

An unexpected diagnosis of methicillin-resistant *Staphylococcus aureus* septic arthritis

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Abstract

Hand infections can result in serious tissue damage and gross functional impairment. This is particularly true in the case of septic arthritis, the most destructive of all joint disease. We report the first case of methicillin-resistant *Staphylococcus aureus* septic arthritis of the distal interphalangeal joint to have occurred in a patient devoid of all risk factors traditionally associated with a hospital-associated infection (HA-MRSA). The afflicted patient's only exposure to the pathogen was during her role as a community carer for an asymptomatic carrier. Delayed treatment allowed the infection to rapidly destroy surrounding soft tissue and necessitate in the need for arthrodesis. It is, therefore imperative that clinicians maintain a low index of suspicion for methicillin-resistant *Staphylococcus aureus* as the causative pathogen in similar cases. Consequently, consideration of empirical antibiotic therapy for this patient subgroup is discussed.

Introduction

Hand infections have the potential to result in serious tissue damage with a subsequent impairment in functional morbidity. This is particularly true in the case of septic arthritis, the most destructive of all joint disease. Septic arthritis confined to the small joints of the hand is a rare occurrence that most commonly follows penetrative trauma.¹ The underlying pathogen in the majority of cases is *Staphylococcus aureus*. However, there have been reports of its methicillin-resistant subtype being isolated, albeit infrequently.^{2,4} Nonetheless, the increased incidence of methicillin-resistant *Staphylococcus aureus* (MRSA) in the community poses several challenges to the management of those presenting with joint sepsis.

MRSA has traditionally been regarded as a pathogen confined to the health-care setting but with reports of community associated strains occurring in individuals with no such

exposure, it is conceivable that the demographic distribution of the organism is changing.^{5,6} Septic arthritis secondary to MRSA is frequently associated with a poor clinical outcome and due to the difficulty in its eradication, may culminate in cartilage erosion, perisynovial abscesses or osteomyelitis.⁷ Thus the importance of delivering appropriate therapy as soon as possible cannot be stressed enough.⁸ Various risk factors for MRSA septic arthritis have been recognized but these do not include being a carer or close contact with an individual carrying the pathogen. Consequently, treatment guidelines do not mention this patient subgroup either.^{9,10}

To the best of our knowledge, we report the first case of atraumatic MRSA septic arthritis confined to the distal interphalangeal joint (DIPJ) of the hand. The patient was devoid of all typical risk factors associated with a HA infection. However, she was the community carer of an individual harboring the organism. The possibility of empirical antibiotic therapy against MRSA for such patients is discussed.

Case Report

A 53-year old woman with osteoarthritis presented to her family doctor with a one-day history of sudden onset pain in her right fifth digit associated with erythema and localized swelling. There was no evidence of immunosuppression, recent trauma or similar problems in the past. She was the carer of an individual carrying MRSA though, and amongst other things her job entailed maintaining a tracheostomy tube. The clinical picture was suggestive of either gout or septic arthritis, and subsequently anti-inflammatory drugs, analgesia and flucloxacillin were prescribed. Due to the ineffectiveness of this therapy she presented to the Emergency Department 24 h later.

On examination, the patient was afebrile and had an acutely inflamed distal interphalangeal joint with diminished flexion. There was no evidence of a synovial sheath infection. With the exception of a moderately elevated C-reactive protein that measured 43 mg/L, all other blood tests including white cell count and urate were normal. Radiographs too were unremarkable so the patient was discharged on analgesia for what was thought to be an acute exacerbation of osteoarthritis. However, she returned the following day with severe pain and a completely erythematous finger.

The clinical picture was now suggestive of septic arthritis. Blood cultures were taken and the distal joint aspirated, yielding a small amount of pus that was sent for analysis. Pending these results, an initial antibiotic regimen of intravenous (i.v.) flucloxacillin 500 mg

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6-hourly and benzylpenicillin 1.2 g 6-hourly was commenced. Four days later the fluid specimen returned as MRSA positive. No crystals were seen on examination under polarized light. Accordingly, i.v. teicoplanin was commenced for three days at a dose of 800 mg once daily. The infection settled during this period of glycopeptide therapy and following a significant clinical improvement the patient was discharged on oral trimethoprim 200 mg 12-hourly.

Ten days post discharge the patient's condition deteriorated. A second admission was necessary during which i.v. teicoplanin was restarted for eight days at a dose of 800 mg once daily. Owing to a substantial clinical improvement and normal blood tests, the patient was once again discharged on oral trimethoprim 200 mg 12-hourly. Screening for MRSA from the nose, throat and groin was undertaken on both admissions with a negative result each time.

At the time of follow-up four weeks later the infection had completely resolved. Nevertheless, the patient was left with impaired function and decided to proceed to an arthrodesis at a later stage.

Discussion

Sepsis involving the small joints of the hand is infrequently reported.¹ It has been recognized that the most important factors in attaining a successful outcome are early diagnosis and the institution of appropriate antimicrobial therapy.^{1,11} Unfortunately, despite a high

clinical suspicion of septic arthritis in many cases, the diagnosis cannot be confirmed because the synovial fluid aspirate is often sterile on bacterial culture. This may lead to difficulties in patient management and, therefore compromise the outcome.¹²

The emergence of MRSA within the community setting has somewhat complicated the management of septic arthritis even further. As the majority of cases are secondary to *Staphylococcus aureus*, β -lactam antibiotics form the mainstay of initial treatment.¹³ MRSA on the other hand is resistant to such therapy and is more effectively treated by glycopeptide antibiotics. It is, therefore useful to determine which patient groups are at risk of MRSA and hence require alternative therapy. Certain risk factors can aid in this decision including recent hospitalization, nursing home residency, intravenous drug use, chronic dermatological conditions, previous catheters or known carriage of the pathogen.^{9,14} In the current case, however, the patient did not have any traditional risk factors associated with HA (HA)-MRSA and was therefore treated inadequately. Furthermore, once appropriate therapy was instituted it was done so for too short a time period permitting resurgence of the infection. This is likely to have led to the need for an arthrodesis to achieve an acceptable degree of joint function.

Given the atraumatic nature of the infection, we postulate that it arose from direct contact with the organism during the patient's caring duties, possibly via unnoticed skin abrasions. This argument is further strengthened by the lack of detectable MRSA carriage on both admissions and the fact that the particular strain isolated had a susceptibility pattern commonly seen locally arising in the community setting (TJ Neal, The Royal Liverpool University Hospital, oral communication, 4th October 2007), and was not one of the recognized epidemic (E-MRSA) strains common to hospital practice. It is, therefore plausible that this was a case of community-acquired (CA)-

MRSA for which the patient had no risk factors for. We have reported the first case of MRSA septic arthritis to have occurred under such circumstances. Our experience highlights how elusive the diagnosis can be when traditional risk factors are not present. Thus, it is imperative that clinicians remain vigilant and maintain a low index of suspicion for such infections as delayed treatment can lead to a poor functional outcome and the need for surgery. We recommend that in either carers or close contacts of those with MRSA infection/carriage, consideration should be given to commencing a complete course of empirical antibiotics against MRSA initially, with a view to tailoring therapy following the results of microbiological investigations. Furthermore, this case also highlights the importance of adopting hygienical control measures to minimize and prevent MRSA transmission from carriers.

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