Poster # **1623**

Outcomes of Critically Ill Adult Hospitalized Patients with *Pseudomonas aeruginosa* Hospital- and Ventilator-Associated Pneumonia Who Received an Active Anti-Pseudomonal β-Lactam: Does "S" Equal Success in the Presence of Resistance to other Anti-Pseudomonal β-Lactam?

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Background

- The most commonly used antibiotics for patients with hospital-acquired bacterial pneumonia (HABP) and ventilator-associated bacterial pneumonia (VABP) due to *Pseudomonas aeruginosa* (PSA) are the conventional anti-pseudomonal β-lactams (APBLs) (i.e., ceftazidime, cefepime, meropenem or piperacillin-tazobactam).
- Similar resistance mechanisms in PSA affect the APBLs, and it is unclear if resistance to one APBL can affect the clinical effectiveness of other APBLs.
- This study evaluates the impact of APBL resistance among patients with *P. aeruginosa* HABP/VABP who initially receive a microbiologic active APBL.

Methods

- A cohort study of adult Kaiser Permanente Southern California members with a HABP or VABP diagnosis (2011-2017) was performed.
- Patients were required to have a positive respiratory or blood culture for PSA, reside in an ICU at index PSA culture collection, and receive a microbiologically active APBL within 2 days of index PSA collection date.
- Patients were stratified by presence of resistance to APBL on index *P. aeruginosa* (0 vs. ≥1 resistant APBL).
  - Ceftazidime, cefepime, meropenem, or piperacillin/tazobactam
- Primary outcomes were 30-day mortality and discharge to home.
- Multivariable regression models (logistic and cox) with inverse probability of treatment weighting (IPTW) were used to evaluate the association between presence of APBL resistance and outcomes.

Conclusions

Findings suggest that the full APBL susceptibility profile should be considered when selecting therapy for patients with *P. aeruginosa* HABP/VABP.

This study highlights the critical need to determine if more intensive APBL dosing, combination therapy or newer agents are needed to maximize the outcomes of patients with HABP/VABP due to P*. aeruginosa* when there is resistance ≥ 1 APBLs.

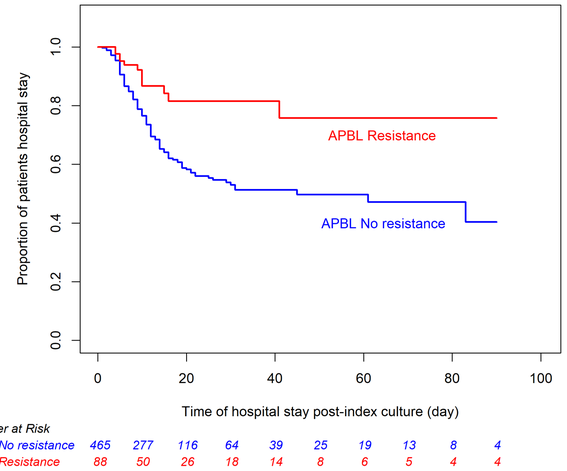
Table 1. Unadjusted and Adjusted Associations between Presence of APBL Resistance and Outcomes among Adult, Intensive Care Unit Patients with Monomicrobial PSA Infection who Received an Active APBL

Outcomes	No resistance (n=465)	≥ 1 APBL Resistant (n=88)	Unadjusted OR/HR (95% CI)	Adjusted OR/HR (95% CI)
30-Day Mortality	124 (26.67%)	29 (32.95%)	1.35 (0.83 – 2.21)	1.65 (1.02 – 2.66)
Discharged Home	162 (34.84%)	15 (17.05%)	0.44 (0.25 – 0.75)	0.50 (0.29 – 0.85)

Results

- During the study period, 553 patients with monomicrobial *P. aeruginosa* HABP/VABP met the study criteria.
- Eighty-eight patients (16%) had a PSA HABP/VABP that was resistant to at least one APBL class [1 (n=56) or 2 (n=32)]
- The microbiologically active APBLs) received was cefepime/ceftazidime, piperacillin/tazobactam, and meropenem in 55.2%, 37.8%, and 12.3% of patients, respectively (29 patients received >1 APBL)
- Thirty-day mortality was 28%, and 32% were discharged home.
- Results of the unadjusted and adjusted multivariate analyses are shown in **Table 1**.
- Results of Kaplan-Meier analyses for time to discharge home by APBL resistance status is shown in **Figure 1.**
- Resistant to ≥ 1 APBL was associated with worse outcomes relative to no APBL resistance
  - Higher adjusted odds of 30-day mortality
  - Lower hazard risk of being discharge to home

Figure 1. Kaplan Meier curve demonstrating time to discharge to home by APBL resistance



Limitations

- Strict criteria was used to create a homogeneous population, and it is unknown if the findings are applicable to other populations, including those with polymicrobial HABP/VABP and other infection sites
- Future treatment outcomes studies are needed to determine if the APBL selected, its MIC value, and dosing modified the outcomes observed in this analysis.
- This study may not be generalizable to other institutions with differing local ecology or stewardship practices.

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