



## Brief report

## Idle central venous catheter-days pose infection risk for patients after discharge from intensive care

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## Key Words:

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This prospective observational study measured idle central venous catheter (CVC)-days (no medical indication), and ward clinicians' adherence to evidence-based practices for preventing short-term central line-associated bloodstream infections (CLABSIs). In 340 patients discharged from ICU over a 1-year period, 208 of 794 CVC-days (26.2%) were idle. Interventions to prevent CLABSIs were poorly implemented. Ward clinicians need education regarding risk management strategies to prevent CLABSIs, and clear accountability processes for prompt catheter removal are recommended.

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Central venous catheters (CVCs) are vital for assessing and managing critically ill patients in the intensive care unit (ICU). The use of CVCs comes with inherent risks, most notably central line-associated bloodstream infections (CLABSIs), which are associated with increased morbidity, mortality and health care costs.<sup>1</sup> Implementing practices to reduce CLABSIs have been confined mostly to ICUs, putting patients discharged from ICUs to wards with a CVC in place at risk for development of CLABSI. Recent US data show 20.1 million CVC-days and 23,000 CLABSIs in non-ICU wards in 2009.<sup>2</sup>

Guidelines strongly recommend prompt removal of CVCs (category 1A),<sup>3</sup> because the risk of developing CLABSIs increases with each day of prolonged use.<sup>4</sup> Idle CVC-days represent continued use of CVCs without justification by medical indications. Investigating the number of idle CVC-days, along with the use of post-insertion interventions known to prevent CLABSIs,<sup>3</sup> will identify the scope of the problem and enable the development of specifically targeted interventions to implement evidence-based practices. Thus, the aims of this study were to quantify idle CVC-days in patients discharged from ICUs to general wards, and describe the use of evidence-based postinsertion nursing interventions to reduce CLABSIs.

### METHODS

Following hospital Ethics Committee approval, a prospective observational design was used to quantify the number of idle CVC-days and the use of evidence-based interventions known to prevent CLABSIs. The setting was a 460-bed quaternary hospital with a 36-bed ICU. All patients discharged from the ICU with an uncuffed CVC (cardiopulmonary catheter sheath or multilumen catheter) for short-term therapy or monitoring were included. Patients with a cuffed, implanted, or tunneled CVC for long-term therapy, such as chemotherapy, were excluded.

Between October 2009 and October 2010, outreach ICU nurses conducted daily assessments until CVC removal as part of their usual role. An idle CVC-day was defined as a day of CVC insertion without a documented or observable medical indication for use (Table 1). Evidence-based postinsertion nursing management practices included the use of an occlusive dressing, use of a bio-patch, anchored lines, particulate matter absent in lumens and connectors, documentation of CVC line change due date, and a process for maintaining lumen patency (infusion or prescribed flush).<sup>3</sup>

### RESULTS AND DISCUSSION

Of the 1,650 patients discharged from the ICU to wards, 340 (21%) had a short-term CVC in place. The median duration of ward-based CVC use was 2.34 days (interquartile range, 1-3 days; range, 1-15 days). A total of 794 daily assessments were conducted by

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**Table 1**  
Criteria for continued CVC use

IV antibiotic use (type not differentiated)
Poor peripheral access (based on clinical examination, discussion with attending nurses/doctors)
Hemodynamic monitoring
Administration of total parental nutrition, vasoactive agents, or immunosuppressants

**Table 2**  
Frequency of adherence to evidence-based practices to reduce CLABSI risk

Evidence-based practice	Adherence, n (%)
Biopatch present	596 (75)
Occlusive dressing present	653 (71)
Intact occlusive dressing (n = 653)	
CVC	477 (73)
CPC	411 (68)
IV lines anchored	379 (48)
Line change due documented	17 (2)

CPC, central pulmonary catheter.

outreach ICU nurses. Of the 794 total CVC-days, 208 (26.2%) were idle; that is, there was no medical indication for continued CVC use. The 434 multilumen CVC-days included 58 (13.4%) idle CVC-days, and the 345 cardiopulmonary sheath days included 151 (43.8%) idle CVC-days (missing data, n = 15). Roughly 50% of the patients recorded at least 1 idle CVC-day, and 25% had at least 2 idle CVC-days (range, 1-4 days).

Adherence to evidence-based postinsertion interventions was poor, particularly regarding ensuring an intact occlusive dressing (Table 2). Overall, approximately one-quarter of CVC assessments revealed a lack of adherence to practices known to prevent CLABSIs. Formal documentation of CLABSI prevention practices was poor, with only 43% (n = 339) of patients having the hospital-specific form for documenting care included in their records.

