BACKGROUND

Healthcare-acquired infections (HAIs), such as ventilator-associated pneumonia (VAP) and bloodstream infections due to central line placement (CRBSI), are negative patient healthcare outcomes. VAP is a common complication of mechanical ventilation, occurring in 10–20% of intubated and mechanically ventilated patients.1 In 2004, the National Nosocomial Infection Surveillance System (NNISS) reported pooled mean CRBSI rates of 3.2 to 7.4 per 1000 central lines days x 1000 for all types of ICUs. The most common pathogens isolated in HAIs as a group of in-hospital infections include Staphylococcus aureus, Streptococcus pneumoniae, or respiratory pathogens, such as Haemophilus influenzae, Moraxella catarrhalis, and Escherichia coli.2,4 Despite the frequency of these occurrences, HAIs are considered preventable.5 The Institute for Healthcare Improvement (IHI) has provided information on the prevention of VAP and CRBSIs in the form of care bundles,6 which have been shown to reduce CRBSIs1 and VAP rates.7 An oral care protocol may also decrease the rates of VAP. One controlled study showed that the addition of tooth brushing to a ventilator bundle reduced the rate of VAP from 2 cases/1000 ventilator days to 0.63 cases/1000 ventilator days compared with a standard oral care protocol with no tooth brushing.8 Other studies showed that the addition of an oral care protocol involving a 0.12% chlorhexidine gluconate (CHG) rinse with alcohol reduced VAP rates in surgical patients.1,12

Objective & Purpose of Intervention

On the basis of previous evidence, it is apparent that the implementation of preventive measures improves VAP and CRBSI rates. The purpose of this quality-assurance intervention was to use the IHI Ventilator Bundle, the IHI Central Line Bundle, and an oral-care protocol kit to reduce VAP and CRBSI rates in ICU populations.

Methods

RATES OF VAP AND CRBSI were monitored during the study in all patients in the critical care unit, medical-surgical ICU (MSICU), trauma ICU (TICU), neurosurgical ICU (NSICU), intermediate care unit (IMC), coronary care unit (CCU), and cardiovascular ICU (CVICU). These rates were then compared with historical baseline rates of VAP and CRBSI.

VAP was defined as pneumonia that first developed more than 48 hours after a first episode of intubation and mechanical ventilation. Pneumonia was diagnosed if the patient developed a new and persistent (at least 72 hours) radiographic infiltrate plus a new (<10 mm) temperature of >100.4°F, or >38°C, leukocytosis (25% increase from baseline in circulating leukocytes and a value >10,000 mm3), and a core temperature >38.3°C. Pneumonia was also diagnosed if a new and persistent radiologic infiltrate plus a new (<10 mm) temperature of >100.4°F, or >38°C, leukocytosis (25% increase from baseline in circulating leukocytes and a value >10,000 mm3 or <1500 or >12,000 mm3), and purulent tracheal or sputum aspirate (purulent if 1,000 neutrophils were present).2 For the CRBSI portion of the study, patients were included if they had a non-tunnelled catheter, a peripherally inserted central catheter, or an arterial line. The patient had to be older than 18 years of age and free of bloodstream infection at the time the vascular line was inserted during the first 48 hours after insertion of the line. Patients were excluded if the intravascular catheter was inserted in a facility other than Inova Fairfax Hospital or if they had an intra-aortic balloon pump or a Hickman, Groshong, or ventricular assist device in place.

CRBSI was diagnosed if a positive blood culture was obtained >48 hours after insertion of a vascular catheter. The cultured infection had to be due to a recognized pathogen cultured from one or more blood cultures, and the pathogen cultured could not be related to an infection at another site. The patient had to have a fever (temperature of >100.4°F or >38°C), chills, or hypotension. Alternatively, the patient had to have signs and symptoms of an infection, had to have a positive laboratory result not related to another infection, and had to meet 2 of the following criteria: infection with a common skin contaminant cultured from ≥2 blood samples drawn on separate occasions, infection with a common skin contaminant cultured from ≥1 blood sample obtained from a patient with an intravascular line, or receiving physician institute-appropriate antimicrobial therapy, or have a positive result for a pathogen from a site distant to an infection site.

In addition to the bundles, a Champion group was established, which met every 6 weeks and focused on ensuring compliance with the bundle. The results were shared with staff, and recommendations for improvement were made.

Reference:


