2427. *Comparison of Ceftazidime–Avibactam and Ceftazidime–Tazobactam In Vitro Activities When Tested Against Gram-Negative Bacteria Isolated From Patients Hospitalized With Pseudomonas in US Medical Centers (2017)*

Helio S. Sader, MD, PhD; Robert K. Flamm, PhD; and Mariana Castanheira, PhD; T3M Laboratories, North Liberty, Iowa. 1United States Committee on Antimicrobial Susceptibility Testing, Silverton, Oregon. 2T3M Laboratories, Inc, North Liberty, Iowa.

**Session:** 250. Treatment of AMR Infections

**Saturday, October 6, 2018: 12:30 PM**

**Background.** We evaluated Enterobacteriaceae (ENT) and *P. aeruginosa* (PSA) antimicrobial susceptibility patterns isolated from patients with pneumonia, including ventilator-associated pneumonia (VAP), and compared the *in vitro* activity of ceftazidime–avibactam (CAZ-AVI) and ceftazidime–tazobactam (C-T) against various resistant (R) subsets.

**Methods.** Clinical isolates consecutively collected (1/patient) from 70 US medical centers in 2017 by the INFORM Program were susceptibility (S) tested against CAZ-AVI, C-T, and -ENT; and compared at a central laboratory by reference broth microdilution methods. The organism collection included 1,865 ENT and 1,337 PSA isolates.

**Results.** The most active agents against ENT were CAZ-AVI (99.5%;S; table), amikacin (AMK; 98.7%), the carbapenems meropenem (MEM) and doripenem (97.3%), and tigecycline (TGC; 94.1%), but only CAZ-AVI and TGC retained good activity (≥90%) against carbapenem-resistant ENT (CRE; 98.0% and 90.0%, respectively). The most active agents against multidrug-R (MDR) ENT were CAZ-AVI (96.6%) and AMK (90.6%), whereas C-T and MEM were active against only 55.2% and 77.7% of these organisms, respectively; CAZ-AVI was the most active agent tested against extensively drug-R (XDR) ENT (97.6%) followed by AMK (73.2%) and TGC (65.9%). Among *Klebsiella* spp. with an ESBL phenotype, S to CAZ-AVI, C-T and MEM were 100.0%, 68.4%, and 83.9%, respectively. CAZ-AVI and C-T were very active against PSA and exhibited similar coverage among these organisms (96.2% and 96.5%, respectively), including MEM (96.2%), AMK (98.1% and 98.9%), C-T (94.9%) and MEM (94.9%) and XDR (79.4% and 80.4%) isolates (table). Among PSA isolates NS to CAZ, MEM and piperacillin–tazobactam (P-T), S to CAZ-AVI, C-T, and AMK were 73.7%, 76.6% and 82.6%, respectively. All PSA isolates were colistin-S. Among isolates from VAP, S to CAZ-AVI and C-T were 100.0% and 99.2% for ENT (n = 266), and 97.8% and 99.5% for PSA (n = 183), respectively.

**Conclusion.** CAZ-AVI and C-T showed similar coverage (%) against PSA (96.2–96.5%), including against MDR (64.9–86.4%) and XDR (79.4–80.4%) isolates. In contrast, C-T was less active than CAZ-AVI against ENT in general and exhibited limited activity against ENT-R subsets.

**Disclosures.** H. S. Sader, Allergan: Research Contractor, Research support. R. K. Flamm, Allergan: Research Contractor, Research support. M. Castanheira, Allergan: Research Contractor, Research support.

---

2429. *The Epidemiology and Outcomes of Enterobacter cloacae Bloodstream Infections in Children*  
2428. *Lower Rates of Antibiotic Treatment of Vancomycin-Resistant Compared With Vancomycin Susceptible Enterococcal Bacteriuria*  
2429. *The Epidemiology and Outcomes of Enterobacter cloacae Bloodstream Infections in Children*  
2430. *Impact of USCAST Proposed Breakpoint Changes to Aminoglycosides, Cyclines, and Levofloxacin on Carbapenem-Resistant Enterobacteriaceae at a US Tertiary Referral Academic Medical Center*

---

**Therapy for VRE was diverse among most institutions and included agents such as daptomycin, β-lactams, doxycycline, fosfomycin, nitrofurantoin and linezolid. Hospital 2 had a total of 15 treated cases; 11 of which were treated with linezolid. Therapy for VSE primarily consisted of β-lactam or vancomycin.**

**Conclusion.** The rates of treatment were higher with VSE compared with VRE. ID was more frequently consulted in patients with VRE and those patients were treated less frequently.

