1056. Predicting Central Nervous System Complications in *Staphylococcus aureus* Bacteremia Using Clinical Scoring System

Chung-Jong Kim, MD, PhD[1]; Kyoung-Ho Song, MD, PhD[2]; Chang Kyung Kang, MD[3]; Pyeong Gyun Choe, MD[4]; Ji Yun Bae, MD[5]; Hee Jung Choi, MD[6]; Younghee Jung, MD[7]; Seung Soon Lee, MD[8]; Wan Beom Park, MD, PhD[4]; Ji Hwan Bang, MD[4]; Eu Suk Kim, PhD[9]; Sang Won Park, MD, PhD[4]; Nam Joong Kim, MD, PhD[4]; Myoung-Don Oh, MD, PhD[4]; Hong Bin Kim, MD, PhD[2] and KIND Study Group; [1]Internal Medicine, Ewha Womans University, Seoul, Korea, Republic of (South), [2]Department of Internal Medicine, Seoul National University Bundang Hospital, Seongnam, Korea, Republic of (South), [3]Seoul National University College of Medicine, Seoul, Korea, Republic of (South), [4]Department of Internal Medicine, Seoul National University College of Medicine, Seoul, Korea, Republic of (South), [5]Department of Internal Medicine, Ewha Womans University mokdong hospital, Seoul, Korea, Republic of (South), [6]Internal Medicine, Ewha Womans University, Mokdong Hospital Dept of Internal Medicine, Seoul, Korea, Republic of (South), [7]Division of Infectious Diseases, Hallym University Sacred Heart Hospital, Hallym University College of Medicine, Anyang-si, Korea, Republic of (South), [8]Division of Infectious Diseases, Hallym University Sacred Hospital, Hallym University College of Medicine, Anyang-si, Korea, Republic of (South), [9]Seoul National University Bundang Hospital, Seoul, Korea, Republic of (South)

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Background. Central nervous system (CNS) complications occurring in patients with *Staphylococcus aureus* bacteremia (SAB) are the most severe complications. In this study, we compared clinical data of SAB patients between cases with and without CNS complication and analyzed the risk factor of CNS complications.

Methods. Data from cases with SAB occurred during 5 years at four hospitals were collected. The presence of CNS complications was confirmed by brain MRI, CT, or lumbar puncture. We excluded the cases who already had CNS lesions such as trauma, brain tumor, or cerebrovascular accident. We also excluded the cases who were died or transfer out <7 days of bacteremia onset. Cases were divided into complication group or noncomplication group according to the presence of CNS complication. We compared the clinical profiles between the groups, and analyzed the risk factor of CNS complications by multivariate logistic regression analysis.

Results. A total of 1,085 cases of SAB patients were included. Among these, 43 (4%) cases were complication group (embolic infarct [n = 23], brain hemorrhage [n = 8], infarct with hemorrhage [n = 8], and brain abscess or meningitis [n = 4]), while 810 (74%) cases were noncomplication group. Two hundred and forty-one cases were excluded. The results of multivariate analysis were shown in table. When selecting by having less than three factors among SOFA > 5, methicillin-susceptible, endovascular infection (weight 2), presence of metastatic infection and community onset, it helps to exclude CNS complications (AUC of ROC curve = 0.77, P < 0.01, sensitivity; 67.5%, specificity: 75.5%, positive predictive value: 12.9%, negative predictive value 97.7%).

Conclusion. CNS complication could be excluded by using clinical variables

Variables	Complication Group (n = 43)	Non-Complication Group (n = 801)	*P*-Value	Adjusted Odds Ratio	*P*-Value
Sex (m)	23 (54%)	499 (62%)	0.25	1.4 (0.8–2.8)	0.28
Age (mean)	66 (¡¾17)	64 (¡¾16)	0.38		
Community onset	30 (70%)	450 (56%)	0.08	1.3 (0.7–2.7)	0.44
Methicillin-susceptible isolates	27 (63%)	380 (47%)	0.05	1.9 (0.9–3.9)	0.07
SOFA score (median)	6 (3–9)	3.5 (1–6)	0.01	1.1 (1.1–1.2)	0.01
Duration of bacteremia (median)	4 (1–6)	2 (0–5)	0.01		
Endovascular involvement of infection	18 (42%)	106 (13%)	<0.01	3.1 (1.5–6.3)	0.01
Presence of any metastatic infection	20 (47%)	155 (19%)	<0.01	2.3 (1.2–4.7)	0.02
90 day-mortality	11 (34%)	121 (19%)	0.03		

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1057. Treatment Efficacy of Ceftriaxone vs. Cefazolin for Methicillin-Susceptible *Staphylococcus aureus* Infections

