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How Should Surveillance Systems Account for Concurrent Intravascular Catheters?

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The risk of central venous catheter (CVC)-associated bloodstream infections has decreased dramatically.[1] The same may not be true for infections associated with short-term peripheral venous catheters.[2] The effects of future preventive efforts should be measured using data derived from evidence-based surveillance programs. Dube et al[3] describe a multicenter, retrospective cohort study that assessed the risk of central line–associated bloodstream infection (CLABSI) associated with concurrent CVCs. Analyzing a propensity-adjusted cohort of 11 796 hospitalized patients by status of concurrent CVCs, the authors found that the likelihood of a patient developing CLABSI, after adjustment for confounders, was increased by 62% when they had 2 concurrent CVCs for more than two-thirds of their overall CVC dwell time. In a CVC survival analysis, the daily excess CLABSI risk associated with a concurrent CVC was approximately 80% after adjusting for confounders. Dube et al[3] are not the first to measure the risk of CLABSI among patients with concurrent catheters; others have also found that concurrent catheters are independently associated with increased CLABSI risk (**Table**).[3-9] Regarding surveillance, adding concurrent CVC days to the denominator reduces the measured incidence of CLABSI. Concurrent CVC days are not accounted for in the US

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Table. Association of Concurrent Catheters With CLABSI Risk

Source	Study Design	C-Ds, 1 CVC	C-Ds, All Simultaneous CVCs	C-Ds, All Simultaneous CVCs and Arterial Catheters	Risk of CLABSI	Risk of Catheter Colonization or CLABSI
Aslakson et al,[4] 2011	Single center, prospective, cross-sectional study among patients in the ICU	485	745, PICCs excluded	1293	NA[a]	NA[a]
Legriel et al,[5] 2011	Single center, prospective, cross-sectional study among patients in the ICU	Yes	No	Yes	NA	Odds ratio, 30.3 (95% CI, 3.0-311.0) for simultaneous presence of 3 catheters; odds ratio, 5.1 (95% CI, 1.7-14.9) for average number of catheters by exposure day during ICU stay[b]
Scheithauer et al,[6] 2013	Single center, prospective, cross-sectional study among patients in the ICU	14 080	22 944	NA	Incidence rate ratio, 3.6 (95% CI, 2.6-5.1) for simultaneous presence of >1 CVC; incidence rate ratio, 0.81 (95% CI, 0.79-0.83) when simultaneous CVC days included in denominator[c]	NA
Concannon et al,[7] 2014	Single center, case-control study	Yes	Yes	No	Odds ratio, 3.4 (95% CI, 1.7-6.9) for simultaneous presence of >1 CVC[d]	NA
Talbot et al,[8] 2015	Single center, retrospective cohort study among patients in the ICU and not in the ICU	170 254	184 645	NA	CLABSI rates decreased 4%-12% when simultaneous CVC days included in denominator	NA
Couk et al,[9] 2019	Multicenter, retrospective cohort study among patients in the ICU and not in the ICU	156 574	180 950		Odds ratio, 5.8 (95% CI, 4.1-8.1) for concurrent CVC at any point during hospitalization; CLABSI rates decreased 25% in ICU and 6% outside ICU when simultaneous CVC days included in denominator[b]	NA
Dube et al, 2020[3]	Multicenter, retrospective cohort study among patients in the ICU and not in the ICU	Yes	Yes	No	Adjusted risk ratio, 1.62 (95% CI, 1.10-2.33) among patients with 2 CVCs for more than two-thirds of their CVC days[d]	NA

Abbreviations: C-D, catheter day; CLABSI, central line–associated bloodstream infection; CVC, central venous catheter; ICU, intensive care unit; NA, not applicable; PICC, peripherally inserted central catheter.

[a] No CLABSIs noted during study.

[b] Analysis performed with univariate analysis.

[c] Analysis performed with Poisson regression.

[d] Analysis performed with multiple logistic regression.

Centers for Disease Control and Prevention National Healthcare Safety Network; this may partially explain the higher incidence of CLABSI in some tertiary-care academic centers. Without adjustment for this important risk factor, these centers are more likely to incur financial penalties because CLABSI is a component of the formula used in the Hospital-Associated Condition Reduction Program.[10] Based on the totality of data in the peer-reviewed literature, concurrent CVCs are a modifiable CLABSI risk factor and adding concurrent CVC days to the Centers for Disease Control and Prevention National Healthcare Safety Network surveillance system will help ensure hospitals are treated equally regarding this modifiable risk factor. However, this may have the unintended consequence of lowering the threshold to maintain such catheters when not absolutely necessary for patient care. Thus, it will be essential to raise awareness of the risk posed by concurrent CVCs.

The study by Dube et al[3] demonstrates that it is time to reassess our national surveillance program regarding CLABSI. The evidence is clear that concurrent CVCs must be accounted for. In a 2011 study,[5] concurrent catheters included CVCs and arterial catheters; whether surveillance using concurrence should include CVCs and arterial catheters should be addressed in future investigations. Additionally, as we focus our prevention efforts on CLABSI, we should remember that all intravascular devices, including short-term peripheral venous catheters, pose a risk of life-threatening infection. Short-term peripheral venous catheters may pose an even greater threat, given that hospitals are pushed to remove CVCs to reduce CLABSI risk, but they do so by replacing CVCs with short-term peripheral catheters for many patients. It is hoped that future surveillance programs will include the risk to our patients from these catheters as well.

ARTICLE INFORMATION

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