Use of Bacitracin Therapy for Infection Due to Vancomycin-Resistant Enterococcus faecium

An outbreak of infections due to vancomycin-resistant Enterococcus faecium (VREF) was recently observed in a hospital in Southern California. Several patients developed fatal bacteremia or intraabdominal infection due to VREF. The gastrointestinal tract is the principal site of colonization of VREF, and prior colonization with resistant bacteria often preceded the development of life-threatening infection [1]. During the epidemic, several patients at the hospital and an adjacent long-term care facility had significant gastrointestinal colonization of VREF (determined with use of perirectal swabs). All the isolates were highly resistant to vancomycin (MIC, >32 μg/mL), penicillin, gentamicin, and streptomycin but were susceptible to nitrofurantoin and bacitracin (at a level of <16 μg/mL). All of the colonized patients were placed in contact isolation [2]. We believed that oral bacitracin might be useful for eradicating VREF from the gastrointestinal tract in these colonized patients and that it might prevent life-threatening infection due to VREF.

Eight patients who were colonized with VREF were treated with 25,000 units of bacitracin (no less than 50 units/mg, diluted in 5 mL of 0.9% normal saline); the antibiotic was given orally or by gastrostomy tube twice a day for 10 days, after which specimens for repeated cultures were obtained with use of perirectal swabs every week for 3 weeks. Perirectal swab specimens were screened for VREF by a method described previously [3]. All of the specimens had at least 2+ growth of VREF at the time of the initial stool screening.

The results of perirectal swab cultures for five patients were repeatedly negative after one course of treatment with bacitracin, and one patient's cultures became negative only after a second course of treatment with this drug. Three of these six patients were subsequently treated with antibiotics for other infections, and one relapsed (the results of a perirectal culture were positive in this case). The results of perirectal cultures were persistently positive for two patients after they received therapy with bacitracin. Culture of specimens from the distal, anatomically disconnected rectum yielded VREF for one patient who underwent a diverting colostomy for a gangrenous colon even though VREF was eradicated from the colostomy drainage. The results of culture for one patient remained positive after one course of treatment with bacitracin, and this patient died of bacteremia due to VREF. All of the patients tolerated bacitracin therapy, without any side effects.

The small, uncontrolled study reported herein suggests that use of oral bacitracin therapy may be a safe and effective way to eliminate VREF from the gastrointestinal tract, and the findings of this study are consistent with those of a recently published study [4]. O'Donovan and colleagues demonstrated that 25,000 units of bacitracin given every 6 hours for 10 days was effective in eradicating VREF from the gastrointestinal tract of all treated patients. Twenty-five percent of the patients relapsed within 3 weeks of treatment. We eradicated VREF in 75% of our patients. One of our patients (12.5%) relapsed, but we could not differentiate relapse from reinfection with VREF in this patient 2 months after the initial successful treatment.

Effective treatment of patients colonized with VREF may not only reduce the risk of further nosocomial spread of VREF but will reduce the need for prolonged isolation and hospitalization. Currently, effective policies for treating patients colonized with VREF have not been implemented [2]. Long-term care facilities in our area will not accept patients who are colonized with VREF, which results in prolonged quarantine and otherwise unnecessary hospitalization of these patients. Administrators of the involved long-term care facility estimated that the isolation procedure alone would increase the cost of medical care by U.S. $50 per patient-day. Hospital pharmacies currently pay only about U.S. $25 for one course of treatment with oral bacitracin. The cost of treating patients with VREF bacteremia is astronomical according to our limited experience, and the mortality rate for these patients remains high. Early administration of oral bacitracin therapy to eliminate VREF from the intestinal tract of colonized patients may prove to be the most beneficial maneuver to prevent this life-threatening infection in a epidemic setting.

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References


Note Added in Proof

No cases of colonization or infection with VREF have occurred in this hospital for ~1 year since the epidemic was stopped by effective infection control measures, restriction of the use of vancomycin, and administration of oral bacitracin to the colonized patients.