



Central Line–Associated Bloodstream Infections in a Community Hospital: A Retrospective Cohort Study



Kiratpreet Sraa, BS¹, Madison Gackle, BS¹, Jacob Barnard, MS¹, Yousef Saramah, BS¹, Adam Dawson, DO³, Jacqueline Neff, BSBM², Tyrus Nelson, BS², Diana Lalitsasivimol, PhD², Anthony Santarelli, PhD^{1,2}, John Ashurst, DO^{1,2}

Midwestern University, Arizona College of Osteopathic Medicine¹; Kingman Regional Medical Center, Office of Research and Sponsored Programs²; Kingman Regional Medical Center, Emergency Department

INTRODUCTION

Central line–associated bloodstream infections (CLABSIs) are hospital-acquired infections that occur when a patient with a central venous catheter (CVC) develops a bloodstream infection not attributable to another source [1]. They represent a major cause of morbidity, mortality, and healthcare cost, with estimates of \$1.9 billion annually in the United States and attributable mortality of 14–16% [2,3]. Although 65–70% of CLABSIs are considered preventable through strict adherence to sterile technique and infection control protocols, they remain a significant challenge across care settings [4]. National Healthcare Safety Network (NHSN) definitions are used to standardize surveillance, yet studies demonstrate that true incidence is often underestimated, limiting benchmarking and quality improvement [1]. Most available data are drawn from academic or tertiary centers, leaving rural and community hospitals underrepresented despite their unique challenges, including limited staffing, fewer infection prevention resources, and higher patient comorbidity burden.

OBJECTIVE

To describe the demographic, procedural, and microbiological characteristics of CLABSIs in a community hospital and to compare outcomes with national infection prevention benchmarks.

METHODS

This retrospective cohort study reviewed all patient visits between June 1, 2020, and September 30, 2024, at Kingman Regional Medical Center. Patients who developed CLABSI during this period were identified using ICD code (T80.211A) and included in the analysis. Extracted data included patient demographics (age, sex, substance use, comorbidities), procedural characteristics (vein selection, laterality, line type, and ultrasound use), and clinical outcomes (microbiological results, in-hospital mortality, and 30-day mortality). Descriptive statistics were calculated for categorical and continuous variables. Group comparisons were performed using chi-square tests for categorical variables and Mann–Whitney U tests for continuous variables.

RESULTS

Patient Demographics

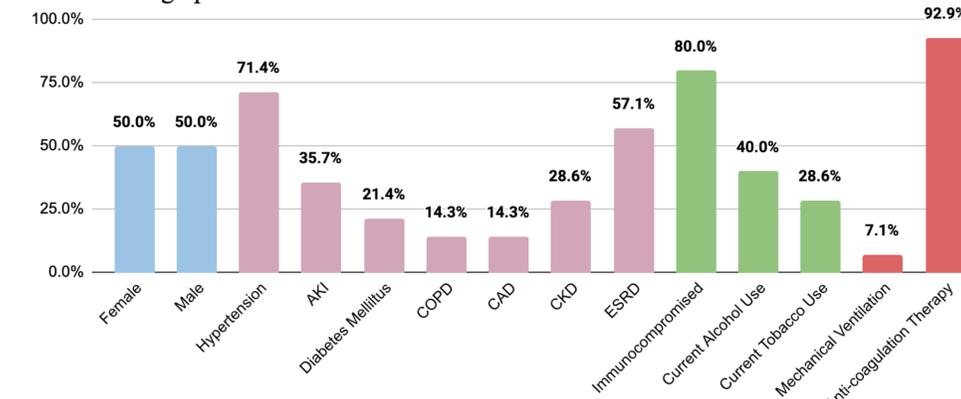


Figure 1. Distribution of demographic and clinical characteristics among patients with CLABSI (n = 14). Renal disease and hypertension were highly prevalent comorbidities within the cohort.

