1043. Evaluation of Early Clinical Failure Criteria for Gram-Negative Bloodstream Infections
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Background. Early identification of patients at high risk of morbidity and mortality following Gram-negative bloodstream infections (GN-BSI) based on initial clinical course may prompt adjustments to optimize diagnostic and treatment plans. This retrospective cohort study aims to develop early clinical failure criteria (ECFC) to predict unfavorable outcomes in patients with GN-BSI.

Methods. Adults with community-onset GN-BSI who survived hospitalization for at least 96 hours at Palmetto Health hospitals in Columbia, SC, USA from January 1, 2010 to June 30, 2015 were identified. Multivariate logistic regression was used to examine association between clinical variables within 72–96 hours of BSI and unfavorable outcomes (28-day mortality or hospital length of stay ≥14 days).

Results. Among 766 patients with GN-BSI, 225 (29%) had unfavorable outcomes. After adjustments for Charlson Comorbidity Index and appropriateness of empiric antibiotics, a 28-day mortality rate of 14.6% in the ECFC model, predictors of unfavorable outcome included patients with an aac(6')-Ia gene, ceftriaxone resistance, and ≥3 ECFC.

Conclusion. Risk of 28-day mortality of patients with GN-BSI can be estimated within 72–96 hours of GN-BSI using ECFC. These criteria may have utility in future clinical research in assessing response to antimicrobial therapy based on a standard evidence-based definition of early clinical failure.

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1044. Aztreonam (AZT) vs. Cephalosporin (CEP) Therapy for the Treatment of Gram-Negative Bacteremia
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Background. The IDSA recommends use of AZT in patients with a confirmed beta-lactam allergy for nosocomial Gram-negative infections. Despite this recommendation, there is limited data to suggest AZT is inferior to cephalosporins (CEP) for the treatment of Gram-negative bacteremias. This study aims to calculate clinical outcomes in bacteremic patients treated with either AZT or CEP therapy.

Methods. A single-center, retrospective chart review of adult patients with positive blood cultures for Escherichia coli, Klebsiella pneumoniae or Pseudomonas aeruginosa was conducted to compare clinical outcomes between those who received ≥48 hours of AZT or CEP therapy (cefepime or ceftriaxone). The following clinical outcomes were assessed: clinical cure, in-hospital mortality, post-infection length of stay (LOS), post-infection intensive care unit LOS, microbiologic cure and leukocytosis resolution.

Results. One-hundred and twenty-nine patient met criteria for evaluation; 41 received AZT (6.8%) and 88 received CEP. Patients who received AZT were more likely to have renal dysfunction (34.1% vs. 18.2%, P = 0.046), receive synergistic antimicrobials (61% vs. 28.4%, P = 0.001) and have a longer post-infection LOS (1 day [0–2] vs. 0 [0–1], P = 0.032) compared with those who received CEP. Although in-hospital mortality rates were similar between both groups (2.4% vs. 3.4%, P = 1.000), there was a statistically significant difference in clinical cure rates (70.7% vs. 90.9%, P = 0.003), post-infection length of stay (7 days [5–10] vs. 5 [4–8], P = 0.007) and time to clinical cure (2.8 days [1.6–5.8] vs. 2.0 [1.2–2.9], P = 0.018) in the AZT and CEP groups respectively. In a multivariate logistic regression model, patients who received AZT were significantly less likely to achieve clinical cure (OR=0.187, 95% CI (0.058–0.597)). In a pre-determined subgroup analysis, clinical cure rates varied in E. coli (72% vs. 94.4%, P = 0.009), K. pneumoniae (70% vs. 90.5%, P = 0.296) and P. aeruginosa (66% vs. 90.9%, P = 1.000) in theAZT and CEP groups respectively.

Conclusion. Patients who receive aztreonam for Gram-negative bacteremia may be more likely to experience clinical failure. Larger, prospective studies are warranted to confirm these findings.

