ICU Compliance Rates of 95% Cut CLABSIs

VITALS

Major Finding: Only when an ICU had a central line bundle policy, monitored compliance, and had 95% or greater compliance did CLABSI rates decrease significantly.

Data Source: Survey of 312 ICUs at 250 U.S. hospitals.

Disclosures: Dr. Furuya had no disclosures.

BY MIRIAM E. TUCKER

ATLANTA — Overall compliance with a central line bundle did not significantly affect the rate of central line–associated bloodstream infections unless it reached 95% or higher in a nationwide sample of 312 intensive care units, but compliance with individual elements of the bundle appeared to lower infection rates somewhat.

The findings should not be interpreted to mean that bundles are ineffective. "This study raises the intriguing possibility that complying with all bundle elements is no better than complying with at least one bundle element. … In other words, it's okay to miss an element as long as compliance with other elements is high," Dr. E. Yoko Furuya said during a special presentation of the four best submitted abstracts at the Decennial International Conference on Healthcare-Associated Infections.

The central line bundle—consisting of hand hygiene, maximal barrier precautions, chlorhexidine skin antisepsis, optimal catheter site selection (avoiding femoral vein in adults), and daily review of line necessity—has been promoted by the Institute for Healthcare Improvement and other national/scientific organizations as a strategy for reducing the rates of central line–associated bloodstream infection (CLABSI) events. However, limited data have been available regarding exactly how the bundle works.

"With the new Joint Commission mandate for universal central line 'checklists,' CL bundle use will increase, but will this lead to lower CLABSI rates? It's really not clear," said Dr. Furuya, medical director of infection prevention and control at New York–Presbyterian Hospital.

The data come from a cross-sectional survey of ICUs in the National Healthcare Safety Network (NHSN) hospitals that are participating in the Prevention of Nosocomial Infections and Cost Effectiveness (P-NICE) study. Funded by the National Institutes of Health, the P-NICE study aims to determine the level of infection-control department staffing and the extent of ICU interventions in U.S. hospitals. In the online survey, directors and managers of hospital infection-control departments were asked to report whether the ICU had a written central line bundle policy; whether compliance was monitored and, if so, how often; and the ICU's NHSN-reported CLABSI rate.

"While the bundle is an all-or-nothing approach, we wanted to deconstruct the bundle and look at the effectiveness of individual bundle elements on rates of CLABSIs," said Dr. Furuya, also with Columbia University, New York.

Hand hygiene compliance was controlled for, since it is considered to affect all health care–associated infections and not specifically CLABSIs. Also controlled for were ICU type, infection-control department characteristics, hospital bed size, region, and teaching status. Separate analyses were conducted with and without chlorhexidine antisepsis because some data suggest it may be less effective against gram-negative and fungal pathogens and because its use has been linked to methicillin resistance in *Staphylococcus aureus*, she said.

A total of 250 hospitals reported on central line bundle data for 415 ICUs, of which 312 also included CLABSI rates. Of those 312, 44% were in the northeastern United States, and 26% were in the south. The majority (76%) were from states with mandatory CLABSI reporting. More than half of the 250 hospitals (58%) had 201-500 beds, and 54% of the 415 ICUs were medical/surgical.

Of the 240 hospitals reporting hand hygiene compliance, just 7% reported complying "all of the time" (95%-100%), 43% reported "usually" (75%-94%) complying, and 33% said they only "sometimes" (25%-74%) comply. The overall mean CLABSI rate was 2.1/1,000 central line–days, which is similar to the overall NHSN average, she noted.

Just under half of the 415 ICUs (49%) had written central line bundle policies, and only 45% reported monitoring for compliance. Of those 91, only 38% reported correct implementation of all the bundle elements 95% or more of the time. When not all bundle elements were fully implemented, maximal barrier precautions were most often implemented, while daily line checks and optimal site selection were least commonly implemented.

No associations were found between CLABSI rates and having a bundle policy, monitoring compliance, or low compliance with the central line bundle. In fact, only when an ICU had a policy, monitored compliance, and had 95% or greater compliance did CLABSI rates decrease significantly, Dr. Furuya reported.

In a series of multivariate analyses, no individual bundle element was associated with decreased CLABSI rates; however, when zero compliance was compared with moving from compliance with any one element to any two or more elements, there was a significant decrease in rates. Complying with any one of three bundle elements also resulted in decreased rates and complying with all bundle elements was not necessary to show a significant decrease in infections.

