cross-border projects between the Netherlands and Germany: MRSA-net (EUREGIO Twente/Münsterland and Netherlands and Germany: MRSA-net 2) cross-border projects between the and animal subjects, respectively, of isolates derived from human and other antibacterial agents.

We report on 16 (clinically derived, n = 14; ovine origin, n = 2) oxacillin/cefoxitin-resistant S. aureus isolates possessing the recently described mecA_{LGA251} isolate, but lacking the classical mecA gene currently defining classic MRSA (Table). The isolates belong to spa types t843, t978, t1535, t1773, and t1789. Concurring with the findings in the United Kingdom and Denmark, we found t843 to be the most prevalent spa type. Results of the PBP2a latex agglutination assay were negative for all isolates except for 1 (no. 14), which was indeterminable. García-Álvarez et al. described negative results for all tested isolates (4); Shore et al. reported inconsistent results with this test (5).

According to the Clinical and Laboratory Standards Institute MIC interpretative standards for staphylococci (10), antibacterial agent susceptibility testing revealed resistance to benzylpenicillin and oxacillin/cefoxitin for all isolates. All isolates were shown to produce β-lactamases. Apart from the general categorization of oxacillin/cefoxitin-resistant isolates as resistant to all β-lactams, the MICs of drugs for all isolates included were read as susceptible for imipenem (MIC for 90% of strains tested 0.5 µg/mL) as well as for the anti-MRSA cephalosporin ceftobiprole (MIC for 90% of strains tested 1 µg/mL applying provisional breakpoint ≤4 µg/mL). A large range of MICs were observed for classic cefalosporins, ranging from those isolates categorized as susceptible

Table. Description of mecA_{LGA251}-positive isolates regarding their spa type, ability to grow on selective MRSA media, PBP2a agglutination, mec gene possession, and SCCmec-type*

<table>
<thead>
<tr>
<th>Isolate no. and origin</th>
<th>Year of isolation</th>
<th>Specimen</th>
<th>Spa type</th>
<th>Growth on selective MRSA medium†</th>
<th>PBP2a agglutination</th>
<th>Presence of mecA</th>
<th>mecA_{LGA251}</th>
<th>SCCmecXI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2010</td>
<td>Nasal swab</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>2010</td>
<td>Wound</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>2010</td>
<td>Wound</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>2010</td>
<td>Nasal swab</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>2011</td>
<td>Nasal swab</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>2004</td>
<td>Sputum</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>7</td>
<td>2010</td>
<td>Nasal swab</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>8</td>
<td>2007</td>
<td>Mouth swab</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>9</td>
<td>2010</td>
<td>Nasal swab</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>10</td>
<td>2011</td>
<td>Nasal swab</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>11</td>
<td>2011</td>
<td>Joint aspirate</td>
<td>t843</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>12</td>
<td>2007</td>
<td>Nasal swab</td>
<td>t978</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>13</td>
<td>2010</td>
<td>Nasal swab</td>
<td>t1773</td>
<td>+</td>
<td>–</td>
<td>ND</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>14</td>
<td>2009</td>
<td>Nasal swab</td>
<td>t1789</td>
<td>+</td>
<td>–</td>
<td>ND</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Sheep</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>2010</td>
<td>Unknown</td>
<td>t1535</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>16</td>
<td>2010</td>
<td>Unknown</td>
<td>t1535</td>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

*spa. Staphylococcus aureus protein A; MRSA, methicillin-resistant S. aureus; PBP2a, penicillin-binding protein 2a; SCC, staphylococcal cassette chromosome; +, positive; –, negative; ND, not done.
†ChromID MRSA-Plates (bioMérieux, Marcy-l’Étoile, France).
(cephalothin, n = 15; cefuroxime, n = 10; ceftriaxone, n = 2; cefepime, n = 9) to those classified as resistant.

We observed relatively low oxacillin/cefoxitin MICs for some of the mecA_LG251-positive isolates (MIC 3 μg/mL, n = 1; MIC 4 μg/mL, n = 1; MIC 8 μg/mL, n = 3) compared with the MRSA reference strain ATCC 43300 (MIC 32 μg/mL). All isolates tested were susceptible to all non-β-lactam antibacterial agents, comprising glycopeptides, lipopeptides, fluoroquinolones, macrolides, lincosamides, oxazolidinones, rifampins, streptogramins, glycylcyclines, folate pathway inhibitors, aminoglycosides, and fosfomycin.

Until mecA_LG251 is included as a diagnostic target in molecular MRSA detection tests, oxacillin/cefoxitin-resistant isolates determined to be methicillin-susceptible by traditional, culture-based susceptibility testing methods should not be disregarded, even if mecA and/or PBP2a tests fail to detect their targets. Susceptibility patterns of mecA_LG251-positive Staphylococcus aureus isolates revealed low MICs of oxacillin compared with those for MRSA of the classical mecA type. We presume this indicates an altered affinity of β-lactam antibacterial agents to the putative mecA_LG251 gene product or a divergent expression of the gene. The choice and the dosage of antibacterial agents applicable for S. aureus infections should be reconsidered in light of this novel mecA homolog in molecular screening and identification tests. Studies are warranted to investigate the prevalence of this novel MRSA entity in and outside of hospitals in the human population and in livestock, its clinical effects, and its response to antibacterial agent therapy.

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Author affiliations: University Hospital Münster, Germany (A. Kriegeskorte, B. Ballhausen, E.A. Idelevich, R. Köck, H. Karch, G. Peters, K. Becker); and University Medical Center Groningen, Groningen, the Netherlands (A.W. Friedrich)

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Address for correspondence: Karsten Becker, University Hospital Münster, Institute of Medical Microbiology, Domagkstr. 10, D-48149 Münster, Germany; email: kbecker@uni-muenster.de