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# Vancomycin AUC Monitoring in Individuals with Cystic Fibrosis

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## Background

- Methicillin resistant *Staphylococcus aureus* (MRSA) infects 20-25% of people with CF (pwCF) and is associated with increased morbidity
- Treatment of pulmonary exacerbations (PE) often requires hospitalization including increased respiratory treatments and IV antimicrobials
- IV vancomycin (IV VANC), which is commonly used for MRSA infections, requires serum concentration monitoring to ensure efficacy and minimize toxicity
- Previous monitoring guidelines suggested trough concentrations (15-20 mcg/mL) to predict efficacy and toxicity; recent guidelines recommend using area under the curve (AUC) modeling (400-600 mcg/ml*hr)
- Children’s Mercy Kansas City (CMKC) changed IV VANC monitoring from trough to AUC measurement on 01 May 2020

## Methods

- A retrospective chart review collected trough monitoring data for all pwCF that received IV VANC at CMKC from 01 January 2019 to 31 December 2019
- Data for all pwCF treated with IV VANC after the change to AUC monitoring was prospectively collected from 01 May 2020 to 31 July 2021
  - Data collection included: patient demographics, details of IV VANC therapy (dose, frequency, total exposure, nephrotoxicity), and monitoring data (serum concentrations and AUC modeling)
  - Therapeutic concentrations were defined as a trough between 15-20 mcg/mL and AUC/MIC between 400-600 mcg/mI*hr
  - Descriptive statistics were used to assess pre- and post-implementation data. Chi-squared and t-test were used to determine differences between groups

## Results

<table>
<thead>
<tr>
<th></th>
<th>Trough Monitoring 01.01.2019 to 12.31.2019</th>
<th>AUC Monitoring 05.01.2020 to 07.31.2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Sex, n (%)</td>
<td>14 (56)</td>
<td>7 (58)</td>
</tr>
<tr>
<td>Median Age (years)</td>
<td>14 (4-20)</td>
<td>16 (8-20)</td>
</tr>
<tr>
<td>Mean Treatment Duration (days)</td>
<td>10.46 ± 4.88</td>
<td>9.87 ± 2.93</td>
</tr>
<tr>
<td>Mean Daily IV VANC Exposure (mg/kg/day)</td>
<td>71.34 ± 10.63</td>
<td>75.68 ± 11.91</td>
</tr>
<tr>
<td>Number of Treatment Courses Achieving Therapeutic Target (n, %)</td>
<td>18 (43)</td>
<td>19 (95)</td>
</tr>
<tr>
<td>Mean Time to Therapeutic Concentration (hours)</td>
<td>86.33 ± 75.80</td>
<td>28.37 ± 25.98</td>
</tr>
<tr>
<td>Mean Number of Phlebotomies</td>
<td>4 ± 2</td>
<td>4 ± 2</td>
</tr>
</tbody>
</table>

- Changing to AUC monitoring for IV VANC among pwCF was not associated with a significant change in daily IV VANC exposure, duration of treatment, or number of phlebotomies
- More treatment courses achieved therapeutic targets with AUC monitoring compared to trough monitoring
- AUC monitoring resulted in a significant decrease in mean time to therapeutic concentration by 57.96 hours

## Conclusions