Osteomyelitis

A case report

**Background**
Methicillin resistant *Staphylococcus aureus* (MRSA) infection has classically been associated with institutional health care settings such as hospitals and nursing homes.

**Objective**
This article presents a case of community acquired MRSA infection resulting in severe osteomyelitis of the humerus, followed by a brief discussion and literature review.

**Discussion**
Over the past few years, more community acquired cases of MRSA have occurred. Methicillin resistant *S. aureus* usually infects skin and soft tissue. Occasionally, a life threatening infection occurs involving the blood, lungs, heart and bone.

**Case study**
An Aboriginal male, 16 years of age, presented with a history of left shoulder pain for 1 month. The pain followed a kick during a Taekwondo class and was followed by mild fever, especially at night, weight loss and malaise.

Clinical examination revealed gross limitation of left shoulder movement with disuse atrophy of the shoulder and forearm muscles on the left side. There was no tenderness, erythema or swelling of the shoulder joint. The patient was admitted for further evaluation.

Investigations revealed:
- haemoglobin: 103 g/L
- white cell count: 9.4 cells/mm³
- blood film: normocytic normochromic red cells
- erythrocyte sedimentation rate (ESR): 98 mm/hour
- C-reactive protein: 69 mg/L
- shoulder X-ray: diffuse osteolysis of the upper half of the humeral shaft extending in to the head with inferior subluxation of the humeral head
- computerised tomography (CT): an extensive osteolytic lesion involving the upper humeral shaft with extensive regional adenopathy and nonspecific swelling of the soft tissues around the bone (Figure 1, 2).
The differential diagnosis at this stage included osteomyelitis and bone tumour (Ewing sarcoma or osteosarcoma). A bone biopsy revealed mature bone with extensive acute inflammation on a background of granulation tissue. Micro-abscesses were seen and fragments of necrotic bone were noted within the areas of inflammation. Gram staining of the sections revealed Gram positive cocci. There was no evidence of malignancy in any sections and the features were consistent with acute and chronic osteomyelitis.

Culture of the biopsied specimen grew non-multiresistant methicillin resistant *Staphylococcus aureus* (MRSA), which was resistant to penicillin, methicillin/fluoxacillin and cephalosporins, but sensitive to cotrimaxazole, tetracycline, vancomycin, fusidic acid, erythromycin and rifampicin.

The patient was started on rifampicin 300 mg twice per day and fusidic acid 500 mg three times per day. After a week he was discharged with a final diagnosis of osteomyelitis of the left humerus caused by community acquired non-multiresistant MRSA. He steadily improved over the next month with improvement in joint movements and weight gain. He did not report any side effects from the treatment. At 4 weeks his inflammatory markers and haemoglobin had returned to normal. Treatment was continued for a total of 6 weeks.

Infections with methicillin resistant *Staphylococcus aureus* (MRSA) have occurred since the 1960s, but were mainly limited to hospital and health care settings. Sporadic reports of community acquired MRSA (CAMRSA) infections occurred between 1980 and 1999. There has been an increase in the number of reported community acquired cases since 1999.²

Most CAMRSA infections occur in skin and soft tissue and in specific population groups such as children, prisoners, athletes, Indigenous Australians, and homosexual men.²⁻⁴ Occasionally, a life threatening infection occurs involving the blood, lungs, heart and bone. In the United States, a series of fatal cases in children were caused by a clone of MRSA known as ‘USA 400’.⁵ A recent USA study⁶ identified a second clone, known as ‘USA 300’, as a predominant CAMRSA in Georgia.

**Infections**

The clinical spectrum of infections caused by CAMRSA has been wide ranging from minor skin and soft tissue infections to life threatening pneumonias, sepsicaemia, osteomyelitis, and bacterial endocarditis. Skin infections caused by these organisms are often misdiagnosed as spider bites, and appropriate antibiotics are not initiated. A recent study by Mark et al⁶ revealed that 63% of skin and soft tissue infections caused by MRSA were community acquired.

**Treatment**

Treatment of infections caused by CAMRSA remains challenging. Many are resistant to oral cephalosporins and antistaphylococcal penicillins, which are most commonly used to treat skin and soft tissue infections. However, the majority of infections are susceptible to tetracyclines, cotrimaxazole, rifampicin, fusidic acid and vancomycin.

In Australia, strains vary in their resistance to erythromycin. However, inducible erythromycin resistant isolates are phenotypically susceptible to lincosamide antibiotics, so clindamycin is an attractive option. Unfortunately there are concerns that this organism can mutate from inducible erythromycin resistant/ clindamycin susceptible phenotype to the constitutive erythromycin/ clindamycin resistant phenotype.¹³

Mild infections often require incision and drainage alone, however in areas with high prevalence of CAMRSA, serious skin and soft tissue infections with methicillin resistant *Staphylococcus aureus* (MRSA) have occurred since the 1960s, but were mainly limited to hospital and health care settings. Sporadic reports of community acquired MRSA (CAMRSA) infections occurred between 1980 and 1999. There has been an increase in the number of reported community acquired cases since 1999.²

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infections warrant therapy with agents such as vancomycin that are active against MRSA. Minor infections can be treated with oral co-trimoxazole. Additional medications include linezolid (which may have a role in antagonising the Panton-Valentine leukocidin toxin in addition to its antibiotic properties) and intravenous immunoglobulin (which may have antibodies against the toxin).

Clinicians should have a low threshold for obtaining specimens for culture when patients present with skin and soft tissue infections. This is important so that infections caused by Streptococci and MSSA can be treated with other antibiotics preventing the inappropriate use of glycopeptides.14

Summary of important points

• Community acquired MRSA infections are becoming increasingly prevalent.
• CAMRSA commonly causes minor skin and soft tissue infections. Occasionally, it can be responsible for significant morbidity and mortality.
• Nasal colonisation has not been found consistently to precede the infection with CAMRSA.
• Clinicians should have a low threshold for obtaining specimens for culture in the setting of skin and soft tissue infections particularly when the patient does not respond rapidly to drainage and standard antimicrobial therapy.
• The majority of CAMRSA are susceptible to tetracyclines, cotrimoxazole, rifampicin, fusidic acid and vancomycin.
• Strains vary in their resistance to erythromycin. Erythromycin resistant isolates may respond to clindamycin, but there is a concern that these clones can mutate to a erythromycin/clindamycin resistant strain.
• In the presence of more serious and invasive infections, immediate therapy with vancomycin or linezolid should be instituted without delay until treatment can be modified by culture results.

Conflict of interest: none declared.

References