Complications Associated with Pediatric Outpatient Parenteral Vancomycin Therapy

Priyanka Fernandes, MBBS 1,2, Kelly Flett MD, MMSc 2,3, Amanda Growdon, MD 3, Fabienne Bourgeois, MD, MPH 1,4, Helen Mahoney-West, MSN, CPNP 2, Catherine Lachenauer, MD 3, Mari Nakamura, MD, MPH 1,4

1Preventive Medicine Program, Department of Medicine, University of California Los Angeles, Los Angeles, CA
2Division of Infectious Diseases, Department of Medicine, Boston Children’s Hospital, Boston, MA
3Department of Pediatrics, Harvard Medical School, Boston, MA
4Division of General Pediatrics, Department of Medicine, Boston Children’s Hospital, Boston, MA

Introduction

- Pediatric use of intravenous (IV) vancomycin in the outpatient setting has increased due to the advent of peripherally inserted central catheters and the availability of skilled outpatient nursing services.
- The most common complications in adults treated with vancomycin outpatient parenteral antimicrobial therapy (OPAT) are rash and nephrotoxicity.
- Rates and types of complications associated with pediatric outpatient vancomycin therapy are unknown.

Objectives

For subjects receiving vancomycin in our OPAT Program at Boston Children’s Hospital:
1. Describe baseline patient characteristics.
2. Describe the most common complications encountered during therapy.
3. Determine predictors of unplanned outcomes due to complications.

Methods

- Retrospective study of subjects discharged on vancomycin OPAT and followed by the infectious diseases service from August 2008 through April 2016.
- Demographic and clinical data related to the OPAT course were collected via chart review.
- Complications were categorized as:
  - Antimicrobial-related
  - IV-access-related
  - Concomitant antimicrobial(s)
  - Type of IV access
  - Duration of vancomycin (days; median/IQR)
  - Concomitant antimicrobial(s)

Statistical Analysis:

- Bivariate regression analyses identified demographic and clinical characteristics that were significantly associated with each of two outcomes: PAD and a combined outcome of UHV and/or UR.
- Multivariate regression models used risk factors significant on bivariate analyses, forcing in certain clinically significant variables (pathogen, diagnosis, concomitant antimicrobial use, duration of vancomycin).

Results

Table 1: Demographic and clinical characteristics

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Risk factor</th>
<th>Odds ratio (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAD 1</td>
<td>Any complication</td>
<td>3.199 (1.006, 10.172)</td>
<td>.049</td>
</tr>
<tr>
<td>UHV/UR</td>
<td>Rash</td>
<td>939 (884, .998)</td>
<td>.043</td>
</tr>
<tr>
<td>IV-access-related</td>
<td>Diagnosis of endocarditis</td>
<td>182 (0.37, .895)</td>
<td>.036</td>
</tr>
</tbody>
</table>

1 Adjusted for pathogen, use of concomitant antimicrobials, duration of vancomycin
2 Comparison group=S. aureus
3 Adjusted for diagnosis, use of concomitant antimicrobials, duration of vancomycin
4 Comparison group=Staphylococcus aureus

Conclusions

1. Complications are common in vancomycin OPAT, with a third of children experiencing PAD and slightly less than half experiencing UHV and/or UR.
2. Drug rash is the most common cause of PAD, and intravenous access-related problems are the most common cause of UHV/UR. In contrast with findings in adults, nephrotoxicity (defined by elevated creatinine) occurred infrequently.
3. Transition to oral antimicrobial alternatives should be encouraged when possible.
4. Future research should explore the role of CoNS in complications and compare the outcomes of alternative antimicrobials to vancomycin to determine the most safe outpatient therapy.