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1045. A Multicenter Propensity Score-Adjusted Retrospective Study for Comparison of the Outcome of Treatment With Third-Generation Cephalosporin vs. Broad-Spectrum Antibiotics for Enterobacter Bacteremia
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Background. Enterobacter spp. can develop resistance during prolonged therapy with third-generation cephalosporins (3GC: ceftriaxone, cefotaxime, or ceftazidime) because of derepression of AmpC β-lactamase. However, the clinical significance of this phenomenon remains undetermined. This study aims to assess the outcome of patients with 3GC-susceptible Enterobacter bacteremia (EB) who received definitive therapy with 3GC or broad-spectrum antibiotics (BSA) using propensity score analysis.

Methods. In this retrospective, cohort study conducted at two tertiary care hospitals in Japan, we determined consecutive patients with EB identified from the laboratory databases between January 2010 and December 2017. We enrolled patients with 3GC-susceptible EB treated with 3GC or BSA (defined as fourth-generation cephalosporins, carbapenems, and piperacillin/tazobactam) as definitive therapy. The primary outcome was in-hospital mortality. Secondary outcomes were 30-day mortality, nosocomial antimicrobial-resistant strain, and therapeutic failure defined as clinical cure. Propensity scores were calculated with the IPW adjustment to decrease the confounding by indication.

Results. Among 320 patients with EB; of these, 191 cases were eligible (86 treated with 3GC and 105 treated with BSA). All the measured covariates were well balanced after the IPW adjustment. We observed no significant differences in the adjusted mortality (5.8% in the 3GC group vs. 13.3% in the BSA group; risk difference –7.5% [95% confidence interval (CI): –15.7–7.6; P = 0.09]), and the IPW-adjusted mortality (5.1% vs. 9.4%; risk difference –4.3%; 95% CI: –12.2–3.5; P = 0.3) between the groups. The results of the propensity score-matched analysis and sensitivity analysis were similar. Furthermore, we did not observe the emergence of antimicrobial resistance on antimicrobial therapy after exposure to 3GC.

Conclusion. Definitive therapy with 3GC for susceptible EB was not associated with an increased risk of the 28-day mortality after adjustment for potential confounders with the propensity score analysis or with the emergence of antimicrobial-resistant strain.

Disclosures. All authors: No reported disclosures.

1046. Clinical and Microbiological Characteristics of Patients With Septicemia Caused by IMP-1 Producing Enterobacteriaceae in a Tertiary Hospital in Japan
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Background. Carbapenemase-producing Enterobacteriaceae (CPE) infection has become a great threat to public health worldwide. Although KPC and OXA-48 infections have mostly described, IMP-1 producing Enterobacteriaceae (IMP1-E) are not well studied. We investigated the clinical and microbiological characteristics of septicemia due to the IMP1-E.

Methods. This observational study of inpatients who developed IMP1-E septicemia was conducted in a Japanese tertiary hospital from April 2013 to March 2017. IMP1-E was defined as a decreased susceptibility to meropenem (minimum inhibitory concentration ≥2 mlg/L), as well as a positive sodium mercaptoacetate acid test, and polymeric carbapenem CEP therapy for ≥48 hours. Clinical data were collected from medical charts. Antimicrobial susceptibility was determined by the MicroScan Walkway. We performed total genomic analysis, plasmid analysis, and multilocus sequence typing (MLST) using whole genome sequencing data.

Results. In total, six patients were identified (median age: 55 years). All had severe underlying disease on admission, and five were admitted to the intensive care unit. The sources of IMP1-E septicemia were as follows: two catheter-related BSI, one pyelonephritis, one cholangitis, one bacterial peritonitis, and one unknown focus. Four isolates were Enterobacter cloacae and two were Klebsiella pneumoniae. All patients had a previous history of antibiotic treatment and long-term hospitalization. All patients were treated with either levofloxacin (LVFX) only or LVFX and aminoglycoside (AG). Follow-up blood culture was negative for all patients. All cause-30-day mortality rate was 50%. Although no isolates were resistant to LVFX and AG, they harbored β-lactamase genes. Two isolates harbored the β-lactamase gene. There was a high probability that β-lactamase was harbored in IncHI2 plasmids. MLST sequence type of E. cloaceae isolates comprised ST378, and one ST997; K. pneumoniae isolates comprised ST134, and ST252.
Conclusion. This study showed that IMPL-E septicemia was isolated in patients with severe disease and long-term hospitalization. Selection of antibiotics therapy based on antimicrobial susceptibility induced microbiological cure, but clinical response was dependent on the underlying diseases.