Kavita Bhavan, MD[1]; Anisha Ganguly, BS, BA[2]; Helen King, MD[2]; Aurelia Schmalstieg, MD[2]; Norman Mang, PharmD[3] and Ryan Collins, PA[4]; [1]Infectious Disease, UT Southwestern Medical Center, Dallas, Texas, [2]UT Southwestern Medical Center, Dallas, Texas, [3]Parkland Health And Hospital System, Dallas, Texas, [4]Parkland Health and Hospital System, Dallas, Texas

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Background. Methicillin-susceptible *Staphylococcus aureus* (MSSA) infections are traditionally treated with intravenous (IV) nafcillin, oxacillin, or cefazolin, all antibiotics that require multiple doses per day. Despite theoretical limitations of using ceftriaxone in MSSA infections, some clinical studies suggest noninferiority of ceftriaxone compared with standard of care. At Parkland Memorial Hospital, many patients diagnosed with MSSA infections receive self-administered Outpatient Parenteral Antimicrobial Therapy (S-OPAT). Daily-dosed ceftriaxone is often used for convenience and feasibility of medication adherence.

Methods. We conducted a retrospective cohort study among S-OPAT patients receiving cefazolin and ceftriaxone for treatment of MSSA infections. We compared infection type and planned duration of therapy as baseline differences between the treatment cohorts. Our clinical outcomes of interest were 30-day readmission rates and treatment failure as defined by repeat positive blood culture within 6 months.

Results. We identified 184 patients treated with cefazolin and 74 patients treated with ceftriaxone. Characteristics of treatment plan are shown in Table 1. There were no statistically significant differences in infection type or mean duration of therapy between the two treatment cohorts. Outcomes are shown in Table 2. There were no statistically significant differences in readmission rates and rate of treatment failure.

Conclusion. Our retrospective review suggests patients treated with ceftriaxone for MSSA bacteremia had similar clinical outcomes as those treated with cefazolin. While this study is limited in its retrospective nature, the findings suggest that ceftriaxone may be a safe and more convenient antibiotic option in certain MSSA infections.

	Cefazolin (n = 184)	Ceftriaxone (n = 74)	*P*-Value
Infection type			0.87
Bacteremia	106	29	
Osteomyelitis	23	30	
Skin and soft-tissue infection	14	6	
Endocarditis	14	2	
Line-related	11	1	
Pulmonary	9	2	
GU	5	2	
Other	2	2	
Mean duration of therapy	30 days	32 days	0.26

Disclosures. **All authors:** No reported disclosures.

1058. Prognostic Biomarkers for Persistent Bacteremia and Mortality in Complicated *S. aureus* Bloodstream Infection

Yi Cao, PhD[1]; Alessander Guimaraes, PhD[1]; Kyu Hong, PhD[1]; Oleg Mayba, phD[1]; Melicent Peck, MD, PhD[1]; Johnny Gutierrez, PhD[1]; Felicia Ruffin, MSN, RN[2]; Montserrat Carrasco-Triguero, PhD[1]; Jason Dinoso, PhD[1]; A. Asa Clemenzi-Allen, MD[3]; Catherine Koss, PhD[4]; Stacey A. Maskarinec, MD, PhD[5]; Henry F. Chambers, MD[6]; Vance G. Fowler Jr., MD[7]; Amos Baruch, PhD[1] and Carrie Rosenberger, PhD[1]; [1]Genentech Inc., South San Francisco, California, [2]Division of Infectious Diseases, Duke University Medical Center, Durham, North Carolina, [3]Division of HIV/AIDS, Infectious Diseases and Global Medicine, University of California San Francisco, San Francisco, California, [4]UCSF, San Francisco, California, [5]Infectious Diseases, Duke University Medical Center, Durham, North Carolina, [6]Clinical Research Services, University of California San Francisco, Clinical and Translational Sciences Institute, San Francisco, California, [7]Duke University, Durham, North Carolina

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Background. *Staphylococcus aureus* is a leading cause of bacteremia, yet there remains a significant knowledge gap in the identification of relevant biomarkers that predict clinical outcomes in patients with *S. aureus* bacteremia. Heterogeneity in the host response to invasive *S. aureus* infection suggests that specific biomarker signatures could be utilized to differentiate patients prone to severe disease, thereby facilitating earlier implementation of more aggressive therapies. To further elucidate the inflammatory correlates of poor clinical outcomes in patients with *S. aureus* bacteremia, we evaluated the association between a panel of blood proteins at initial presentation of bacteremia and disease severity outcomes.

Methods. We conducted an observational study (n = 32) to evaluate the prognostic value of circulating protein biomarkers for mortality and persistent bacteremia in patients with *S. aureus* bloodstream infections. A case–control study of 124 patients with complicated confirmed *S. aureus* bloodstream infections was used to validate our findings in the observational study.

