

further studies to support the clinical development of mecillinam/pivmecillinam for the treatment of UTI in the USA.

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### 1618. Meropenem-vaborbactam vs standard of care for multidrug resistant carbapenem-resistant Enterobacteriaceae

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**Session:** P-71. Treatment of Antimicrobial Resistant Infections

**Background.** Antimicrobial resistance to gram negative organisms is an increasing issue worldwide, particularly with regards to extended-spectrum B-lactamase (ESBL) and carbapenem-resistant *Enterobacteriaceae* (CRE) producing organisms. Meropenem/vaborbactam (M-V) is an approved antimicrobial for treatment of some CRE infections. This study compares the outcomes of patients with CRE who were treated with M-V to standard of care (SoC) therapy.

Table 1. Results

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	Treated with M-V (N=25)	Treated with SoC (N=25)	P value
Mean age (SD)	63	66	0.526
Female	36%	60%	0.156
Mean length of stay in days (SD)	33	32	0.899
Infection source			
Intraabdominal	56%	56%	
Pneumonia	24%	24%	
Genitourinary	16%	16%	
Skin/Soft tissue	4%	4%	
Pathogen isolated			
<i>Klebsiella pneumoniae</i>	52%	48%	
<i>Escherichia coli</i>	20%	20%	
<i>Enterobacter sp.</i>	20%	16%	
<i>Citrobacter freundii</i>	4%	8%	
<i>Serratia marcescens</i>	0	4%	
Other <i>Klebsiella sp.</i>	4%	4%	
30 day mortality	48%	32%	0.387
30 day re-admission	20%	16%	1
Clinical outcome			
Cure	52%	28%	0.148
Improved	0%	40%	0.001
Failure	48%	32%	0.098
Non-evaluable	0	0	-
Microbiological outcome			
Eradication	24%	4%	0.098
Presumed eradication	28%	68%	0.01
Persistence	8%	6%	1
Presumed persistence	40%	24%	0.364
	Treated with M-V (N=11)	Treated with SoC (N=15)	P value
Acute kidney injury*	16%	8%	1

(\*AKI was defined as an occurrence of post-baseline Cr >1.5 times the baseline serum creatinine, from 48 hours post-therapy completion. A total of 14 patients were excluded in the M-V group, and 10 patients in the SoC group due to baseline Cr > 2.0.)

**Methods:** A retrospective chart analysis was performed which analyzed 25 patients in the M-V group and 25 patients in the SoC group at an 800-bed tertiary care hospital in Southeast Michigan. Patients were matched by type of infection. Variables included basic demographics, infection source, bacterial species, as well as 30-day re-admission, ICU admission, and creatinine pre- and post-treatment. The primary outcome of interest was 30-day mortality and clinical outcome (cure/improved/failure). Secondary outcomes included microbiological outcome (eradication/presumed eradication/persistence/presumed persistence) and acute kidney injury (AKI) on therapy. The data was analyzed using SPSS version 14.0.

**Results.** The most commonly used antibiotics in the SoC group were ceftazidime-avibactam (64%) and cefepime (32%). In both groups, the most common infection source was intra-abdominal (56%). The most commonly isolated pathogen in each group was *Klebsiella pneumoniae* (52% in M-V and 48% in SoC). Mortality and re-admission at 30 days did not differ statistically between the two groups. However, patients who received M-V were found to be more likely to achieve clinical cure, although this did not achieve statistical significance. Patients who were treated with SoC were significantly more likely to achieve an improved clinical outcome and presumed microbiological eradication (p=0.001 and 0.01 respectively). Of the 50 patients, only 26 patients (52%) met criteria to analyze for AKI. Patients who received M-V were more likely to have AKI (16% compared to 8%) but this did not reach statistical significance.

**Conclusion.** M-V is an important option for care of patients with infections due to MDR gram-negative bacteria. However, further studies are warranted to

determine whether its use is associated with reduced mortality and improved clinical outcomes.