Disclosures. All authors: No reported disclosures.

1047. Global Surveillance: Susceptibility of Ceftriaxone-Tazobactam Against Escherichia coli, Klebsiella pneumonieae, and Pseudomonas aeruginosa Isolates Collected From Bloodstream Infections in the United States From 2015 to 2017

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Background. Ceftriaxone–tazobactam (C-T) is an antibacterial combination of a novel α-lactosyl cephalosporin and a β-lactamase inhibitor. C-T was approved by the US Food and Drug Administration in 2014 and by the European Medicines Agency in 2015 to treat complicated urinary tract infections, acute pyelonephritis, and complicated intra-abdominal infections. The Program to Assess Ceftriaxone–Tazobactam Susceptibility (PACTS) monitors Gram-negative (GN) isolates resistant to C-T worldwide. In the current study, isolates were collected from patients hospitalized with bloodstream infections (BSIs) from 2015 to 2017 within the United States.

Methods. A total of 3,377 prevalence-based BSI GN isolates, including Escherichia coli (EC, 1,422), Klebsiella pneumonieae (KPN, 630), and Pseudomonas aeruginosa (PSA, 344), were collected during 2015 to 2017 from 32 PACTS hospitals in the United States. Isolates were tested for C-T susceptibility by CLSI broth microdilution method in a central monitoring laboratory (JMI Laboratories). Other antibiotics tested were amikacin (AMK), cefepime (FEP), ceftazidime (CAZ), colistin (COL), levofloxacin (LVX), meropenem (MEM), meropenem–tazobactam (TZP), piperacillin–tazobactam (TZP), tigecycline (TGC), and trimethoprim–sulfamethoxazole (TMP–SMZ). Antibiotic-resistant phenotypes analyzed (CLSI, 2018) for EC and KPN included carbapenem–R (CR) and non-CR extended-spectrum β-lactamase (ESBL); as well as CAZ–NS, MEM–NS, and COL–NS PSA.

Results. Of the 3,377 BSI GN isolates, 3,219 (95.3%) had a C-T MIC ≤ 4 mg/L. The three most prevalent GN species isolated from BSIs were EC (42.1%), KPN (18.7%), and PSA (10.2%). The %S of C-T and comparators for the top three pathogens phenotypes analyzed (CLSI, 2018) for EC and KPN included carbapenem–R (CR) and non-CR extended-spectrum β-lactamase (ESBL); as well as CAZ–NS, MEM–NS, and COL–NS PSA.

Conclusion. C-T demonstrated activity against the most prevalent contemporary GN isolates from BSIs in the US. C-T was the only beta-lactam that had >90% activity against all three species: EC, KPN, and PSA. C-T maintained activity (>90%) against isolates resistant to CAZ, TZP, and MEM. These data suggest that C-T may be a useful treatment for GN BSI.

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1048. Beta-Hemolytic Streptococcal Infective Endocarditis: Characteristics and Outcomes From a Large, Multi-National Cohort

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Background. β-Hemolytic streptococci (BHS) are an uncommon cause of infective endocarditis (IE). The aim of this study was to describe the clinical features and outcomes of patients with β-hemolytic streptococcal infective endocarditis in a large multi-national cohort, and compare them to patients with oral Viridans IE, a more common cause of IE.