Indeed, for all elements except chlorhexidine antisepsis, there was a nonsignificant trend toward lowering CLABSI rates. It's unclear whether the lack of chlorhexidine effect may be related to an increasing prevalence of gram-negative and fungal infections causing CLABSIs or to chlorhexidine not being applied optimally, Dr. Furuya noted.

"I think we don't fully understand the implications of what we found with chlorhexidine. I think what we did find is that if you're very compliant with some elements of the bundle you may still reduce CLABSI rates, and even if you're missing one or more elements, then perhaps it doesn't make a difference," she commented.

Further study, including direct observation of adherence to bundles, will be required to determine what impact, if any, very high rates of bundle adherence might have on reducing CLABSI rates. Future planned stages of the P-NICE study will interview personnel about compliance and will examine data over a longer period, she said. ■

MRSA Surveillance, Decolonization, Isolation Work at 4 Years

BY MIRIAM E. TUCKER

ATLANTA — Universal admission surveillance for methicillin-resistant *Staphylococcus aureus* at three Illinois hospitals significantly reduced both MRSA and overall *S. aureus* infection over a 4-year period.

The observational study findings are an expansion of 21-month data that showed reductions of MRSA infection from 8.9/10,000 patient-days at baseline to 3.9/10,000 with universal MRSA real-time polymerase chain reaction–based nasal surveillance followed by topical decolonization and contact isolation of patients who test positive (Ann. Intern. Med. 2008; 148:409-18).

The update included data from the baseline period, all intensive care unit admissions for 1 year, and all hospital admissions for 4 years with universal MRSA surveillance at the three-hospital, 850-bed NorthShore University HealthSystem, which averages 40,000 annual admissions. One-year ICU prevalence, reported previously, was 7.4/10,000 patient-days, and the prevalence after 4 years with universal surveillance was 3.3/10,000, Dr. Lance R. Peterson said at the Decennial International Conference on Healthcare-Associated Infections.

The prevalence density of MRSA decreased at each of the four body sites assessed—bloodstream, respiratory, urinary tract, and surgical site—in each of the time periods, said Dr. Peterson, of NorthShore University HealthSystem, Evanston, Ill.

The percentage of exogenous MRSA fell over the 4 years from 48% to 33%, implying fewer patients were acquiring MRSA in the hospital. Over the same period, there was a 70% reduction in total MRSA disease during hospitalization and at 30 days post hospitalization. The proportion of all *S. aureus* infections that were methicillin-resistant also declined significantly, from 52% at baseline to 31% at 4 years, Dr. Peterson reported.

VITALS

Major Finding: Prevalence of MRSA infection at NorthShore University HealthSystem dropped from a baseline of 8.9 per 10,000 patient-days to 3.3 per 10,000 at 4 years after universal MRSA surveillance with decolonization and contact isolation of those found to be colonized.

Data Source: Observational 4-year study done at a three-hospital, 850-bed health organization.

Disclosures: Dr. Peterson has received research grants from and/or consulted for Cepheid, NorthShore, BD-GeneOhm, MicroPhage, Nanosphere, the National Institute for Allergy and Infectious Diseases, Roche, 3M, and Washington Square Health Foundation, mainly in the area of new test development.

Based on a previous cost analysis of 178 MRSA cases and 5,796 controls, the excess expense of MRSA infection was estimated at $24,000, compared with no infection. During the first 4 years of NorthShore's containment program, 406 MRSA infections and 72 deaths were avoided, with a net expense reduction of $8.8 million, he said.

Previous studies have suggested that the success of a MRSA surveillance program depends on disease/colonization prevalence, scope of surveillance, test sensitivity, rapidity of results reporting, and length of the intervention period. The cost-benefit ratio of any program depends on the degree to which it is successful, Dr. Peterson said.

"If you implement a MRSA control program that includes surveillance and there is no desired impact, you may need to do more, such as expand the population tested or increase the sensitivity and speed of testing," he noted.

The role of adding decolonization in the acute care setting is still unclear, he said. In this study, mupirocin and chlorhexidine decolonization in patients testing positive did not affect the risk of eventual disease, although it did appear to prolong the median number of days to develop infection, from 15.5 days to 50 days. Mupirocin resistance is now at 10%, however, which "is certainly a challenge we'll have to deal with as we go forward," he concluded. ■