Methicillin-resistant *Staphylococcus aureus* septic arthritis: an emerging clinical syndrome

Sir, Despite the increasing importance of methicillin-resistant *Staphylococcus aureus* (MRSA) as a nosocomial and community pathogen, little is known about the clinical characteristics of MRSA septic arthritis. Prior descriptions of native joint MRSA septic arthritis in adults are confined to case reports [1–4]. In recent European studies, 6–8% cases of septic arthritis were due to MRSA [5, 6], although these patients were not described in detail. We reviewed cases of native joint septic arthritis from the past 5 yr from our institutions to assess the prevalence and characteristics of MRSA septic arthritis, and the relative contributions of the healthcare setting and the community to its epidemiology. Dichotomous variables were analysed using Fisher’s exact test and continuous variables were analysed using Student’s t-test.

Demographic and clinical information are summarized in Table 1. Fifteen of 59 septic arthritis cases (25%) involved MRSA. Patients with MRSA septic arthritis were significantly older than patients with non-MRSA septic arthritis (69 ± 54 yr; \( P = 0.003 \)). MRSA septic arthritis patients also had a significantly greater mean number of comorbid medical conditions compared with non-MRSA septic arthritis patients (5.8 vs 2.6; \( P < 0.0001 \)). All 15 patients with MRSA septic arthritis had significant exposure to the healthcare system. Hospitalization within the preceding 6 months was observed in 80% (12 of 15 patients) of the MRSA group compared with 34% (15 of 44 patients) of the non-MRSA septic arthritis group (\( P = 0.002 \)). Of the other three MRSA patients, one had a history of MRSA bacteraemia 3 yr previously and the other two were HIV-positive intravenous drug users.

Joint involvement was similar between the two groups, except that shoulder involvement was significantly more common in MRSA cases: 6 of 15 (40%) vs 6 of 44 (14%), \( P = 0.03 \). This probably relates to the predisposing role of recent falls, upper extremity trauma and orthopaedic procedures among the older patient population with MRSA infection, rather than a particular tropism for the shoulder joint.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>MRSA septic arthritis (( n = 15 ))</th>
<th>Non-MRSA septic arthritis (( n = 44 ))</th>
<th>( P )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographics and risk factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>9/15 (60)</td>
<td>31/44 (70)</td>
<td>0.13</td>
</tr>
<tr>
<td>Age (yr), mean</td>
<td>69</td>
<td>54</td>
<td>0.003</td>
</tr>
<tr>
<td>Hospitalization in hospital</td>
<td>12/15 (80)</td>
<td>15/44 (34)</td>
<td>0.002</td>
</tr>
<tr>
<td>No. of comorbid medical</td>
<td></td>
<td></td>
<td>(&lt;0.0001)</td>
</tr>
<tr>
<td>conditions, mean</td>
<td>5.8</td>
<td>2.6</td>
<td></td>
</tr>
<tr>
<td>Pre-existing rheumatic disease</td>
<td>3/15 (20)</td>
<td>11/44 (25)</td>
<td>&gt;0.2</td>
</tr>
<tr>
<td>Previously healthy</td>
<td>0/15 (0)</td>
<td>7/44 (16)</td>
<td>0.11</td>
</tr>
<tr>
<td>Clinical presentation and outcome</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Fever</td>
<td>7/15 (47)</td>
<td>16/39 (41)</td>
<td>&gt;0.2</td>
</tr>
<tr>
<td>Leucocytosis</td>
<td>10/15 (67)</td>
<td>14/37 (38)</td>
<td>0.04</td>
</tr>
<tr>
<td>Bacteraemia</td>
<td>9/15 (60)</td>
<td>16/44 (36)</td>
<td>0.07</td>
</tr>
<tr>
<td>Polyarticular involvement</td>
<td>4/15 (27)</td>
<td>4/44 (9)</td>
<td>0.08</td>
</tr>
<tr>
<td>Arthroscopic or open surgical drainage</td>
<td></td>
<td></td>
<td>&gt;0.2</td>
</tr>
<tr>
<td>Mortality</td>
<td>3/15 (20)</td>
<td>3/44 (7)</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Data are \( n/N \) (%) of patients unless otherwise indicated.

Mortality during the initial hospitalization was 3 of 15 patients (20%) in the MRSA group vs 3 of 44 patients (7%) in the non-MRSA group (\( P = 0.13 \)). Six of the 12 MRSA patients who survived developed osteomyelitis in the bone adjacent to the joint. Five of the 15 patients had extra-articular focci of MRSA infection: two patients had central line sepsis, one patient had endocarditis, one patient had an epidural abscess, and one patient had infection of an abdominal aortic graft. All 12 survivors were clinically cured of septic arthritis after an average of 6 weeks of antibiotic therapy. Eleven patients received vancomycin and one patient received linezolid. Limited information was available regarding functional outcome.

Colonization or infection with MRSA during hospitalization establishes a durable risk of subsequent MRSA infection. In one study, 29% of hospitalized patients who acquired MRSA developed new or recurrent MRSA infection in the 18 months after discharge [7]. Of the 12 patients with a history of hospitalization in the preceding 6 months, seven developed symptoms of septic arthritis in patients (58%) while out in the community. Although these patients all received empirical treatment with vancomycin, failure to take into account the history of hospitalization could have resulted in inappropriately narrow empirical antibiotic coverage.

MRSA may be more virulent than methicillin-sensitive *Staphylococcus aureus* (MSSA). Approximately 1.6% of episodes of MRSA bacteraemia result in septic arthritis, a rate higher than observed for MSSA bacteraemia [8]. One meta-analysis showed a higher mortality for MRSA bacteraemia than MSSA bacteraemia, a finding that might be explained by bacterial virulence, patient factors, or the lack of rapidly bactericidal antibiotics for MRSA treatment [9]. Our experience is inadequate to determine whether MRSA septic arthritis is more aggressive than MSSA septic arthritis, particularly as the affected older population with chronic illness would be expected to have worse clinical outcomes.

Ten of 12 (83%) MRSA isolates were resistant to clindamycin. As 79% of health-care-associated MRSA strains in the USA are resistant to clindamycin, compared with only 17% of community isolates of MRSA, this suggests a predominance of MRSA septic arthritis from strains originating in the healthcare system [10].

Recommendations for the treatment of septic arthritis place insufficient emphasis on the possibility of MRSA infection in individuals with healthcare system exposure. As septic arthritis may cause rapid joint destruction, and delayed initiation of appropriate therapy is associated with poor outcomes, the correct choice of empirical antibiotic therapy is crucial. Patients with suspected septic arthritis who have a history of recent hospitalization, previous MRSA infection or colonization, multiple comorbid medical conditions, other risk factors for MRSA infection, such as intravenous drug use, or who live in locales with a high prevalence of community-acquired MRSA, should receive an antibiotic regimen containing vancomycin.

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J. J. Ross, L. Davidson

Division of Infectious Diseases, Caritas Saint Elizabeth’s Medical Center and 1Division of Geographic Medicine and Infectious Diseases, New England Medical Center, Boston, MA, USA

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Correspondence to: J. J. Ross, Division of Infectious Diseases, Caritas Saint Elizabeth’s Medical Center, 736 Cambridge Street, Boston, MA 02135, USA. E-mail: jrossmd@cchcs.org


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**Rheumatic fever—a vignette**

**Sir**, A 12-yr-old boy presented with 7 weeks of arthralgia, affecting the knees, cervical spine and small joints of both hands, and pain in the palms of both hands with reduced flexion of the second, third and fourth fingers.

He was initially apyrexial but subsequently developed a temperature of 38°C. He was pale with cervical lymphadenopathy. A nodule was noted over the lateral epicondyle of his left elbow. He had tenosynovitis affecting the palms, fixed flexion deformities of the second, third and fourth fingers of both hands (Figs. 1 and 2) and a reduced range of movement in the cervical spine. Pansystolic and diastolic murmurs were noted.

Investigations showed: haemoglobin 9.9 g/dl (normochromic, normocytic picture), white blood cells (WBC) 9.5 x 10^9/l, platelets 268, erythrocyte sedimentation rate (ESR) 92 mm/h, C-reactive protein (CRP) 48 mg/l, ferritin normal, urea and electrolytes and liver function tests normal. Complement levels were normal and autoantibodies negative. The ECG was normal. Echocardiogram revealed aortic and mitral valve regurgitation. A throat swab grew group A beta haemolytic streptococcus: anti-DNase 360 unit/ml (normal <240), antistreptococcal antibody titres (ASOT) >800 unit/ml (normal <200).

Rheumatic fever was diagnosed. The patient responded well to aspirin and penicillin. Ongoing tenosynovitis improved with prednisolone. Persistent aortic and mitral valve regurgitation were treated with enalapril.

There have been case reports of tenosynovitis and rheumatic fever in adults [1] but not children.

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R. L. Boon, E. Baildam

Musgrove Park Hospital, Paediatrics, Taunton and 1Booth Hall Children's Hospital, Rheumatology, Manchester, UK
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Correspondence to: R. L. Boon. E-mail: robboon69@hotmail.com