Central Line Care

Reducing central line–associated bloodstream infections on a hematologic malignancy and stem cell transplant unit

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BACKGROUND: Patients with hematologic malignancies and stem cell transplant recipients are at increased risk for infections because of their prolonged periods of profound neutropenia. Central line–associated bloodstream infections (CLABSIs) can result in lengthy hospitalizations, increased healthcare costs, and increased morbidity and mortality.

OBJECTIVES: The aim of this comprehensive educational training program was to reduce CLABSI rates by focusing on the standardized practices associated with use, care, and maintenance of all types of central lines.

METHODS: A pretest was administered to nursing staff. Based on the responses, an education program was then created. The program consisted of a comprehensive two-hour class using different modalities of teaching, including standardized practices associated with central line care.

FINDINGS: The comprehensive education program was effective in standardizing education and improving knowledge gaps, resulting in the reduction of CLABSI rates. Overall, staff knowledge surrounding central line care and maintenance increased by 16%. In addition, no CLABSI events have been reported on the unit from the time of program initiation.

KEYWORDS
central line–associated bloodstream infection; central line care; staff education

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CENTRAL VENOUS CATHETERS (CVCs) ARE A REQUIREMENT in the day-to-day treatment of patients with hematologic malignancies or stem cell transplant recipients. CVCs allow for the administration of numerous antibiotics, blood products, chemotherapy and biotherapy agents, total parenteral nutrition, and stem cell infusions. CVCs also minimize the need for repetitive venipunctures for the already compromised patient with cancer. For patients with cancer, central venous access devices (CVADs) include cuffed tunneled CVCs, such as Hickman® or Broviac® catheters, peripherally inserted central catheters (PICCs), or subcutaneous ports (Zakhour et al., 2016). A central line–associated bloodstream infection (CLABSI) can independently develop within 48 hours of central line placement; it is not related to an infection from another site (Centers for Disease Control and Prevention [CDC], 2020). CLABSIs remain a significant cause of treatment-related morbidity and mortality and have been associated with increased healthcare costs in hospitalized patients (CDC, 2020; Kim et al., 2011). CLABSI infection costs in acute care hospital systems are cumulative; based on a 2017 meta-analysis, the cost from one hospital-acquired CLABSI event is $48,108 (Agency for Healthcare Research and Quality, 2017).

When it comes to CLABSIs, the population of adult patients with cancer is often compared to a high-risk or intensive care unit population of patients. However, patients with cancer may be different from other adult high-risk patient populations because of their immune-compromised status, their disease-specific comorbidities, and the frequency with which their central lines are being used (Zakhour et al., 2016). On an annual basis, more than 5 million long-term CVCs are placed in patients with cancer in the United States, giving rise to 200,000–400,000 CLABSI events. CLABSIs in patients with cancer are associated with a reported mortality rate ranging from 12% to 40% (Zakhour et al., 2016). Overall, in both non-oncology and oncology settings, CLABSIs are associated with a mortality rate ranging from 4% to 20% (Drews et al., 2017). The increased risk of mortality in the oncology population demonstrates the imperative nature of this educational initiative.

Although evidence-based prevention guidelines have reduced CLABSI rates (CDC, 2020; O'Grady et al., 2011), many healthcare systems struggle with elevated CLABSI rates for patients in hematology, oncology, and stem cell transplant settings. Patients who receive cytotoxic chemotherapy regimens and/or contract graft-versus-host disease from their treatment are at risk for translocation of oral and gut flora to the bloodstream. Patients with