Methods. The International Collaboration on Endocarditis Prospective Cohort Study (ICE-PCS) is a large multi-national database that recruited patients with IE prospectively using a standardized data set. Sixty-four sites in 28 countries reported patients prospectively using a standard case report form (CRF) developed by ICE collaborators. Patients with BHS IE were compared with patients with IE due to Oral Viridans Streptococci (OVS).

Results. Among 1336 cases of streptococcal IE, 823 (62%) were caused by OVS and 147 (11%) by BHS. The majority of patients in both groups belonged to the male gender and had similar median age. Among the predisposing conditions, congenital heart disease and native valve predisposition were more commonly associated with OVS IE than with BHS IE (P < 0.005). The mean of endocarditis valve disease is associated more with OVS IE than with OVS IE (P = 0.026). BHS were more likely to be penicillin-susceptible than OVS (P = 0.001). Clinically, patients with BHS IE are more likely to present acutely (P < 0.005) and with fever (P = 0.024). BHS IE is more likely to be complicated by stroke (P < 0.005) and other systemic embolism (P < 0.005). The overall in-hospital mortality of BHS IE was significantly higher than that of OVS IE (P = 0.001). The independent factors associated with in-hospital mortality for β-hemolytic streptococcal IE were age, per 1-year increment (OR 1.044; CI 1.014–1.075; P = 0.004) and prosthetic valve IE (OR 3.029; CI 1.711–7.837; P = 0.022). The complications associated with a higher in-hospital mortality were CHEF (OR 2.513; CI 1.074–5.879; P = 0.034), especially CHEF NYHA III or IV (OR 4.136; CI 1.707–10.025; P < 0.002), and stroke (OR 3.198; CI 1.343–7.619; P = 0.009).

Conclusion. Our findings suggest that BHS IE is an aggressive disease characterized by an acute presentation. It is associated with a significant rate of complications and a high rate of in-hospital mortality. This underlines the importance of early surgery to prevent the progression of disease.

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1049. Outcome and Impact of Empirical Antimicrobial Treatment in Bacteremia With Bacteroides Species: A Retrospective Cohort Study in a Region of Southern Sweden

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Background. Anaerobic infections are an important cause of bacteremia and severe infections. Due to increasing extended spectrum β-lactamase resistance (ESBL), the treatment recommendations for anaerobic infections in Sweden have changed during the past ten years. The effects of anaerobe resistance and outcome for patients with anaerobe infections is unclear.

Methods. A retrospective cohort study was conducted in patients with bacteremia due to Bacteroides species in the Region of Skåne between 2011 and 2015. Data on patients were reviewed from medical and microbiological records and we determined the factors associated with 28-day mortality using a multivariate regression model.

Results. Data on 454 patients were reviewed from medical and microbiological records and 389 (median age, 76 years; male, 54%) met the inclusion criteria. The 28-day all-cause mortality rate was 19% (72/389). Inadequate empirical anti-biotic therapy occurred among 182 (47%) patients, and we found a trend toward that inadequate antibiotic treatment increased the 28-day mortality (P = 0.055). The frequency of bacteremia with Bacteroides increased during the period of time and Bacteroides fragilis was the most common bacteria, 55% (212/389). The resistance against piperacillin/tazobactam was higher than in many other studies and among the different Bacteroides isolates that were resistant to piperacillin/tazobactam, Bacteroides thetaiotamicron was the most prevalent with 60% (50/83) being resistant. Piperacillin/tazobactam was the frequently used antimicrobial agent against Bacteroides infections and the utilization was increasing. We did not find any resistance among the Bacteroides isolates against metronidazole and only three isolates were resistant against carbapenams.

Conclusion. Anaerobe resistance is an increasing issue and especially against the most common antibiotic treatment, piperacillin/tazobactam. Early recognition and appropriate treatment is important to avoid proliferation of these increasing bacteria since inadequate treatment increased the mortality.

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1050. Oral Antibiotics for the Treatment of Gram-Negative Bloodstream Infections: Prescribing Practices and Outcomes at a Large Academic Medical Center

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