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### 1619. Meta-analysis of Randomized Control Trials Evaluating New Beta-Lactamase Combination Antibiotics

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**Session:** P-71. Treatment of Antimicrobial Resistant Infections

**Background.** Ceftolozane/ Tazobactam (C/T), Ceftazidime/ Avibactam (C/A), Meropenem/ Vaborbactam (M/V) and Imipenem/ Relebactam (I/R) are new combination beta-lactam/ beta-lactamase inhibitor antibiotics primarily used to treat multidrug-resistant (MDR) Gram-negative infections. This study synthesized outcomes of comparative observational studies and randomized control trials (RCTs) that evaluated clinical success of these antibiotics compared to other therapies.

**Methods.** PubMed, EMBASE, and Google Scholar were searched from January 1<sup>st</sup>, 2013 through October 1<sup>st</sup>, 2019 for comparative observational studies and RCTs of C/T, C/A, M/V and I/R in patients with pneumonia, complicated intra-abdominal and urinary tract infections. Study and patient demographics were collected along with clinical and microbiological success rates. Meta-regression analysis was used to determine the pooled effectiveness of C/T, C/A, M/V, and I/R. Heterogeneity and publication bias were assessed via I<sup>2</sup> values and funnel plots, respectively.

**Results.** Literature search returned 1,645 results. After exclusion criteria, 21 publications representing 6,246 patients were retained: 16 RCTs (8 C/A, 3 C/T, 3 I/R, 2 M/V) and 5 comparative observational studies (3 C/A, 2 C/T). Pooled risk ratios for clinical success showed that all four antibiotics were non-inferior to comparator antibiotics (0.99 (95% CI (0.97-1.01))). Eleven of the sixteen RCTs evaluated microbiological success; pooled risk ratio was 1.08 (95% CI 1.04-1.13), indicating that older therapies were more successful at microbiological eradication than newer antibiotics. Only 6 of the included studies (3 RCTs and 2 observational studies) focused on patients with MDR infections. Limiting the analysis to MDR RCTs did not change the overall conclusions.

**Conclusion.** Although older therapies had slightly higher microbiologic clearance, pooled clinical success rates for C/A, C/T, M/V, and I/R were non-inferior to older therapies, including in studies focused on patients with MDR infections. Additional studies are needed to further evaluate these drugs' effectiveness for treatment of MDR infections.

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### 1620. Minocycline Activity Against Unusual Clinically Significant Gram-Negative Pathogens

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**Session:** P-71. Treatment of Antimicrobial Resistant Infections

**Background.** Unusual non-glucose fermenting Gram-negative (NFGN) pathogens, including *Burkholderia cepacia* species complex, *Achromobacter spp.*, *Alcaligenes spp.*, *Aeromonas spp.*, and other genera, can cause serious hospital-acquired infections in immunocompromised patients. Some genera are inherently resistant to common drug classes and can acquire other resistance mechanisms, making them difficult to treat. In this study, we analyzed the susceptibility of NFGN isolates to minocycline (MIN). Isolates were collected as part of the SENTRY Antimicrobial Surveillance Program from 2014-2019.

**Methods.** From 2014-2019, unusual NFGN isolates were collected from hospitalized patients in 102 hospitals in 35 countries on 4 continents. Hospitals submitted 1 isolate per patient per infection episode that met local criteria for being the likely causative pathogen. Identification was performed by the submitting laboratory and confirmed by JMI Laboratories with matrix-assisted laser desorption ionization-time of flight mass spectrometry or other molecular methods as required. Isolates were tested for MIN susceptibility using the CLSI broth microdilution method at JMI Laboratories. All infection types were included in the susceptibility analysis.

**Results.** The most common infection from which the NFGN were isolated was pneumonia. The top 5 NFGN species were *Achromobacter xylosoxidans* (n=202), *Burkholderia cepacia* species complex (n=199), unspecified *Achromobacter* (n=190), *Aeromonas spp.* (n=127), including *Aeromonas hydrophila* (n=35), *Chryseobacterium spp.* (n=59), and *Alcaligenes faecalis* (n=42). The % susceptible and MIC<sub>50/90</sub> values of MIN for these species are shown in the table.

**Conclusion.** MIN had > 85% susceptible for the most frequently isolated unusual NFGN, including 92% susceptible for *Achromobacter spp.* and 85.9% for *B. cepacia*.