Patients with cystic fibrosis (CF) experience recurrent bacterial pulmonary exacerbations. The management of these infections becomes increasingly complex due to decreased antimicrobial susceptibility. The pharmacokinetics (PK) and pharmacodynamics (PD) of several antimicrobials are affected by the presence of CF traits, making it challenging to achieve optimal PK/PD targets. The objective of this study is to evaluate if population PK modeling and covariate analyses can be utilized to define individualized dosing regimens in CF patients to improve treatment outcomes.

**Methods**

- The study included 150 pediatric and adult participants receiving cefepime (n=82), meropenem (n=42), or piperacillin-tazobactam (n=31) for bacterial pulmonary exacerbations.
- Opportunistic blood samples were obtained during hospitalization.
- One hundred-five pediatric and adult participants receiving cefepime (n=82), meropenem (n=42), or piperacillin-tazobactam (n=31) were enrolled.
- To our knowledge, this is the largest PK study to date of cefepime, meropenem, and piperacillin-tazobactam in individuals with CF.

**Results**

- Comparison of PTA between the two durations of infusion for 50 mg/kg (3 to 11 years) or 2 g (12 years and above) cefepime q8h at the target of 65% T>MIC.
- Comparison of PTA between the target of 100% T>MIC and Gail Tauscher

**Conclusions**

- To our knowledge, this is the largest PK study to date of cefepime, meropenem, and piperacillin-tazobactam in individuals with CF. Clinicians should incorporate PK/PD estimates with these covariate PK models to determine optimal dosing in patients with CF. Since standard dosing regimens may fail to achieve specific PK/PD targets, the use of extended infusions in patients with CF who are receiving a 3-h infusion vs. 0.5 h infusion, based on age and target T>MIC was supported by the Division of Microbiology and Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health through the Vaccine and Treatment Evaluation Unit contract HHSN272200800008C and the National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health through the Ultramark/Upjohn trial contract U01DK36951.

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