A Multi-Disciplinary Approach to Reducing Central Line-Associated Bloodstream Infections on a Transplant and Nephrology Unit
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The use of central venous catheters (CVCs) in acutely ill patients poses a risk of central line-associated blood stream infection (CLABSI). (IHI, 2008). CLABSI are preventable and are associated with increased morbidity and mortality, increased lengths of stay, and increased costs, contributing to 9% of all deaths of patients with end-stage renal disease between 1995 and 1997 (Dopriak, Hikk, Oleksiw, et. al, 2002). CMS and The Joint Commission require hospitals to establish and implement protocols to reduce CLABSI (Hoover & Small, 2009). Lack of hand hygiene, use of immunosuppressive agents, multiple central venous catheters, poor technique when inserting and accessing the line, and leaving lines in longer than therapeutically necessary are contributing risk factors for CLABSI (Hovarth, Norville, Lee, et. al, 2009).

Background
The transplant and nephrology nursing unit at the Medical University of South Carolina Medical Center is a 22 bed unit that provides acute and intermediate inpatient and outpatient nursing care to patients with end-stage renal disease (ESRD) and peri-operative and post-operative care to transplant surgery patients. The unit also has 7 “virtual” outpatient beds for pre-operative surgery workups and education and post-surgical triaging of complications and infusion services.

While infection rates have been closely measured and tracked within the hospital for a number of years, in the spring of 2009 we began looking more closely at rising CLABSI rates on the unit to determine best course of action to improve outcomes for patients. To accomplish our goal of decreasing CLABSI, we first designated a team consisting of nursing staff from the unit, the Infection Control Practitioner (ICP), and a Transplant attending surgeon.

Methods
The team used the IMPROVE model to guide the work of the project. (IMPROVE = Identify the Problem, Measure, Problem Analysis, Remedy, Operationalize, Validate Effectiveness, Evaluate for Sustainability). After defining the problem statement, nursing staff on the unit and the Infection Control Practitioner (ICP) reviewed current practice on CVC site care and maintenance and began daily collection of CVC device days for an accurate denominator for infection rates. The Infection Control department reports monthly data of infection rates per 1000 CVC days.

Clinical investigations of prior and current CLABSI by unit nursing staff, ICP, and Transplant attending surgeon led to the inclusion of nurses from Interventional Radiology (IR) and the inpatient dialysis unit to address identified concerns of initial line insertion and line access practices in procedure areas.

A CVC line bundle was being developed institutionally for insertion and ongoing line care and maintenance, and this was aggressively initiated on the unit. The IV prep was changed from 70% alcohol to chlorhexidine (CHG)/alcohol with an emphasis on friction while scrubbing the hub and allowing prep to dry. Reinforcement of hand hygiene, use of sterile end caps when line not in use, masking when line is open, use of Biopatch dressing, and educating staff to assess CVC
dressings to ensure dressings are always clean, dry, and intact were all initiatives rolled out to nursing staff on the transplant/nephrology unit.

Patient daily goals were incorporated into bedside shift report to address central line care and maintenance with patients and their families. The unit charge nurse participates in multi-disciplinary patient care rounds to assess early removal of unnecessary lines. Nurses from IR and Dialysis audited compliance with the CVC bundle and began educating nurses in procedure areas based on audit results and overall infection rates.

Findings

Start of project: June 2009. The previous 18 month baseline was mean of 3.36 CLABSI per 1000 CVC device days, which was reduced to the project mean of 0.76 CLABSI per 1000 patient days. The relative percent improvement was over 77.4%. Actual CLABSI were reduced from 9 to 2 per respective 18 month time frame. CVC line utilization was reduced by 10%, with an overall estimated cost savings of over $252,000.

Implications/Significance of findings

The implementation of a team approach with evidence-based CVC bundles is an effective strategy to decrease CLABSI rates in hospitalized patients. Inclusion of front-line staff and a multi-disciplinary team promotes ownership and improvement in the process, measures, and patient outcomes. Inclusion of patients in daily clinical goals promotes patient-centered care and improved patient outcomes.

References:


