

after 1 week lends credibility to the belief that contaminated surfaces may serve as potential reservoirs of VRE in hospitals. Their finding that a surface contaminated with a pure culture of VRE yielded viable organisms after nearly 2 months is supported by other studies dealing with the survival of enterococci on dry surfaces.⁴

How important contaminated objects are in transmission of VRE has not been established. Most reports describing environmental contamination by VRE have not provided epidemiologic evidence that patients acquired the organism from the environment. A report implicating contaminated electronic thermometers in the spread of VRE provides the strongest evidence to date that contaminated medical equipment may transmit VRE among patients.⁵ Presumably, transmission from environmental reservoirs also could occur by other means. If "terminal" cleaning of patient rooms between discharge of one patient and admission of a new patient to the room did not remove VRE from contaminated surfaces, the new patient could acquire the organism by touching contaminated items. If this occurred commonly, one would expect to see clustering of VRE cases in certain hospital rooms. To date, this phenomenon has not been reported by hospitals experiencing problems with VRE, and analysis of room locations of VRE cases at the Miriam Hospital seldom has uncovered examples of clustering of cases in certain rooms. These findings suggest that routine terminal cleaning procedures may be adequate in many facilities. Perhaps a more likely scenario is that *daily* cleaning routines in the rooms of colonized patients do not remove VRE from contaminated items and that healthcare workers may contaminate their hands or gloves by touching such objects. If hands are not washed appropriately (or gloves are not removed) upon leaving the patient's room, the organism could be transmitted to other susceptible patients. As suggested by Bonilla et al,¹ additional studies are needed to determine the levels of environmental contamination that are epidemiologically important and the means by which the organism is spread from surfaces to patients.

Transmission of VRE probably occurs most frequently by healthcare workers who have contaminated their hands while caring for an affected patient. Accordingly, control efforts should place a high priority on improv-

ing compliance with recommended barrier precautions and handwashing between patients. Early detection of colonized patients by the microbiology laboratory also has been an important component of effective control programs. Careful cleaning of patient rooms and medical equipment is also important, but should not be the major focus of a VRE control program.

REFERENCES

1. Bonilla HF, Zervos MJ, Kauffman CA. Long-term survival of vancomycin-resistant *Enterococcus faecium* on a contaminated surface. *Infect Control Hosp Epidemiol* 1996;17:770-771. Letter.
2. Boyce JM, Opal SM, Chow JW, et al. Outbreak of multidrug-resistant *Enterococcus faecium* with transferable *vanB* class vancomycin resistance. *J Clin Microbiol* 1994;32:1148-1153.
3. Noskin GA, Stosor V, Cooper I, Peterson LR. Recovery of vancomycin-resistant enterococci on fingertips and environmental surfaces. *Infect Control Hosp Epidemiol* 1995;16:577-581.
4. Bale MJ, Bennett PM, Beringer JE, Hinton M. The survival of bacteria exposed to desiccation on surfaces associated with farm buildings. *J Appl Bacteriol* 1993;75:519-528.
5. Livornese LL, Dias S, Samel C, et al. Hospital-acquired infection with vancomycin-resistant *Enterococcus faecium* transmitted by electronic thermometers. *Ann Intern Med* 1992;117:112-116.

John M. Boyce, MD
Miriam Hospital
Providence, Rhode Island

Bloodstream Infection From a Port-A-Cath: Successful Treatment With the Antibiotic Lock Technique

To the Editor:

A 39-year-old woman with leiomyosarcoma of the stomach had a Port-a-Cath implanted into the arteria hepatica for chemotherapy of liver metastasis during gastrectomy in 1994. In July 1994, complete remission was achieved with six courses of chemotherapy. The arterial port was flushed weekly thereafter to avoid clotting of the catheter. In February 1995, 3 hours after the port had been flushed, the patient complained of myalgia, nausea, chills, and fever up to 40°C and was readmitted to the hospital.

On admission, the patient had no clinical signs of catheter-site infection other than a fever of 38.9°C. The leukocyte count was $2.59 \times 10^9/L$ with 80.5% neutrophils. A penicillinase-positive *Staphylococcus chromogenes*, which was oxacillin susceptible, grew from blood cultures within 16 hours.

Empiric intravenous (IV) therapy with amoxicillin-clavulanic acid was started on admission. The patient became afebrile within 24 hours. Antimicrobial treatment was changed to oral rifampin 450 mg bid and ciprofloxacin 750 mg bid after identification of the microorganism from blood cultures. In addition, the Port-a-Cath system was refilled thrice weekly with 1.6 mL teicoplanin (100 mg) after appropriate aspiration. Rifampin, ciprofloxacin, and teicoplanin were discontinued after 2 weeks; no relapse was observed during follow-up of more than 1 year.

Implanted IV ports and catheters are used widely today for chemotherapy in patients with malignancies. Approximately 1.37 infections per 1,000 catheter-days are observed with implanted IV ports. However, there are few reports on arterial ports and, to our knowledge, none about incidence and treatment of such infections. Given the limited experience, we treated the patient systemically with ciprofloxacin plus rifampin, because of its known efficacy in the treatment of staphylococcal foreign body infections.^{1,2} We additionally administered teicoplanin locally with the antibiotic lock technique.³ This case report raises evidence that arterial port infections can be treated successfully with antimicrobials only.

REFERENCES

1. Raad I, Darouiche R, Hachem R, Mansouri M, Bodey GP. The broad spectrum activity and efficacy of catheters coated with minocycline and rifampin. *J Infect Dis* 1996;173:418-424.
2. Widmer AF, Frei R, Rajacic Z, Zimmerli W. Correlation between in vivo and in vitro efficacy of antimicrobial agents against foreign body infections. *J Infect Dis* 1990;162:96-102.
3. Gasser I, Gavalda J, Pakissa A. Long term follow-up of patients with catheter related sepsis. In: Abstracts of the 35th Interscience Conference on Antimicrobial Agents and Chemotherapy of the American Society for Microbiology; September 1995; San Francisco, CA. Abstract J3.

Thomas Bregenzer, MD
Andreas F. Widmer, MD, MS
University Hospital
Basel, Switzerland