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

---

**Therapy for VRE was diverse among most institutions and included agents such as daptomycin, β-lactams, doxycycline, fosfomycin, nitrofurantoin and linezolid. Hospital 2 had a total of 15 treated cases; 11 of which were treated with linezolid. Therapy for VSE primarily consisted of β-lactam or vancomycin.**

**Conclusion.** The rates of treatment were higher with VSE compared with VRE. ID was more frequently consulted in patients with VRE and those patients were treated less frequently.

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

---

**Therapy for VRE was diverse among most institutions and included agents such as daptomycin, β-lactams, doxycycline, fosfomycin, nitrofurantoin and linezolid. Hospital 2 had a total of 15 treated cases; 11 of which were treated with linezolid. Therapy for VSE primarily consisted of β-lactam or vancomycin.**

**Conclusion.** The rates of treatment were higher with VSE compared with VRE. ID was more frequently consulted in patients with VRE and those patients were treated less frequently.

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

---

**Therapy for VRE was diverse among most institutions and included agents such as daptomycin, β-lactams, doxycycline, fosfomycin, nitrofurantoin and linezolid. Hospital 2 had a total of 15 treated cases; 11 of which were treated with linezolid. Therapy for VSE primarily consisted of β-lactam or vancomycin.**

**Conclusion.** The rates of treatment were higher with VSE compared with VRE. ID was more frequently consulted in patients with VRE and those patients were treated less frequently.

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

---

**Therapy for VRE was diverse among most institutions and included agents such as daptomycin, β-lactams, doxycycline, fosfomycin, nitrofurantoin and linezolid. Hospital 2 had a total of 15 treated cases; 11 of which were treated with linezolid. Therapy for VSE primarily consisted of β-lactam or vancomycin.**

**Conclusion.** The rates of treatment were higher with VSE compared with VRE. ID was more frequently consulted in patients with VRE and those patients were treated less frequently.

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

---

**Therapy for VRE was diverse among most institutions and included agents such as daptomycin, β-lactams, doxycycline, fosfomycin, nitrofurantoin and linezolid. Hospital 2 had a total of 15 treated cases; 11 of which were treated with linezolid. Therapy for VSE primarily consisted of β-lactam or vancomycin.**

**Conclusion.** The rates of treatment were higher with VSE compared with VRE. ID was more frequently consulted in patients with VRE and those patients were treated less frequently.

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

---

**Therapy for VRE was diverse among most institutions and included agents such as daptomycin, β-lactams, doxycycline, fosfomycin, nitrofurantoin and linezolid. Hospital 2 had a total of 15 treated cases; 11 of which were treated with linezolid. Therapy for VSE primarily consisted of β-lactam or vancomycin.**

**Conclusion.** The rates of treatment were higher with VSE compared with VRE. ID was more frequently consulted in patients with VRE and those patients were treated less frequently.

**Disclosures.** All authors: No reported disclosures.
Results. K. pneumoniae (n = 58; 48%) and Enterobacter spp. (n = 40; 33%) comprised the majority of CRE.

Table 1: CRE Susceptibility

| Antimicrobials | EUCAST % Susceptibility (Breakpoint) | CLSI/FDA % Susceptibility (Breakpoint) | USCAST % Susceptibility (Breakpoint) | P-Value |
|----------------|------------------------------------|---------------------------------------|-------------------------------------|---------|
| Aminoglycosides|                                    |                                       |                                     |         |
| Amikacin       | 66% (8)                            | 86% (1B)                               | 55% (4)                             | <.001   |
| Gentamicin     | 21% (2)                            | 31% (0)                                | 21% (2)                             | <.001   |
| Tobramycin     | 15% (2)                            | 18% (4)                                | 14% (1)                             | 0.063   |
| Cycles         |                                    |                                       |                                     |         |
| Tigecycline    | 43% (1)                            | 16% (4)                                | 1% (1)                              | <.001   |
| Fluoroquinolones|                                   |                                       |                                     |         |
| Levofloxacin   | 6% (0.5)                           | 15% (2)                                | 6% (0.5)                            | 0.001   |

P < 0.05 are significant and indicate differences between CLSI/FDA and USCAST susceptibility.

Conclusion. Implementation of the proposed USCAST susceptibility breakpoints will impact clinician antimicrobial choice regarding the treatment of infections caused by CRE. Amikacin and tigecycline susceptibility markedly decreased when utilizing the proposed USCAST breakpoints.

Disclosures. All authors: No reported disclosures.