Results. We identified 13 candidate proteins that were correlated with mortality and persistent bacteremia by multiple comparisons. Further statistical modeling identified IL-8 and CCL2 as the strongest individual predictors of mortality, with the combination of these biomarkers having the best power to classify fatal outcome. Baseline IL-17A levels were elevated in patients with persistent bacteremia, endovascular and metastatic tissue infections.

Conclusion. The results demonstrate the potential utility of selected biomarkers to distinguish patients with the highest risk for treatment failure and bacteremia-related complications, providing a valuable tool for clinicians in the management of *S. aureus* bacteremia. Additionally, these biomarkers could identify patients with the greatest potential to benefit from novel therapies in clinical trials.

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1059. *Staphylococcus aureus* Bacteremia Treatment: Results From Pilot Surveillance in Four US States

Sarah Kabbani, MD MSc[1]; Kelly Jackson, MPH[1]; Lauren Epstein, MD, MSc[1]; Anita Gellert, RN[2]; Carmen Bernu, BS[3]; Rahsaan Overton, MPH[4]; Joelle Nadle, MPH[5]; Ghinwa Dumyati, MD, FSHEA[6]; Ruth Lynfield, MD, FIDSA[3]; Susan M. Ray, MD[7]; Erin Epson, MD[8] and Isaac See, MD[1]; [1]Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia, [2]NY Emerging Infections Program, Center for Community Health and Prevention, University of Rochester Medical Center, Rochester, New York, [3]Minnesota Department of Health, St. Paul, Minnesota, [4]Georgia Emerging Infections Program, Atlanta, Georgia, [5]California Emerging Infections Program, Oakland, California, [6]University of Rochester Medical Center, Rochester, New York, [7]Emory University

School of Medicine, Atlanta, Georgia, [8]Healthcare-Associated Infections Program, California Department of Public Health, Richmond, California

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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.

Disclosures. **All authors:** No reported disclosures.

1060. Risk Factors for Recurrent *Staphylococcus aureus* Bacteremia

Seong-Ho Choi, MD, PhD[1,2]; Felicia Ruffin, MSN, RN[3]; Lawrence Park, PhD[3]; Batu K Sharma-Kuinkel, PhD[1]; Maria Souli, MD PhD[4]; Bobby Warren, MPS[1]; Brenda Hansen, MS[5]; Felix Mba Medie, PhD[6] and Vance G. Fowler Jr., MD[7]; [1]Duke University Medical Center, Durham, North Carolina, [2]Chung-Ang University Hospital, Chung-Ang University College of Medicine, Seoul, Korea, Republic of (South), [3]Division of Infectious Diseases, Duke University Medical Center, Durham, North Carolina, [4]4th Department Internal Medicine, National and Kapodistrian University of Athens, School of Medicine, Athens, Greece, [5]Medicine, Duke University Medical Center, Durham, North Carolina, [6]Duke University Medical Center, Durham, North Carolina, [7]Duke University, Durham, North Carolina

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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.

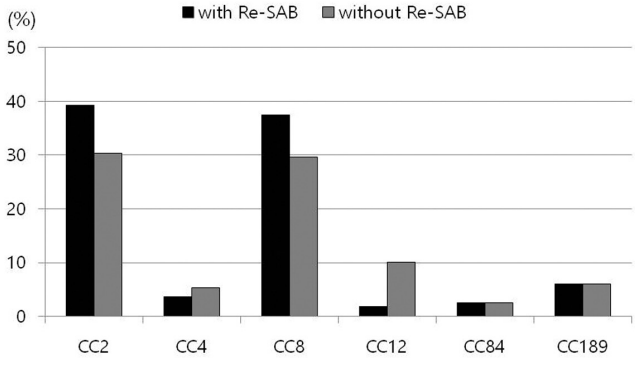

Figure 1. Distribution of clonal complex types of *Staphylococcus aureus* isolates in patients with recurrent *S. aureus* bacteremia (Re-SAB) and those without it.

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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

Sarah Jorgensen, PharmD, BCPS, AAHIVP[1]; Evan J. Zasowski, PharmD, MPH[1,2]; Trang D. Trinh, PharmD, MPH[1,3]; Abdalhamid M. Lagnf, MPH[1]; Sahil Bhatia, BS[1] and Michael J. Rybak, PharmD, MPH, PhD[4]; [1]Anti-Infective Research Laboratory, Department of Pharmacy Practice, Wayne State University, Eugene Applebaum College of Pharmacy and Health Sciences, Detroit, Michigan, [2]Department of Pharmacy Practice and Translational Research, University of Houston College of Pharmacy, Houston, Texas, [3]Department of Clinical Pharmacy, University of California, San Francisco, School of Pharmacy, San Francisco, California, [4]259 Mack Ave, Suit 4131, Eugene Applebaum College of Pharmacy and Health Sciences Bldg, 259 Mack Ave, Detroit, Michigan

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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, singe-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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