

# Daptomycin versus Vancomycin for Complicated Skin and Skin Structure Infections: Clinical and Economic Outcomes

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## Abstract and Introduction

### Abstract

**Study Objective.** To assess the effect of daptomycin compared with vancomycin on the clinical and economic outcomes in patients with complicated skin and skin structure infections.

**Design.** Prospective, open-label study.

**Setting.** Level 1 trauma center in Detroit, Michigan.

**Patients.** Fifty-three adult patients with complicated skin and skin structure infections at risk for methicillin-resistant *Staphylococcus aureus* (MRSA) infection who were treated with daptomycin and a matched cohort of 212 patients treated with vancomycin.

**Intervention.** Patients in the prospective arm received intravenous daptomycin 4 mg/kg every 24 hours for at least 3 days but not more than 14 days. Historical controls received at least 3 days of vancomycin dosed to achieve trough concentrations of 5–20 µg/ml.

**Measurements and Main Results.** Outcomes evaluated included blinded assessments of clinical resolution, duration of therapy, and costs. The most common diagnoses were cellulitis (31%), abscess (22%), and both cellulitis with abscess (37%). Microbiology differed significantly between groups, with *S. aureus* found in 27 patients (51%) in the daptomycin group and 167 patients (79%) in the vancomycin group and MRSA in 22 (42%) and 159 (75%), respectively ( $p < 0.001$ ). The proportions of patients with clinical improvement or resolution of their infections on days 3 and 5 were 90% versus 70% and 98% versus 81% in the daptomycin versus vancomycin groups, respectively ( $p < 0.01$  for both comparisons), and 100% at the end of therapy in both groups. Among patients with complete resolution of their infections (41 patients [77%] with daptomycin vs 89 patients [42%] with vancomycin,  $p < 0.05$ ), median duration of intravenous therapy was 4 and 7 days, respectively, ( $p < 0.001$ ), and hospital costs were \$5027 and \$7552 ( $p < 0.001$ ).

**Conclusions.** Patients receiving daptomycin achieved more rapid resolution of symptoms and clinical cure and had a decreased duration of inpatient therapy compared with those receiving vancomycin. This study suggests that daptomycin is a cost-effective alternative to vancomycin for complicated skin and skin structure infections.

### Introduction

Skin and skin structure infections are frequently encountered in medical practice. In 2004, these infections were the primary diagnosis in approximately 562,000 hospital discharges, with an average length of stay of 4.7 days, according to the most recent survey from the Centers for Disease Control and Prevention (CDC).<sup>[1]</sup> Bacterial skin diseases encompass a wide spectrum of clinical manifestations, ranging from local superficial infections to life-threatening aggressive infections. Prompt treatment with an appropriate antibiotic is an important factor in limiting the subsequent complications associated with skin infections.<sup>[2]</sup>

Skin and skin structure infections are most commonly caused by gram-positive organisms, including *Staphylococcus aureus* and *Streptococcus* species. The increasing prevalence of methicillin-resistant *S. aureus* (MRSA) in the hospital and community complicates the treatment of skin and skin structure infections. An important concern is that MRSA is associated with a significant increase in cost of care. In a case-control study of staphylococcal bloodstream infections, MRSA was associated with an additional 8 days of hospitalization and \$17,400 when compared with methicillin-susceptible *S. aureus*.<sup>[3]</sup> Another group reported similar results in an observational cohort of patients with surgical site infections, in which MRSA was independently associated with an additional \$13,900 in hospital costs/infection.<sup>[4]</sup> Further, in an analysis of clinical trial data in patients with complicated skin and soft-tissue infections, it was reported that treatment of MRSA with vancomycin resulted in total treatment costs of more than \$6000.<sup>[5]</sup>

Daptomycin (Cubicin; Cubist Pharmaceuticals, Lexington, MA) is a novel lipopeptide antibiotic recently approved by the United States Food and Drug Administration for the treatment of complicated skin and skin structure infections caused by susceptible strains of gram-positive bacteria, such as *Streptococcus* species and *S. aureus* including MRSA. Daptomycin demonstrates bactericidal activity and is more rapidly bactericidal than vancomycin against staphylococci and enterococci.<sup>[6]</sup> In a randomized, investigator-blinded, clinical trial, clinical success rates at the end of therapy were similar between patients treated with daptomycin and those treated with standard therapy.<sup>[7]</sup> However, among patients who were successfully treated with daptomycin, a significantly greater ( $p < 0.001$ ) proportion of patients (63% vs 33%) required only 4–7 days of intravenous therapy compared with the control group (semisynthetic penicillins and/or vancomycin). This was supported by further analyses of the same trial, which revealed that patients with complicated skin and skin structure infections who were treated with daptomycin demonstrated a more rapid response than those treated with standard therapy.<sup>[7]</sup>

The objective of our study was to evaluate the impact of treatment with daptomycin compared with vancomycin on clinical and economic outcomes in patients treated for complicated skin and skin structure infections in an acute care hospital setting.