treatment and monitoring of adverse events. These are 3 core aspects of de-escalation, and the duration of antibiotic treatment appears to be essential in minimizing the emergence of multidrug-resistant microorganisms. Most notably, prescriber education focused on de-escalation therapy is best incorporated into practice settings and requires additional expertise when adequate clinical cultures yield no identified pathogen.

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Figure 1. Summary of the treatment course and vancomycin and daptomycin MICs for all 12 methicillin-resistant Staphylococcus aureus (MRSA) bloodstream isolates. The culture results are indicated beneath the timeline; each positive result is indicated with a +, and each negative result is indicated with a -. Numbers beside “Vancomycin MIC” and “Daptomycin MIC” reflect the changing MICs of those drugs during the time interval indicated by the arrows. MRSA-AGN, probable MRSA bacteremia–associated acute glomerulonephritis; OHT, orthotopic heart transplantation.

Fatal Bacteremic Mycotic Aneurysm Complicated by Acute Renal Failure Caused by Daptomycin-Nonsusceptible, Vancomycin-Intermediate, and Methicillin-Resistant Staphylococcus aureus

To the Editor—Fatal cases of mycotic aneurysm and refractory bacteremia due to daptomycin-nonsusceptible, vancomycin-intermediate, and methicillin-resistant Staphylococcus aureus (MRSA) have rarely been reported. A 57-year-old man underwent orthotopic heart transplantation for dilated cardiomyopathy in July 2006. Long-term intramuscular teicoplanin treatment was given because of suspicion of postoperative sternum osteomyelitis and mediastinitis caused by MRSA (figure 1). Fifteen months after receiving the transplant, the patient developed hematuria and left flank pain. Acute renal function deterioration (i.e., an increase in serum creatinine level from 1.2 mg/dL to 3.1 mg/dL) was found 3 months before the episode of hematuria and left flank pain. Two sets of blood cultures re-
developed MRSA. Analysis of renal biopsy specimens showed immune complex–related diffuse proliferative glomerulonephritis, suggesting infection–associated (i.e., MRSA bacteremia–associated) acute glomerulonephritis. Persistent hematuria and rapid deterioration of renal function (serum creatinine level, 9.2 mg/dL) were noted on hospital day 6. Antibiotic treatment was switched to intravenous linezolid (600 mg every 12 h) on hospital day 7. The patient started hemodialysis on hospital day 10. Transesophageal echocardiography revealed no evidence of vegetation. Vancomycin was added on hospital day 15 because of persistent MRSA bacteremia. One week later, absence of hematuria and negative blood culture results were noted. The patient continued to receive chronic hemodialysis (twice weekly) and intravenous vancomycin (750 mg twice weekly).

The patient was readmitted to the hospital ∼3 months after hospital discharge because of fever, chills, and gross hematuria. Three sets of blood cultures obtained on day 105 and day 106 after starting vancomycin treatment yielded MRSA. Linezolid and fusidate sodium (250 mg administered orally every 8 h) were initiated. The findings of a thoracic CT and a gallium-67 scan suggested a mycotic aneurysm with dissection from the ascending aorta to the aortic root.

Antibiotic treatment was switched to daptomycin (250 mg administered every other day) and fusidate sodium. Four weeks later, open ascending aortic grafting was performed. However, septic shock with acute respiratory distress syndrome developed on the second postoperative day, and the patient died of uncontrolled MRSA bacteremia.

The MICs of vancomycin and daptomycin for the 12 MRSA isolates were determined by the broth microdilution method [1]. The MRSA isolate (isolate 8) developed nonsusceptibility to vancomycin (MIC, 4 μg/mL) and daptomycin (MIC, 2 μg/mL) simultaneously ∼5.5 months after treatment with glycopeptides and before the initiation of daptomycin treatment (figure 1). Pulsotypes of the 12 isolates were identical, suggesting that they belonged to a single clone [1].

Cases of reduced susceptibility to daptomycin in patients with persistent MRSA bacteremia treated with prolonged vancomycin monotherapy and daptomycin exposure have been described elsewhere [2–7]. The prolonged glycopeptide treatment probably not only selected vancomycin–intermediate MRSA but also weakened the bactericidal activity of daptomycin. In our patient, MRSA bacteremia was also associated with infection–related acute glomerulonephritis and subsequently resulted in end-stage renal disease.

In conclusion, for patients with refractory MRSA bacteremia and difficult–to–eradicate infectious foci who have received prolonged glycopeptide therapy, routine testing of all MRSA isolates for susceptibility to daptomycin and glycopeptides is crucial before initiating treatment with daptomycin as a salvage therapy, particularly for patients with renal failure.

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References


Maculopapular Rash Induced by Oral Vancomycin

To the Editor—Oral vancomycin is believed to be an ideal drug for treatment of Clostridium difficile infection (CDI); an important reason cited is that oral vancomycin is not systemically absorbed, resulting in high levels in the colonic lumen, with serum levels being virtually nil [1]. We report our experience with a patient who developed an adverse effect secondary to absorption of oral vancomycin; we also provide a literature review.

The patient was a 73–year–old woman who experienced colonic perforation during colonoscopy. Her hospital course was complicated by hospital–acquired pneumonia. She was being treated with intravenous vancomycin, piperacillin–tazobactam, and metronidazole when a diffuse maculopapular rash was first noted. The rash resolved after all antibiotics were discontinued. Six weeks later, the patient developed watery diarrhea that was diag-