Figure 1. Clinical course of a patient with prosthetic valve endocarditis due to *Mycobacterium fortuitum* that was successfully treated: temperature maximum vs. hospital day. Antibiotics with activity against *M. fortuitum*, as well as blood culture results, are shown. Break in hospital days represents at-home antibiotic therapy. AV, aortic valve.

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References


Clonal Features of Community-Acquired Methicillin-Resistant *Staphylococcus aureus* in Children

Recent studies from Chicago noted an increase in isolation of community-acquired (CA) clindamycin-susceptible methicillin-resistant *Staphylococcus aureus* (MRSA) from children [1, 2]. We studied MRSA isolates from children that were recovered at the University of Illinois Hospital (62 isolates) and Michael Reese Hospital (8 isolates) in Chicago. Related clinical and epidemiological methods and data have been reported elsewhere [2, 3].

All MRSA isolates were stored in skim milk at −80°C since 1987 (1994 at Michael Reese Hospital). Antibiotic susceptibility testing for all isolates was performed by means of MicroScan technology (Dade International, West Sacramento, CA), and oxacillin MICs for 10 selected isolates were determined by broth macrodilution testing according to the guidelines of the National Committee for Clinical Laboratory Standards [4]. All organisms were typed by pulsed-field gel electrophoresis (PFGE) by use of *Smal* (a modified version of the method
described by Matushek et al. [5]). Isolates with the same restriction pattern were considered identical; those with ≤6 band differences were considered possibly related [6] and were grouped with the identical isolates in the same pulsotype group. Detection of mecA followed the PCR methods described by Carroll et al. [7]. Fisher's exact test was used for statistical analysis.

Of the 70 isolates, 50 were susceptible to clindamycin and 20 were resistant. Most (92%) of the 36 known CA isolates were clindamycin-susceptible, compared with only 41% of the 22 known nosocomially acquired (NA) isolates (P < .001). PFGE revealed 11 different pulsotypes. Thirty-eight (76%) of the 50 clindamycin-susceptible isolates were possibly related (26 were identical) and were designated as group 1. Sixteen (80%) of the 20 clindamycin-resistant isolates were possibly related (12 were identical) and designated as group 4. Nine other pulsotype groups included only 1–4 isolates each. Most (71%) of the isolates from group 1 were CA, whereas most (66%) of the isolates from group 4 were NA (P < .001). Group 1 isolates were prevalent mainly during 1994–1997, whereas NA group 4 isolates were recovered during 1987–1997.

Oxacillin MICs determined by microbroth dilution testing were ≥4 μg/mL for all isolates. Oxacillin MICs determined by broth macrodilution testing for 10 group 1 isolates were all ≥32 μg/mL. The group 1 isolates had a more restricted pattern of resistance to 12 antibiotics when compared with group 4 isolates and isolates from other groups (table 1). MICs of other β-lactam agents and imipenem for group 1 isolates were also lower than those for group 4 isolates (data not shown). All but 2 of 23 group 1 isolates and all 12 group 4 isolates tested were positive for the mecA gene.

PFGE results and the antibiotic resistance pattern show that among isolates from children in Chicago, there has been an increase in the prevalence of a new MRSA type that is distinct from NA MRSA. Our group 1 isolates are similar to 2 isolates recovered at the University of Chicago Hospitals from children who had CA infection (PFGE results are shown in [1]) and to CA and clindamycin-susceptible isolates recovered from adults at our institution [8]. Two of our isolates that were tested by PFGE at the University of Chicago are similar to their CA clindamycin-susceptible “group G” isolates from colonized children (S. Boyle-Vavra and R. S. Daum, unpublished data). The clonal nature of these isolates, the absence of common risk factors in most CA infections seen in these children [1, 3], and the antibiotic susceptibility pattern suggest that the origin of these organisms is in the community.

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Table 1. Results of antibiotic susceptibility testing for methicillin-resistant Staphylococcus aureus (MRSA) isolates from children according to pulsotype group.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Group 1&lt;sup&gt;a&lt;/sup&gt; (n = 38)</th>
<th>Group 1&lt;sup&gt;b&lt;/sup&gt; (n = 26)</th>
<th>Group 4&lt;sup&gt;c&lt;/sup&gt; (n = 18)</th>
<th>Other groups&lt;sup&gt;d&lt;/sup&gt; (n = 14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clindamycin&lt;sup&gt;f&lt;/sup&gt;</td>
<td>100</td>
<td>100</td>
<td>11</td>
<td>71</td>
</tr>
<tr>
<td>Erythromycin&lt;sup&gt;f&lt;/sup&gt;</td>
<td>82</td>
<td>92</td>
<td>0</td>
<td>21</td>
</tr>
<tr>
<td>TMP-SMZ&lt;sup&gt;e&lt;/sup&gt;</td>
<td>97</td>
<td>100</td>
<td>28</td>
<td>71</td>
</tr>
<tr>
<td>Gentamicin&lt;sup&gt;e&lt;/sup&gt;</td>
<td>87</td>
<td>92</td>
<td>56</td>
<td>71</td>
</tr>
<tr>
<td>Amikacin&lt;sup&gt;e&lt;/sup&gt;</td>
<td>87</td>
<td>92</td>
<td>61</td>
<td>71</td>
</tr>
<tr>
<td>Ofloxacin&lt;sup&gt;e&lt;/sup&gt;</td>
<td>84</td>
<td>88</td>
<td>28</td>
<td>43</td>
</tr>
<tr>
<td>Ciprofloxacin&lt;sup&gt;e&lt;/sup&gt;</td>
<td>87</td>
<td>92</td>
<td>22</td>
<td>43</td>
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<tr>
<td>Tetracycline</td>
<td>63</td>
<td>62</td>
<td>89</td>
<td>86</td>
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<tr>
<td>Rifampin</td>
<td>87</td>
<td>92</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>87</td>
<td>92</td>
<td>94</td>
<td>100</td>
</tr>
<tr>
<td>Nitrofurantoin</td>
<td>87</td>
<td>92</td>
<td>89</td>
<td>100</td>
</tr>
<tr>
<td>Sulfisoxazole</td>
<td>18</td>
<td>15</td>
<td>6</td>
<td>14</td>
</tr>
</tbody>
</table>

NOTE. TMP-SMZ, trimethoprim-sulfamethoxazole.
<sup>a</sup> Pulsotype group includes isolates with ≤6 band differences determined by pulsed-field gel electrophoresis.
<sup>b</sup> Most group 1 isolates were community-acquired.
<sup>c</sup> A subset of group 1 isolates with identical numbers and sizes of bands.
<sup>d</sup> Most group 4 isolates were nosocomially acquired.
<sup>e</sup> Ten isolates in 6 different pulsotype groups were clindamycin-susceptible, and 5 isolates in 4 different pulsotypes groups were clindamycin-resistant.
<sup>f</sup> Group 1 vs. group 4, P < .001.
<sup>g</sup> Group 1 vs. group 4, .001 < P < .05.

References