



HOSPITAL ACQUIRED BLOODSTREAM INFECTIONS IN PEDIATRIC PATIENTS UNDERGOING HEMATOPOIETIC STEM CELL TRANSPLANTATION

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Purpose

The purpose of this thesis was to investigate hospital acquired bloodstream infections, in pediatric patients undergoing hematopoietic stem cell transplantation (HSCT), using a subset of data from an ongoing study. The goal of the larger study was to track changes in central line-associated bloodstream infections (CLABSIs), in children with immune-compromised conditions to guide interventions to reduce infection.

Background

Children undergoing HSCT are a distinct subset of pediatric hematology and oncology patients who are at significant risk for developing CLABSIs due to their extended use of central venous catheters and prolonged immunosuppression. Understanding characteristics of children who developed CLABSIs after HSCT and the organisms involved in these events can help refine strategies to reduce these infections.

Methods

CLABSI events involving HSCT patients from a single pediatric hospital between January 2006 to June 2019 were reviewed. CLABSI events and their associated characteristics were compared during 1) a 5-year pre-intervention baseline (2006-2010) and 2) following the introduction of CLABSI-reduction interventions (2011 to June 2019). Interventions included the introduction of Children's Hospital Association's best practice bundles in 2011 as well as the addition of structured hygiene supportive cares in 2013. Because the hospital was unable to separate central line days for HSCT patients from the total number of central line days for the unit to provide a comparison of rates, events were descriptively compared between the two periods.

Results

During the baseline and intervention periods, the unit averaged 32 transplants per year. Twenty-eight CLABSIs involving 25 patients occurred during 2006-10 (average 5.6 CLABSIs/year), and 26 CLABSIs involving 24 patients occurred from 2011- June 2019 (average 3.1 CLABSIs/year). Even though frequency of CLABSI events decreased during the intervention period ($t=2.4$; $p=.04$), characteristics of patients who developed CLABSIs and the predominant organisms were similar across both periods. CLABSIs were most frequent among children with leukemia ($n=11$; 39% in the baseline and $n=9$; 35% in the intervention period) and in those 0 to 4 years of age ($n=17$; 61% in the baseline and $n=13$; 50% in the intervention period). During both time periods, over half (54%) of the patients who developed CLABSIs were neutropenic. The most frequent causative organisms were also similar across both periods and included coagulase-negative staphylococci (baseline $n=9$; 32%; intervention period $n=8$; 31%) and *Enterococcus* species (baseline $n=7$; 25%; intervention period $n=4$; 15%).

Implications

The introduction of structured interventions including best-practice bundles and intensified hygiene cares were successful at decreasing the frequency of CLABSI events. Children who remain at greatest risk for CLABSIs post-HSCT include those less than five years of age and those with leukemia. These data provide guidance for understanding the characteristics of children undergoing HSCT who are at highest risk for CLABSIs. By continuing a safe environment and promoting a culture of patient safety in nursing cares, CLABSI events can be reduced and decreased rates can be maintained.