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Session: 131. Bacteremia and Endocarditis

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Background. *Staphylococcus aureus* treatment guidelines are being revised to include proposed quality measures for evaluation of patients with *S. aureus* bacteremia (SAB) (e.g., infectious disease [ID] consultation, echocardiogram, and documenting clearance of bacteremia). We describe current management practices of SAB to identify opportunities for quality improvement.

Methods. We conducted a pilot assessment of SAB cases reported to CDC's Emerging Infections Program active, laboratory- and population-based surveillance from 24 hospitals in four states during 1–2 months in 2017 or 2018. An SAB case was the isolation of *S. aureus* from a blood culture among adults (≥18 years) in the catchment area. We collected clinical and demographic information and performed a descriptive analysis of management of SAB cases.

Results. Among 109 SAB cases identified, 50 (46%) were methicillin-resistant *S. aureus* (MRSA). While hospitalized, 87 (80%) patients were evaluated by ID consultation, 90 (83%) underwent an echocardiogram (26 were transesophageal), and 92 (84%) had documented clearance of bacteremia. During the hospitalization, 15 (14%) died and 12 (11%) left against medical advice (AMA). Of those who survived and did not leave AMA, median duration of hospitalization after initial culture was 10.5 days (interquartile range 7–18). In total, 10 survivors (9% of cases) completed at least 2 weeks of antibiotics while hospitalized, and 65 (60% of cases) were discharged on antibiotic therapy. Among the 25 MRSA patients discharged on antibiotics, common treatments were vancomycin (64%), daptomycin (8%), ceftaroline (8%), and linezolid (4%). Among the 40 methicillin-susceptible SAB patients discharged on antibiotics, cefazolin (56%), ceftriaxone (13%), cefepime (5%), linezolid (5%), nafcillin (3%), and vancomycin (3%) were most common. The remainder of outpatient treatments included oral β-lactams, clindamycin, doxycycline, levofloxacin, and erythromycin.

Conclusion. Overall, the majority of patients with SAB underwent evaluation according to the proposed quality measures and received therapy with targeted anti-staphylococcal agents, although opportunities to optimize treatment remain. Hospitalized patients who leave AMA represent a particular challenge for effective SAB therapy.

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1060. Risk Factors for Recurrent *Staphylococcus aureus* Bacteremia

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Background. Recurrent *Staphylococcus aureus* bacteremia (Re-SAB) occurs in 2–17% of patients with SAB within 3–12 months after resolution of the first episode. The risk factors for Re-SAB are incompletely understood.

Methods. Re-SAB was defined as a second episode of SAB after the resolution of the first episode occurring at least 14 days from the date of the last positive blood culture of the first episode. Using the SAB Group Prospective Cohort Study (SABG-PCS) data between January 2008 and May 2015, patients with Re-SAB were selected and compared with those without it. Pulsed-field gel electrophoresis (PFGE) was done for the clinical isolates from the Re-SAB group, and *spa* typing was for those from both groups. Baseline sera from patients with Re-SAB and age/race/gender matched (1:1) control subjects with SAB but without Recurrence underwent Luminex multiplex cytokine array.

Results. Seventy patients experienced Re-SAB (9.3%) and 686 SAB patients did not. In the Re-SAB group, 156 episodes of SAB were observed. Median time to Re-SAB was 147.5d (IQR, 76–358). Among 65 PFGE-analyzed pairs of isolates from the first and the subsequent episodes, the time to Re-SAB of <300 days was more commonly found in the PFGE-identical pairs than in the PFGE-different pairs (75.6% vs. 33.8%, $P = 0.001$). In the comparison of clinical factors between 56 Re-SAB patients with available data and 686 without Re-SAB, African American race, dialysis dependence, the presence of foreign body, persistent bacteremia, metastatic abscess formation, and methicillin-resistant *S. aureus* (MRSA) were more frequently observed in patients with Re-SAB. In a multivariate analysis to identify risk factors for Re-SAB, African American race, dialysis dependence, metastatic abscess formation, and MRSA were independent risk factors. The distribution of *spa* types between the two group was presented in Figure 1.

Conclusion. Re-SAB involves a combination of multiple factors of host, microbe, and treatment. Further laboratory investigation for any determinants in host and microbe is required.

Figure 1. Distribution of clonal complex types of *Staphylococcus aureus* isolates in patients with recurrent *S. aureus* bacteremia (Re-SAB) and those without it.

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1061. Comparison of the Acute Physiology and Chronic Health Evaluation (APACHE) II Score and the Pitt Bacteremia Score to Predict Mortality in Methicillin-Resistant *Staphylococcus aureus* Bacteremia

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Background. Methicillin-resistant *Staphylococcus aureus* bloodstream infection (MRSA BSI) is associated with high morbidity and mortality. The prediction of outcomes may have a profound impact on clinical decision making and risk stratification. The Acute Physiology and Chronic Health Evaluation (APACHE) II Score and the Pitt Bacteremia Score (PBS) have been repeatedly described as independent predictors of mortality in MRSA BSI. The APACHE II is complex to calculate and many of the variables may not be pertinent to MRSA BSI. The PBS is a simple score using readily assessable variables. The comparative predictive performance of the two models in MRSA BSI has not been evaluated.

Methods. Retrospective, observational, single-center cohort study in adults with MRSA BSI between 2008 and 2018. Patients who did not receive active therapy ≤72 hours of index culture were excluded. APACHE II and PBS were calculated using the worst physiological values recorded ≤24 hours of blood culture collection. Discriminatory ability for 30-day mortality was assessed using the c-statistic and was compared using the Hanley and McNeil method. The best cut-off point in each scoring system was determined using the Youden Index (J).

Results. A total of 455 patients were included. The median (IQR) PBS and APACHE II were 2 (0, 3) and 18 (11, 23), respectively. All-cause 30-day mortality was 16.3%. The c-statistic (95% CI) for the APACHE II vs. PBS in the overall cohort and stratified by ICU status were: 0.813 (0.763, 0.863) vs. 0.717 (0.653, 0.782), $P = 0.0035$; ICU 0.729 (0.610, 0.848) vs. 0.570 (0.442, 0.699), $P = 0.026$; and non-ICU 0.821 (0.761, 0.881) vs. 0.700 (0.614, 0.786), $P = 0.0046$, respectively. The APACHE II with the maximum J value was 21; sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) for 30-day mortality were 81.08%, 72.97%, 36.81%, and 95.21%, respectively. The PBS with the maximum J value was 3; sensitivity, specificity, PPV, and NPV were 66.22%, 72.18%, 31.61%, and 91.67%, respectively.

Conclusion. The APACHE II was superior to the PBS in predicting 30-mortality in patients with MRSA BSI in the overall cohort and stratified by ICU status at BSI onset. Future research to develop a more practical scoring model with high discriminatory power is needed.

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