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Impact of the 2013 Revised Centers for Disease Control and Prevention Central Line–Associated Bloodstream Infection (CLABSI) Surveillance Definition on Inpatient Hospital CLABSI Rates: Is It Enough?

To the Editor—It is with great interest that we read the article entitled "Distribution of Pathogens in Central Line–Associated Bloodstream Infections among Patients with and without Neutropenia following Chemotherapy: Evidence for a Proposed Modification to the Current Surveillance Definition" by Steinberg et al.[1] This study found that common microbial residents of the gastrointestinal tract were overrepresented in neutropenic patients, suggesting that central line–associated bloodstream infections (CLABSIs) in neutropenic patients may primarily represent bacterial translocation of gut organisms rather than infections related to the central line catheter. Steinberg and colleagues state that their findings support the efforts by the National Healthcare Safety Network to refine the CLABSI surveillance definition. We present a comparison of the pre-2013 CLABSI surveillance definition with the revised CLABSI surveillance definition in a large tertiary hospital, utilizing 4 years of surveillance data. These data provide additional evidence of the increased validity of the current definition and suggest areas for further refinement.

In January 2013, the Centers for Disease Control and Prevention (CDC) released a revised CLABSI surveillance definition that included a mucosal barrier injury–laboratory-confirmed bloodstream infection (MBI-LCBI) component. MBI-LCBI eliminated the following 2 groups of patients: (i) allogeneic hematopoietic stem cell transplant recipients within the past year with either grade III or IV gastrointestinal graft versus host disease or 1 or more liters of diarrhea in 24 hours within 7 days of the blood cultures and (ii) patients with neutropenia on or within 3 days of the positive blood culture.[2] This new exclusion criterion aimed to reduce the number of cases due to bacterial translocation in immunocompromised patients that were counted as CLABSIs. This is an important effort by the CDC, which acknowledges that not all reported CLABSIs are a result of gaps in infection control practices.

To determine the impact of the recent change in the CL-

ABSI definition, CLABSI rates using the pre-2013 CLABSI definition and those using the current CLABSI definitions were compared at a large teaching hospital in San Diego, California, during 2008–2012 (Table 1). A total of 142 cases met the pre-2013 CLABSI definition. When the current CLABSI definition was applied to the 142 cases, 22 cases in neutropenic patients with an endogenous source of infection related to MBI were excluded. This significantly reduced the CLABSI rate by 15% ($P = .001$), from 1.49 cases per 1,000 patient line-days to 1.26 cases per 1,000 patient line-days. This did not change the distribution of the CLABSI cases by age, sex, or likelihood of intensive care unit admission (Table 1). We conclude that the current CDC CLABSI definition does a good job refining the surveillance definition with respect to neutropenic patients; however, there are still 2 subgroups thought to inflate CLABSI rates that are not accounted for by the current modified definition in any way.

Despite this recent revision, CLABSI rates remain inflated as a result of the inclusion of 2 principal subsets: (i) intra-abdominal surgery patients and (ii) *Enterococcus* cultures mixed exclusively with skin organisms. Both neutropenic and intra-abdominal surgery patients are prone to bacterial translocation, which can result in an endogenous source of infection.[3] The chances for an endogenous source of infection are increased with mechanical handling of the bowel during surgery.[4] Endogenous sources of infection are not preventable and, therefore, will continue to inflate CLABSI rates and prevent hospitals from ever reaching a rate of zero unless an exclusion criterion is created for the CLABSI surveillance definition. Similarly, single *Enterococcus* cultures or *Enterococcus* cultures mixed exclusively with skin organisms are likely contaminants in 15%–30% of cases.[5] One study reported that 64% of their vancomycin-resistant enterococci bacteremia cases had spontaneous resolution, indicating that the blood culture was positive as the result of a skin contaminant.[6] As a result, these cases will continue to inflate CLABSI rates unless single *Enterococcus* cultures or Enterococci cultures mixed exclusively with skin organisms are excluded from the CDC CLABSI surveillance definition. CLABSI rates would likely decrease dramatically if exclusion criteria for these 2 subsets were created and used in combination with the neutropenic exclusion criterion created in the current CLABSI definition.

Steinberg et al[1] proposed that neutropenic patients observed with *Escherichia coli* be added as an exclusion criterion for the CLABSI definition. The Steinberg study found significant differences in microbiological findings between neutropenic and nonneutropenic patients. *Candida* species was the most common isolate among nonneutropenic patients (33.2% vs 6.1% among neutropenic patients), whereas *E. coli* was the most common isolate among neutropenic patients (22.7% vs 2.5% among nonneutropenic patients). Our study results were consistent with these findings. We found *Candida* species to be the most common isolate among nonneutropenic patients (25% vs 9% among neutropenic patients) and *E. coli* to be the most common isolate among neutropenic patients (31.8% vs 7.5% among nonneutropenic patients). We support Steinberg et al[1] in their call to further refine the CLABSI definition.

Future research should focus on endogenous sources of infection in intra-abdominal surgery patients and on single *Enterococcus* cultures and enterococci cultures mixed exclusively with skin organisms as contaminants as areas for refinement. Additional refinement of the CLABSI surveillance

TABLE 1. Central Line–Associated Bloodstream Infection (CLABSI) Rates for Pre-2013 Centers for Disease Control and Prevention (CDC) CLABSI Definition Cohort and Current CDC CLABSI Definition Cohort for Scripps Mercy Hospital, 2008–2012

Variable	Pre-2013 CLABSI definition ($n = 142$)	Revised CLABSI Definition ($n = 120$)	P
CLABSI rate	1.49	1.26	.0012
Age, years, median (range)	60 (0–94)	61 (0–94)	
Age group			.9696
0–5	2 (1.4)	2 (1.7)	
13–18	1 (0.70)	1 (0.83)	
19–35	14 (9.9)	12 (10.0)	
36–64	73 (51.4)	55 (45.8)	
65–85	47 (33.1)	45 (37.5)	
>85	5 (3.5)	5 (4.2)	
Sex			.9742
Male[a]	79 (55.6)	67 (55.8)	
Female	63 (44.4)	53 (44.2)	
ICU patient			.3426
Yes[a]	65 (45.8)	62 (51.7)	
No	77 (54.2)	58 (48.3)	

NOTE. Data are no. (%) of patients unless otherwise indicated. ICU, intensive care unit.
[a] Reference category.

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definition to include only those infections relevant to infection control practices is necessary to attain the Centers for Medicare and Medicaid Services' goal of CLABSI elimination (a "never event"). Likewise, to appropriately advise medical staff and remediate infection control practices associated with CLABSI, a definition that focuses on truly preventable CLABSIs is essential.[7]

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