Is Central Venous Catheter Tip Colonization With Pseudomonas aeruginosa a Predictor for Subsequent Bacteremia?

To The Editor—A recent study showed that patients with intravascular catheter colonization with Staphylococcus aureus, but without concomitant bacteremia, had a 24% chance of subsequent S. aureus bacteremia if they did not receive immediate antistaphylococcal antibiotics [1]. Likewise, central venous catheter colonization with multidrug resistant (MDR) Acinetobacter baumannii was associated with a 28% incidence of subsequent bacteremia, with bacteremia being more frequent among patients who did not receive antibiotics within 48 hours after catheter removal [2]. Evidence to guide the appropriate management of Pseudomonas aeruginosa catheter colonization is lacking and it has been suggested as an area for future study by the Infectious Diseases Society of America [3]. We performed a prospective study to assess the incidence of bacteremic complications in patients with P. aeruginosa–colonized central venous catheter tips who had clinical sepsis but did not have concomitant bacteremia.

Between 1 January 2004 and 31 July 2011, all patients with P. aeruginosa cultured from central venous catheter tips, who had concomitant blood cultures performed in the 48 hours before and after catheter removal, and who met the definition of sepsis [4] were identified from the Infection Control and Microbiology databases at Thammasat University Hospital. These patients were then prospectively followed for evidence of bacteremia caused by P. aeruginosa. Patients were excluded from analysis if they had a blood culture positive for P. aeruginosa within 48 hours before or after catheter removal, an identified focus of infection due to P. aeruginosa, or a blood culture positive for multiple organisms. The demographics and clinical characteristics of study patients were
abstracted from the medical records, and all patients were observed for P. aeruginosa bacteremia in the 6 months following catheter removal. We defined MDR P. aeruginosa as an isolate that was resistant to 3 or more of the following antibiotics: cephalosporins, β-lactam/β-lactamases inhibitors, aminoglycosides, fluoroquinolones, and carbapenems. Bacteremia was defined as a positive blood culture for P. aeruginosa obtained 48 hours after catheter removal, with an antibiotic susceptibility pattern identical to that of the catheter isolate. Treatment of P. aeruginosa was defined as receipt of 3 or more days of parenteral antimicrobial therapy for which the isolated strain was susceptible. Catheter tips were cultured using the roll plate method [5].

During the study period, 181 patients had catheter tips positive for P. aeruginosa; 120 (66%) did not have evidence of P. aeruginosa bacteremia within the 48 hours before and after catheter removal and met all study inclusion criteria. Eighteen patients (15%) had MDR P. aeruginosa. Among the 120 study patients, 65 (54%) received treatment for P. aeruginosa and 55 (46%) received no specific therapy. There were no differences in demographics and clinical characteristics between patients who did and did not receive treatment (data not shown). The median duration of catheterization between the groups was comparable (16 days vs 15 days; P = .79). There was no difference in the median number of blood cultures obtained in the 48 hours before and after catheter tip culture among patients who subsequently developed bacteremia versus those who did not (3 vs 2 bottles; P = .79). Thirty (55%) patients who received no therapy subsequently developed P. aeruginosa bacteremia versus 4 (6%) patients who received therapy (relative risk = 8.86; 95% CI, 3.3–23.6; P < .001; Figure 1). All patients who had MDR P. aeruginosa developed subsequent bacteremia (17 patients in the therapy group vs 1 patient in the no-therapy group). Bacteremia occurred a median of 8 days after central venous catheter removal (range, 3–24 days). Bacteremic complications and mortality outcome among 2 groups is shown in the Figure 1.

Although limited by sample size and the inability to perform molecular typing of P. aeruginosa strains, this is the first study to suggest that central venous catheter colonization with P. aeruginosa in patients with sepsis, but negative concomitant blood cultures, was associated with a 28% (34/120) incidence of subsequent bacteremia. In addition, antibiotic treatment was associated with 94% lower risk of subsequent bacteremia, which supports the role of antibiotic treatment to prevent subsequent bacteremia among these patients. Our data suggest the need for additional studies to identify risk factors for subsequent P. aeruginosa bacteremia in patients with catheter colonization and clinical sepsis and to establish the optimal duration of treatment.

Notes

Financial support. This work was supported by the National Research University Project of the Thailand Office of Higher Education Commission and the Thammasat Infectious Diseases and Infection Control Research Unit to A. A.

Potential conflicts of interest. All authors: No reported conflicts.

All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

Anucha Apisarnthanarak,1 Piyaporn Apisarnthanarak,2 David K. Warren,3 and Victoria J. Fraser3

1Department of Medicine, Division of Infectious Diseases, Thammasat University Hospital, Pratumthani, 2Department of Radiology, Siriraj Hospital, Mahidol University, Bangkok, Thailand; and 3Department of Medicine, Division of Infectious Diseases, Washington University School of Medicine, Saint Louis, Missouri

References


Correspondence: Anucha Apisarnthanarak, MD, Division of Infectious Diseases, Thammasat University Hospital, Prathomthi, Thailand, 12120 (anapisarn@yahoo.com).

Clinical Infectious Diseases 2012;54(4):581–3
© The Author 2011. Published by Oxford University Press on behalf of the Infectious Diseases Society of America. All rights reserved. For Permissions, please e-mail: journals.permissions@oup.com.

DOI: 10.1093/cid/cir891