skin was approximately 5; most of the samples tested at 30 seconds contained no detectable CFU.

CHG+IPA was safe and effective in reducing the number of CFU on the skin of the abdomen at 30 seconds and 10 minutes after application. In addition, the antimicrobial activity of CHG+IPA persisted for at least 6 hours.

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Nosocomial Central Venous Catheter Infections Among Patients With Different Types of Cancer

To the Editor:

More than 200,000 nosocomial bloodstream infections occur each year in the United States. Most of these are related to central venous catheters.[1] Among patients with cancer, malignancy-specific rates of nosocomial catheter-related bloodstream infection (CR-BSI) have not been well defined. We systematically determined rates of nosocomial CR-BSI according to underlying malignancy at our center.

Memorial Sloan-Kettering Cancer Center is a 434-bed, tertiary-care cancer hospital in New York City divided into adult disease-specific units, an adult bone marrow transplant unit, an adult intensive care unit, and a pediatrics unit. We conducted intermittent surveillance between February 1997 and February 2001 for nosocomial CR-BSI on the pediatrics, leukemia, lymphoma, breast, bone marrow transplant, and intensive care units. Patients with implanted subcutaneous ports, tunneled (Hickman–Broviac) catheters, leukopheresis catheters, temporary triple-lumen central catheters, and peripherally inserted central catheters were included.

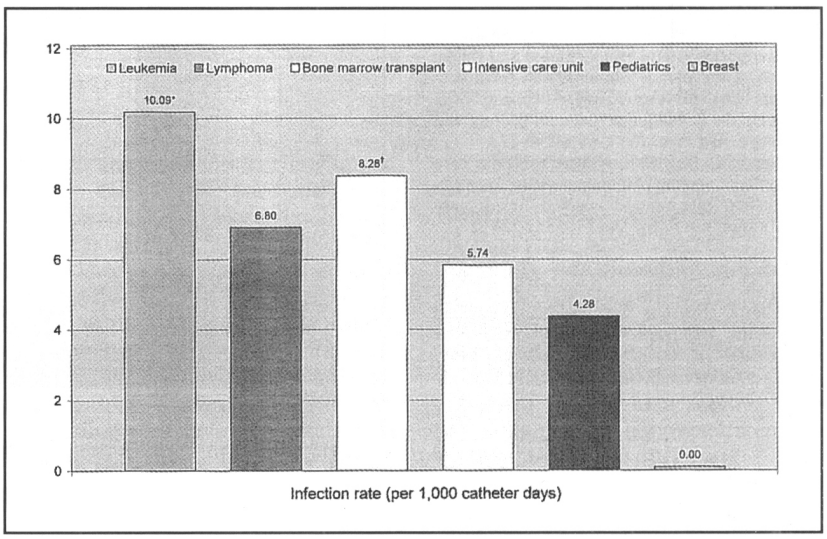

FIGURE. Hospital unit-specific rates of nosocomial catheter-related bloodstream infection during periods of surveillance from 1997 to 2001 at Memorial Sloan-Kettering Cancer Center. *$P < .05$ compared with breast; †$P = .09$ compared with breast.

Registered nurses or nurse practitioners assigned to each unit recorded the number of catheter-days and evaluated each central venous catheter daily. An infection control practitioner confirmed each CR-BSI according to definitions from the Hospital Infection Control Practices Advisory Committee.[1] Only nosocomial cases were included, defined as no evidence of infection present at admission and first positive blood cultures drawn more than 48 hours later. Cancer-specific rates were compared using the two-sided, chi-square statistic.

A total of 6,295 catheter-days of surveillance was performed on the leukemia (1,982 days), lymphoma (441 days), bone marrow transplant (1,811 days), intensive care (697 days), pediatrics (935 days), and breast cancer (429 days) units. Forty-six nosocomial CR-BSIs (20 leukemia, 3 lymphoma, 15 bone marrow transplant, 4 intensive care, 4 pediatrics, and 0 breast cancer) were identified during the periods of surveillance for an overall rate of 7.31 per 1,000 catheter-days (95% confidence interval, 5.16 to 9.45). Disease-specific rates of nosocomial CR-BSI are included in the figure. A statistically significant difference ($P < .05$) was found between patients with leukemia (20 per 1,982 catheter-days) and patients with breast cancer (0 per 429 catheter-days).

Central venous catheters play an important role in the treatment of patients with a variety of diseases. However, catheter-related infections commonly occur and cause significant morbidity and mortality. Mean rates of CR-BSI in medical–surgical intensive care units in the United States between 1995 and 2000 ranged from 3.9 to 6.0 per 1,000 catheter-days depending on the type of medical center.[2] In a previous study of patients with cancer at our institution,[3] at least one device-related infection occurred in 43% of all Hickman-type catheters and 8% of all totally implanted subcutaneous ports placed between 1987 and 1989.

Cancer-specific rates of nosocomial CR-BSI have not previously been well described. Studies[3-7] of central venous catheters in patients with cancer either did not divide patients by type of malignancy or failed to distinguish between hospitalized and ambulatory patients. Also, all catheter-related infections (eg, insertion site, tunnel, pocket, and bloodstream infection) were commonly considered together, limiting any conclusions on specific risk factors for CR-BSI. We found significant differences in rates of CR-BSI between hospitalized patients with hematologic malignancies and those with solid tumors (as represented by patients with breast cancer).

Several possible explanations exist for the wide range of cancer-specific rates. Patients with

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hematologic malignancies and those undergoing bone marrow transplant are frequently hospitalized around the time of intensive chemotherapy, require multiple transfusions, and have prolonged periods of neutropenia. These patients also commonly have Hickman-type, leukopheresis, or temporary triple-lumen catheters, whereas patients with solid tumors at our institution more commonly have totally implanted subcutaneous ports. Finally, patients with hematologic malignancies may be immunocompromised from their underlying illness and therefore more predisposed to disseminated infection. Of note, children in the pediatrics unit and adults in the intensive care unit represent a combination of patients with hematologic malignancies and solid tumors and had intermediate rates of CR-BSI (Figure).

Our study has several limitations. The number of infections is relatively low, limiting statistical analysis and definitive conclusions. Demographic data on the patients, including risk factors for infection, types of catheters, and clinical outcomes, are not included. Finally, differences between hospital units in infection control practices to reduce CR-BSI are not discussed. A standardized approach to catheter care is currently practiced throughout our hospital and we are studying the effect of sterile dressings and antibiotic-impregnated catheters in high-risk patients.

Previous studies of CR-BSI have grouped all patients with cancer together. As our study demonstrates, significant differences in rates of CR-BSI exist among hospitalized patients according to type of cancer. Our results serve as a useful benchmark for further investigation of nosocomial CR-BSI in patients with cancer. Measures to reduce the risk of CR-BSI should be targeted toward patients at high risk, including the critically ill and those with hematologic malignancies.

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