2431. Evaluation of Clinical Outcomes in Bacteremia Due to AmpC β-Lactamase Producing Organisms Stratified by Treatment

Travis Carlson, PharmD; Kady Phu, PharmD and Hannah Palmer Russo, PharmD; CH St. Luke's Health - Baylor St. Luke's Medical Center, Houston, Texas

Session: 250. Treatment of AMR Infections
Saturday, October 6, 2018: 12:30 PM

Background. Enterobacteriaceae and Pseudomonas aeruginosa are common bloodstream pathogens with variable AmpC β-lactamase (AmpC) incidence. The clinical utility of treatment with non-carbenampe/cefpime options remains unclear. The objective of this study was to compare the clinical outcomes for patients receiving a carbapenem or cefepime (CC) and alternative therapy (AT) for bacteremia caused by organisms known to produce AmpC.

Methods. Hospitalized adults with a confirmed mono-microbial bacteremia admitted from June 2016 to December 2017 were included. Patients were stratified by definitive therapy (DT) with CC or AT. The AT group was treated with fluoroquinolones, third-generation cephalosporins, piperacillin–tazobactam, aztreonam, or tobramycin. The primary outcome was in-hospital mortality. Secondary outcomes included treatment failure, microbiological failure, hospital length of stay (LOS), and intensive care unit LOS. Multiple regression analysis was used to adjust for potential confounding variables.

Results. Of 68 patients meeting eligibility criteria, 46% received CC for DT. Enterobacteriaceae were isolated in 45% of patients in the CC group. In-hospital mortality was 32% and 3% (P = 0.0017) in the CC and AT groups, respectively. Source control, APACHE II score on the date of index culture, and immune status did not differ between groups. Definitive CC therapy was independently associated with mortality (odds ratio, 15.17; 95% confidence interval, 1.69–135.76; P = 0.0017). Only 6 (9%) patients received AT as empiric and DT. Those who received definitive AT received a median of 5 days (interquartile range, 3–9 days) of CC prior to being switched to AT.

Conclusion. While most patients received empiric CC, definitive treatment with CC was found to be an independent predictor of in-hospital mortality. These findings suggest that AT may be a de-escalation treatment strategy for clinicians to consider. However, these results should be confirmed in a larger population.

Disclosures. All authors: No reported disclosures.

2432. Appropriateness of Empirc Extended-Infusion Piperacillin/Tazobactam in the Intensive Care Unit

Kendall Tucker, PharmD3; Molly Benning, BS1; Keenan Ryan, PharmD, PhC2; Caitz Wallaven, PharmD, MS1 and Bernadette Jakean, PharmD, PhC, BCPS3, AAHPHP2, Pharmacy, University of New Mexico Hospitals, Albuquerque, New Mexico, University of New Mexico Health Sciences Center, Albuquerque, New Mexico, College of Pharmacy, University of New Mexico, Albuquerque, New Mexico

Session: 250. Treatment of AMR Infections
Saturday, October 6, 2018: 12:30 PM

Background. Gram-negative (GN) infections in ICU patients have increased antibiotic resistance owing to higher minimum inhibitory concentrations (MICs). Piperacillin/tazobactam (PTZ) 3.375 g extended infusion (EI) may be used as an empiric agent. GN organisms with PTZ MICs > 16/4 may be inadequately covered by this regimen. The objective of this study was to evaluate MICs of GN isolates from the ICU to determine whether PTZ 3.375 g EI is an appropriate empiric regimen for ICU patients. Appropriateness of empiric antibiotic therapy was defined as PTZ MIC ≤16/4 in greater than 80% of isolates. The secondary objective was to evaluate patient-specific risk factors that may be associated with elevated PTZ MICs in GN pathogens.

Methods. All ICU patients admitted from January to December 2017 with a confirmed GN pathogen from a non-urinary source were included. Patients were excluded if they had cystic fibrosis, cultures obtained >48 hours prior to ICU admission, or they were incarcerated. Patients’ electronic medical records were reviewed for the following data: age, sex, ethnicity, location prior to ICU admission, GN-pathogen, culture source, risk factors for multi-drug-resistant organisms (diabetes, injection drug use, indwelling catheter, wounds/trauama), pathogen susceptibility profile, risk modifying co-morbidities (diabetes, heart failure, chronic kidney disease, and liver disease) and creatinine clearance.

