ABSTRACT
Ten patients with moderately severe cellulitis who were referred to a hospital infusion center for parenteral antibiotic therapy were given oral linezolid instead. All of the patients complied with the treatment regimen and exhibited a clinical cure of their infection. Adverse drug events were mild, and none of the patients discontinued therapy prematurely. The total cost associated with an average course of linezolid therapy was less than that of four days of twice-daily vancomycin therapy in the infusion center.

INTRODUCTION
Linezolid (Zyvox®, Pfizer) is the prototype of a new class of antimicrobials known as the oxazolidinones.1 This antibiotic has excellent activity in vitro against gram-positive bacteria, including methicillin-resistant Staphylococcus aureus (MRSA), and it has been highly successful in the treatment of serious skin and soft tissue infections (SSTIs).2,3 Compared with vancomycin (Vancocin®, Eli Lilly), linezolid has some advantages because of its excellent oral bioavailability and enhanced tissue penetration.4 These attributes may allow clinicians to use an oral agent in place of parenteral therapy for the treatment of multidrug-resistant pathogens, such as MRSA and vancomycin-resistant enterococci.

PILOT STUDY
In a small pilot study, we investigated whether oral linezolid would be a safe, efficacious, and less costly alternative to parenteral therapy in patients with moderately severe cellulitis.

Patient Criteria
Patients with moderately severe cellulitis who were referred to a hospital-based infusion center were eligible for enrollment into this open, nonrandomized pilot study. After the investigators received permission for enrollment from the patient’s referring physician, they told the patients about the study and obtained written informed consent from them before entry into the study. All guidelines for human research were followed in the conduct of the study.

Under the treatment protocol, enrolled patients received 600 mg of oral linezolid every 12 hours in place of their prescribed parenteral antibiotic. An infectious-disease (ID) specialist monitored each patient. The ID specialist and the patient’s referring physician determined the duration of treatment. A complete blood count (CBC) was taken weekly while the patients were receiving linezolid. Patients were observed for one to two weeks after completing therapy so that they could be monitored for clinical relapse and adverse drug events (ADEs).

The costs of using linezolid in these patients were analyzed according to standard hospital charges in the infusion center.

Results
A total of 10 patients (five men and five women) were enrolled (age range, 29–80 years; mean age, 49). Seven of the patients were obese (defined as greater than 50% above their ideal body weight), six had lower-extremity cellulitis, one had lymphedema, and two were smokers. None had diabetes, heart failure, liver disease, or renal insufficiency.

All 10 patients complied with the treatment regimen and completed their course of linezolid therapy. The average length of therapy was 12 days (range, 5–27 days). Each patient experienced a clinical cure, but a secondary wound infection developed in one patient with underlying trauma. The growth of Proteus mirabilis in the wound was successfully treated with trimethoprim/sulfamethoxazole.

Four patients reported ADEs. These side effects were mild in nature and included one case each of nausea, loose stools, headache, and metallic taste. No cases of thrombocytopenia occurred in these patients.

The costs associated with linezolid therapy are shown in Table 1. An average course of treatment with oral linezolid (12 days) cost $1,548, which included the charges of medication, physician visits, and laboratory monitoring. This therapy resulted in average daily charges of $129. Vancomycin 1 g every 12 hours was the most commonly prescribed parenteral antibiotic in these patients, with daily charges of $417 in our infusion center. Of note, patients with cellulitis who were referred for treatment with vancomycin in our infusion center during the past year received an average of 30 doses (15 days) of therapy.

DISCUSSION
Outpatient parenteral antimicrobial therapy (OPAT) has the potential to greatly reduce costs and improve patient satisfaction.5 Currently, SSTIs are the most common forms of infection treated with OPAT. In this preliminary study, we found that oral linezolid could be a suitable alternative to OPAT in patients with moderately severe cellulitis and that linezolid therapy brought about an excellent cure rate and a low incidence of side effects. Furthermore, our patients were willing to try an oral alternative to parenteral therapy and were highly satisfied.6

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compliant with their twice-daily treatment regimen.

Lymphatic and venous compromise is frequently identified in patients with cellulitis. One of the potential risk factors for this condition is obesity. The seven obese patients weighed an average of 146 kg (approximately 321 pounds; range, 101–196 kg, or 222–431 pounds), which was more than twice the weight of the non-obese group. Moreover, all but one of these patients had lower-limb cellulitis. Weight-related dosage adjustments for antimicrobials are rarely made, and the consequences of obesity have not been studied for most antibiotics. In this study, a standard dosage regimen of linezolid was used and was successful in our obese patients.

Although the acquisition cost of oral linezolid is higher than that of generic drugs such as vancomycin, the total costs of treating an episode of cellulitis can be significantly decreased with this new antibiotic. On the basis of the charges in our hospital infusion center, four days of twice-daily vancomycin therapy would be more expensive than the total charges (drug, physician visits, laboratory monitoring) associated with an average course of oral linezolid in these patients (see Table 1). These preliminary findings are of great interest, and the overall costs of these therapies need to be further elucidated in a larger, prospective, randomized trial.

CONCLUSION

With the availability of linezolid, we now have the opportunity to use an oral antimicrobial agent that is as safe and effective as parenteral agents against multidrug-resistant pathogens such as MRSA. Linezolid has the potential to improve patient satisfaction and to reduce total treatment costs, when compared with OPAT, in patients with moderately severe cellulitis.

REFERENCES