Meropenem Efficacy in the Neonatal Intensive Care Unit: A Case Series

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Background
- Meropenem is a broad spectrum carbapenem antibiotic
  - Used occasionally in the neonatal intensive care unit (NICU)
  - Treats infections such as meningitis, sepsis, and pneumonia
- There is controversy regarding whether an infusion duration of 4 hour vs 30 minutes is the most effective for neonates
- Meropenem is currently administered over 30 minutes in Fraser Health NICU

Objectives
- To determine the overall cure rate achieved with the current meropenem regimen in the NICU
- To determine time to microbiological cure and clinical cure when meropenem was required

Methods
- Design: Chart review
- Inclusion:
  - Received meropenem in the NICU
  - Dates: June 2012 to May 2017
  - Hospitals: Surrey Memorial or Royal Columbian
- Exclusion: 45 or more weeks post menstrual age
- Analysis: Descriptive statistics

Results
- Table 1: Patient characteristics
  - Group A (n=5)
    - Day of life: 20 (4 to 21)
    - Post menstrual age (weeks): 1056 (830 to 1325)
    - Male: 3
    - Central line: 3
    - Intubated: 5
    - Platelet transfusion: 1
    - Culture type: ETT aspirate
    - Blood: 1
    - Cerebral spinal fluid: 0
  - Group B (n=2)
    - Day of life: 17 (9 to 23)
    - Post menstrual age (weeks): 970 (910 to 1030)
    - Male: 0
    - Central line: 2
    - Intubated: 2
    - Platelet transfusion: 0
    - Culture type: Blood
    - Blood: 2
    - Cerebral spinal fluid: 2
  - Group C (n=10)
    - Day of life: 22 (5 to 46)
    - Post menstrual age (weeks): 1084 (565 to 2240)
    - Male: 5
    - Central line: 2
    - Intubated: 8
    - Platelet transfusion: 1
    - Culture type: Blood
    - Blood: 4
    - Cerebral spinal fluid: 0

Figure 1: Patient inclusion flow diagram

Table 2: Microbiological cure with meropenem (n=7)

<table>
<thead>
<tr>
<th>Positive culture</th>
<th>Repeat culture on follow up</th>
<th>Microbiological Cure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood</td>
<td>7</td>
<td>100%</td>
</tr>
<tr>
<td>CSF</td>
<td>2</td>
<td>100%</td>
</tr>
</tbody>
</table>

Sputum cultures were excluded due to the possibility of persistent colonization

Figure 2: Cure with meropenem (n=17)

Figure 3: Time to microbiological cure with meropenem (n=7)

Average time to clinical cure (n=6): 3.3 days

Limitations
- Small number of patients had objective changes in clinical status
- Not all patients had a follow up culture for test of cure

Conclusions
- 82% of patients had their infection cured
- All repeat blood/CSF cultures were negative
- Average time to microbiological cure was 4.1 days for blood cultures
- Average time to clinical cure was 3.3 days
- Meropenem regimen was effective