Results. 231 patients were included in the study. The average patient was 56.7 years old ±16.95. The majority of patients were white (64.1%) and male (69.7%). There were no significant differences in baseline characteristics between patients with PTZ MICs >16/4 and those with MICs ≤16/4. Pseudomonas aeruginosa (41%) was the primary organism identified and 28% of all GN isolates had MICs >16/4. Dialysis (P = 0.028), IV antibiotics (P < 0.001) and presence of wounds or trauma (P = 0.018) were all associated with elevated MICs.

Conclusion. Current PTZ EI 3.375g dosing may not provide adequate empiric coverage of GN pathogens for ICU patients especially for patients who received previous IV antibiotics, are on dialysis, or have the presence of wounds or trauma.

Disclosures. All authors: No reported disclosures.

2433. Evaluation of Meropenem (MEM) in Combination With Colistin (COL) Against Colistin-Resistant Extensively Drug-Resistant (XDR) Gram-Negative Bacteria

Nivedita Singh, MS1; Logan Nguyen, Student1; Michael J. Rybak, PharmD, MPH, PhD1 and Keith S. May, MD, MPH1; Pharmacy Practice, Anti-Infective Research Laboratory, Department of pharmacy practice, Detroit, Michigan, 259 Mack Ave, Suite 4131, Eugene Applebaum College of Pharmacy and Health Sciences Bldg, 259 Mack Ave., Detroit, Michigan, 48201, College of Medicine, Division of Infectious Diseases, Michigan Medicine, Ann Arbor, Michigan

Session: 250. Treatment of AMR Infections
Saturday, October 6, 2018: 12:30 PM

Background. The treatment of XDR Gram-negative bacilli poses a significant clinical challenge with limited treatment options. Colistin-resistant XDR Gram-negative bacteria are becoming more commonplace in the clinical setting. Combination therapy is needed for treatment of such infections. The objective of this study was to evaluate the synergistic effect of the combination with COL and MEM against Colistin-resistant XDR Gram-negative bacilli.

Methods. In this study, a total of 30 Colistin-resistant XDR Gram-negative clinical isolates were evaluated, including five isolates of Pseudomonas aeruginosa, twenty-four isolates of Acinetobacter baumannii and one isolate of Klebsiella pneumoniae. Minimum inhibitory concentrations (MICs) were determined with COL and MEM for each strain by broth microdilution. COL and MEM MICs were measured in the presence of 0.25- to 0.5-× the MIC of the other antibiotic to determine the ability to lower MIC values. Time-kill assays were performed with each agent and in combination to evaluate the potential for synergistic interactions. Additive and synergistic effects were defined as 1- to 2-log reductions in CFU/mL from the most active single agent at 24 hours, respectively.

Results. All isolates were resistant to COL (MIC90 32 mg/L), whereas all bacteria with except one A. baumannii, were resistant to MEM (MIC90 >64 mg/L). Zero to greater than nine-fold decrease in MEM MICs were observed in combination with COL at 0.25- to 0.5-× the MIC of the other antibiotic demonstrating synergistic activity against 70% of tested strains and additive in 3% of the tested strains at 24 h in time-kill. The combination was infrequently used in 26% of the tested strains.

Conclusion. These data indicate that the addition of MEM to COL therapy in colistin resistant XDR Gram-negative bacteria demonstrate synergistic or additive effects against a majority of XDR Gram-negative bacteria. The combination might be a promising therapeutic option for treatment of these problem pathogens.

Disclosures. M. J. Rybak, Allergan; Consultant, Grant Investigator and Speaker's Bureau, Research grant and Research support. Achaogen: Consultant, Grant Investigator and Speaker’s Bureau, Consulting fee, Research grant and Research support. Sunovian: Consultant, Grant Investigator and Speaker’s Bureau, Consulting fee, Research grant and Research support. Melinta: Consultant, Grant Investigator and Speaker’s Bureau, Consulting fee, Research grant and Research support. Zavante: Consultant, Grant Investigator and Speaker’s Bureau, Consulting fee, Research grant and Research support. NIAID: Consultant, Grant Investigator and Speaker’s Bureau, Consulting fee, Research grant and Research support.

2434. Review of Linezolid (LZD) Use and Onset of Toxicity in 4 Belgian Hospital Centers: A Retrospective Study

Hélène Thiénot, PharmD3; Carole Briquet, PharmD; Frédéric Frippiat, MD; Frédérique Jacobs, MD1; Xavier Holmesman, MD3; Paul Tulkens, MD3; Anne Spinevich, PharmD, PhD and Françoise VanBambeke, PharmD, PhD; Université Catholique de Louvain, Cliniques Universitaires Saint Luc, Brussels, Belgium, Infectious Diseases and Internal Medicine, Centre Hospitalier Universitaire