Procedural Factors

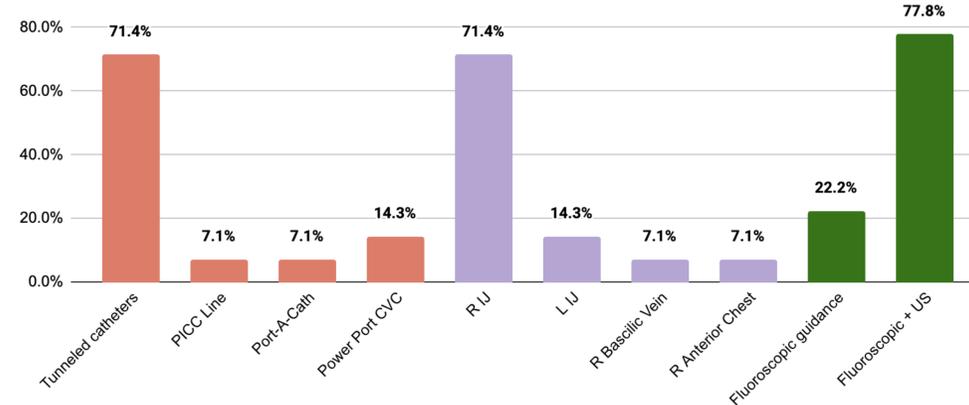


Figure 2. Procedural characteristics of CVC placement among CLABSI cases. Tunneled catheters and right internal jugular vein access were most frequently observed.

Microbiological Characteristics & Mortality Outcome

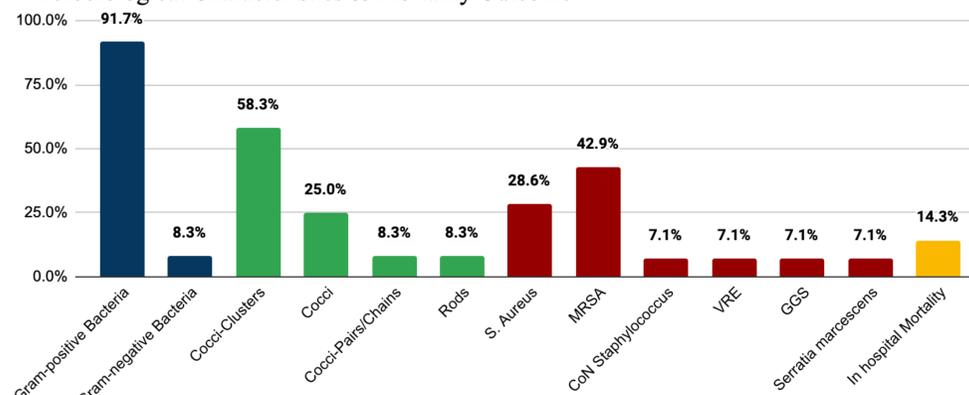


Figure 3. Microbiological profile and in-hospital mortality among CLABSI cases. Gram-positive organisms, particularly cocci in clusters, were the most common pathogens.

DISCUSSION

- CLABSI cases were concentrated among patients with significant renal disease, with over half carrying a diagnosis of end-stage renal disease and more than one-third experiencing acute kidney injury.
- The predominance of tunneled catheters in these cases likely reflects their frequent use in patients requiring chronic vascular access, which may have contributed to infection risk.
- The right internal jugular vein was the most common insertion site, though its predominance in this sample may also reflect the vascular access patterns of patients with renal comorbidities.
- Despite the use of both ultrasound and fluoroscopic guidance in the majority of procedures, CLABSIs still developed, suggesting that insertion technique alone was not a sufficient protective factor.
- There was a predominance of Gram-positive organisms, particularly cocci in clusters, consistent with skin flora as a frequent source of contamination.
- In-hospital mortality occurred in 14% of patients (n=2), though no significant differences were observed across sex or comorbidity subgroups.
- The absence of significant associations between comorbidities, procedural characteristics, and outcomes is likely attributable to the small cohort size and the high degree of comorbidity burden shared across patients.

CONCLUSION

CLABSIs in this cohort were characterized by a high prevalence of renal disease and use of tunneled catheters. Mortality rates are comparable to national reports though no predictive patient or procedural factors were identified. Study limitations include the single-site design, small sample size, and incomplete reporting of risk factors, all of which reduce generalizability. Future directions include expanding to multicenter cohorts, incorporating detailed data on catheter duration and maintenance practices, and evaluating modifiable practices to inform quality improvement and prevention strategies.

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