REFERENCES

1. Ehrenkranz JM, Nerenberg DE, Shultz JM, Slater KC. Intervention to discontinue parenteral antimicrobial therapy in patients hospitalized with pulmonary infections: effect on shortening patient stay. ***Infect Control Hosp Epidemiol.*** 1992;13:21-32.
2. Young MJ, Bresnitz EA, Strom BL. Sample size normogram for interpreting negative clinical studies. ***Ann Intern Med.*** 1983;99:248-251.
3. Cupples LA, Heeren T, Schatzkin A, Colton T. Multiple testing of hypotheses in comparing two groups. Ann ***Intern Med.*** 1984;100:122-129.
4. Fleiss JL. ***The Design and Analysis of Clinical Experiments. New*** York, NY: John Wiley and Sons Inc; 1982.
5. Sanders WE, Morris JF, Makris AT, et al. Oral ofloxacin for the treatment of acute bacteria1 pneumonia: use of a nontraditional protocol to compare experimental therapy with "usual care" in a multicenter clinical trial. ***Am J Med.*** 1991;91:261-266.
6. Miettinen 0. Confounding and effect-modification. ***Am J Epidemiol.*** 1974;100:350-353.

The author replies.

I thank Dr Widmer for his interest in our study. I fear, however, that he has misread the paper in a number of important aspects.

In answer to his questions, the study was undertaken solely to promote discontinuation of parenteral therapy (as indicated in the title). The stated endpoint defining physician compliance was cessation of parenteral antimicrobial treatment within 48 hours of unsolicited intervention, without regard to initiation of oral antimicrobials. All but one compliant physician, however, did discontinue parenteral treatment in favor of oral treatment.

Issues of sample size and study power were addressed in the discussion.

The multiple univariate comparisons set forth in Table 2 are for group comparisons of as many patient characteristics as can be identified. This was done to evaluate comparability of study populations and is essential to assess the outcome of the randomization process. A secondary question was whether pertinent differences existed between patients of compliant or noncompliant physicians. In this context, adjustments for multiple comparisons are meaningless; they would not increase the number of differences between various groups beyond the one already noted, nor would adjustment for unequal variances change the findings to make for longer treatment with corticosteroids in other patient sets.

I cannot fathom any biological relation between a physician's choice of oral or parenteral antimicrobial therapy for patient management during hospitalization, and posthospitalization occurence in the same patient of a new aspiration pneumonia or new lobar pneumonia at a new anatomic site, or death unrelated to the original pul-

monary infection. Such post-hospitalization events can only be chance occurrences. I remind Dr. Widmer of the classic statistical observation of Damon Runyan, the chronicler of Broadway gamblers and racetrack touts: "Life itself is nine to five against."

Characteristics of noncompliant and compliant physicians were fully explored and presented in Table 3. No difference was evident.

I am mystified by any concern for osteomyelitis and endocarditis, first evident at 30 days after hospital discharge, in an essentially nonbacteremic population of adults successfully treated for pulmonary infection. A 30-day posthospitalization followup is not only appropriate, it is unique for this type of published study.

The randomization process was not influenced by physician compliance.

Finally, I yield to no one in my admiration of the publications of W. Eugene Sanders, Jr., a distinguished physician-investigator and former fellow Floridian. In fact, Dr. Sanders and I are coauthors of two scientific papers in press at the time of this writing. Moreover, we currently are engaged in discussions of a joint investigation to expand our observations of antimicrobial management of patients with pneumonia and to combine the unique features of our published studies.

N. Joel Ehrenkranz, MD
Florida Consortium for Infection Control
South Miami, Florida

Streptococcus salivarius Meningitis Following Myelography

To the Editor:

DeJong and Barrs recently reported two cases of *Streptococcus salivarius* meningitis following myelography.[1] We wish to report a similar case.

A 50-year-old man had severe low back pain radiating to the left leg and ankle. A lumbar myelography and lumbar epidural nerve block were performed. Approximately 21 hours later, the patient had a temperature of 39.7°C, headache, confusion, and vomiting. He had a slightly stiff neck. The Kernig and Brudzinski signs were both positive. The cerebrospinal fluid (CSF) contained RBC 2601 mm^3, WBC 4,420/mm^3, 97% neutrophils, protein 369 mg/dl, and glucose 11 mg/dl. The gram stain of CSF showed no organisms, but culture subsequently grew *S salivarius*. One of two blood cultures grew *S salivarius*. The patient was initially treated with vancomycin and ceftazidime. As soon as the infecting organism was identified, therapy was changed to intravenous penicillin G. The patient was discharged uneventfully after a two-week course of antibiotic treatment.

There was no previous case of bacterial meningitis following myelography in our hospital. Investigation by the infection control service revealed that face masks were not routinely worn by personnel during myelography. A letter was sent to all the neurologists and neurosurgeons who performed myelography requesting that "everyone in the room wear a face mask; sterile trays be opened immediately prior to use; physicians and/or assistants wear sterile gloves and sterile gown." This request met with much opposition. The neurosurgeons replied that requiring a face mask and sterile gown was an imposition and that they did not intend to follow the recommendation. Inquiries at several large hospitals in the region revealed that a face mask was not required during the procedure of myelography. All our ancillary personnel assisting myelography are now wearing face masks. We have not had another case of bacterial meningitis following myelography during the subsequent 18 months to date.

Bacterial meningitis following myelography is indeed a rare event. In 1985, Schelkun and colleagues reported one case and reviewed the literature; there were 14 cases including their own.[2] Therefore, including our patient, there are now 17 reported cases of bacterial meningitis following myelography. There were eight cases caused by viridans streptococci, four caused by S *salivarius*, one caused by *Streptococcus sanguis*, one caused by *Streptococcus mitis*, one caused by group G streptococcus, one caused by *Streptococcus bovis*, and one caused by *Pseudomonas aeruginosa*. The majority were from normal oropharyngeal flora. Therefore, it seems that the source of contamination is the mouths of personnel in the room where myelography is performed. Because streptococcal meningitis following myelography is so rare, it has been difficult to persuade physicians who do the procedure to wear a face mask.

Chatrchai Watanakunakorn, MD, FACP, FCCP
Charlotte Stahl, RN, MSN, CIC
St. Elizabeth Hospital Medical Center
Youngstown, Ohio

REFERENCES

1. DeJong J, Barrs ACM. Lumbar myelography followed by meningitis. *Infect Control Hosp Epidemiol.* 1992;13:74-75.
2. Schelkun SR, Wagner KF, Blanks JA, Reinert CM. Bacterial meningitis following pantopaque myelography. A case report and literature review. *Orthopedics.* 1985;8:73-76.