Delayed removal of CVCs and poor adherence to postinsertion interventions placed patients discharged from ICU to acute medical/surgical wards at high risk for CLABSI. These practices indicate poor knowledge of the risk of CLABSIs in patients and/or inadequate translation of evidence-based practices for CVC management. Such low adherence to interventions known to reduce the risk of infection from indwelling CVCs is of concern. Adherence to essential sterile dressing techniques, along with more advanced practices known to reduce CLABSIs, was poor in this study.

Few previous studies have explored the prevalence of idle CVC-days or unjustified ongoing use of CVCs. A smaller retrospective study conducted over a 9-day period in 3 wards reported at least 1 idle CVC-day for 63% of ward-based patients (n = 89),<sup>5</sup> and a much earlier study also showed that ward-based patients are at high risk for prolonged CVC use and thus for CLABSI.<sup>6</sup> Previous studies have documented the risk of infection from peripheral IV lines in ward patients.<sup>7,8</sup> In the present study, the increased complexity of patients and prompt discharges from ICU to enhance patient flow suggest an increasing rate of CVC use over peripheral IVs for ward-based patients. Although the recent emphasis on preventing infections during CVC insertion is essential,<sup>9</sup> current contexts of care suggest that placing equal importance on implementing post-insertion nursing interventions known to prevent CLABSIs is warranted. This is the first study to define the scope of and audit this issue in the current era. We argue that the use of antimicrobial CVCs does not negate the need for postinsertion nursing interventions and timely removal decisions. All known evidence-based practices

to reduce infection risks should be implemented, particularly in this era of increasing awareness of clinical deterioration due to sepsis of varying causes.<sup>10</sup>

The finding that one-half of all patients with a CVC had at least 1 idle CVC-day calls for immediate changes in ward-round practices and documentation to prevent patient harm. A model in which daily review and removal of a CVC resides with the medical unit (often the ICU) in which it was inserted could be uniformly instituted to reduce uncertainty surrounding accountability for decision making regarding CVC use. Alternatively, a doctor dedicated to managing CVC insertion, removal, and replacement across the hospital could be considered. Targeted practices, such as having an outreach ICU nurse review and discuss the use of postinsertion interventions with ward nurses, may improve knowledge of, and adherence to these essential CLABSI prevention strategies. Indeed, based on previous ICU data, such prevention strategies decreased CLABSIs by 58% between 2001 and 2009.<sup>2</sup> The use of a daily checklist to review postinsertion interventions and indications for continued use may help prevent CLABSIs, similar to the groundbreaking use of Provonost's checklist<sup>9</sup> for CVC insertion. Revising the hospital-specific CVC form to a checklist may improve adherence to, and documentation of, CLABSI prevention strategies and prompt removal.

The strengths of our study include prospective data collection and comprehensive follow-up. We recognize the limitations of reporting historically distant data, however, and our results might not reflect current hospital practices. Indeed, guided by outreach ICU nurses, CVC nursing practices have improved, but remain imperfect. Of note, despite daily assessments for an entire year, our data do not show increasing use of CLABSI prevention practices as the year progressed. This may be explained by the accepted presence of, and questioning of practices by, outreach ICU nurses; rostering of ward nurses over 3 shifts within a 24-hour period, which reduces daily exposure of individuals (~1,200 exposed to this study) to the outreach ICU nurses; and staff turnover in the hospital over the full year. Funding limitations precluded measurement of CLABSI rates in this study. We recommend further studies to measure CLABSI rates in ward patients following interventions to address practice concerns identified in this study.

This innovative study is the first to have a prospective longitudinal approach for 1 year across a hospital to quantify idle CVC days and use of postinsertion interventions. Understanding these patterns of CVC care will help guide targeted interventions to reduce CLABSI rates in ward patients and allow measurement of the effectiveness of these interventions.

## CONCLUSION

Ward-based patients are at high risk of developing CLABSIs owing to poor adherence to recommended post-CVC insertion interventions and idle CVC-days. Given that most of these short-term CVCs were inserted in the ICU, accountability for ongoing CVC care needs to be maintained or clearly transferred to another entity equally skilled in and knowledgeable of CLABSI prevention strategies.

## References

1. The Joint Commission. Preventing central line-associated bloodstream infections: a global challenge, a global perspective. Oak Brook [IL]: Joint Commission Resources; 2012.
2. Srinivasan A, Wise M, Bell M, Cardo D, Edwards J, Fridkin S, et al. Vital signs: central line-associated bloodstream infections—United States, 2001, 2008, and 2009. *MMWR Morb Mortal Wkly Rep* 2011;60:243-8.
3. O'Grady NP, Alexander M, Burns LA, Dellinger EP, Garland J, Heard SO, et al. Guidelines for the prevention of intravascular catheter-related infections 2011. *Clin Infect Dis* 2011;52:e162-93.

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