Impact of Total Body Weight on Efficacy of Ceftriaxone in Obese Patients

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BACKGROUND

Obese patients are at an increased risk of infection and poor therapeutic outcomes compared to non-obese patients.

Pharmacokinetic parameters of β-lactam antibiotics are impacted by excessive adipose tissue and increased glomerular filtration rates.

Minimal data exist that assesses the relationship between ceftriaxone efficacy and obesity.

Purpose: To evaluate the clinical outcomes of ceftriaxone when used as definitive monotherapy for obese patients versus non-obese patients.

METHODS

Study Design

• Single center, retrospective cohort; approved by the University of Mississippi Medical Center Institutional Review Board

Outcome Measures and Definitions

• Composite Primary – Clinical Treatment Failure:
  • Presence of any of the following:
    • Change in definitive therapy between 72 hours and 14 days post-initiation due to clinical worsening
    • Persistent leukocytosis (WBC >10x10^9/L) between 72 hours and 14 days after treatment initiation
    • Fever (single temperature >100.9 F) between 72 hours and 14 days post-treatment initiation
    • Re-infection within 30 days leading to readmission to the hospital
  • Secondary:
    • 30-day inpatient all-cause mortality
    • 30-day hospital readmission

Subjects

• The study population included patients admitted to the University of Mississippi Medical Center from July 2015 to July 2017

Analysis

Results were reported as proportions or medians [interquartile range (IQR)]. Comparisons between the obese group and non-obese group were analyzed using Student’s t-test or Mann-Whitney U test for continuous variables and χ² test or Fisher’s Exact test for categorical variables. A p-value of < 0.05 was considered statistically significant. Statistical analysis was performed using SPSS software version 24.0 (IBM).

CONCLUSION

• Obese patients treated with ceftriaxone had higher rates of treatment failure compared with non-obese patients.

• While not statistically significant, there was numerically higher inpatient mortality in obese patients compared with non-obese patients.

• Further examination is needed to assess impact of ceftriaxone dose and organism MIC on clinical failure in obese patients.

RESULTS

PATIENT DEMOGRAPHICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total (n=101)</th>
<th>Obese (n=39)</th>
<th>Non-Obese (n=62)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>62 [51-70]</td>
<td>62 [53-70]</td>
<td>62 [51-70]</td>
<td>0.761</td>
</tr>
<tr>
<td>Sex, male</td>
<td>56 (55.4)</td>
<td>24 (61.5)</td>
<td>32 (51.6)</td>
<td>0.329</td>
</tr>
<tr>
<td>Weight, kg</td>
<td>80 [64-98]</td>
<td>103 [95-120]</td>
<td>66 [59-77]</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

INFECTION SOURCE

- UTI/GYN
- Respiratory
- Bacteremia
- SSTI/Wound
- Bone/Joint
- Other

No statistical significance between groups

MICROBIOLOGICAL RESULTS

- MSSA
- Staphylococcus spp.
- Streptococcus spp.
- E. coli
- Klebsiella spp.
- Proteus spp.
- Enterobacter spp.
- Citrobacter spp.
- Other Gram (-) spp.

No statistical significance between groups

COMPOSITE PRIMARY OUTCOME

<table>
<thead>
<tr>
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<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Clinical Failure</td>
<td>49 (49)</td>
<td>24 (62)</td>
<td>25 (40)</td>
<td>0.038</td>
</tr>
<tr>
<td>Change in Therapy</td>
<td>26 (26)</td>
<td>14 (36)</td>
<td>12 (20)</td>
<td>0.064</td>
</tr>
<tr>
<td>Persistent Leukocytosis</td>
<td>39 (39)</td>
<td>21 (54)</td>
<td>18 (29)</td>
<td>0.013</td>
</tr>
<tr>
<td>Fever</td>
<td>12 (12)</td>
<td>6 (15)</td>
<td>6 (10)</td>
<td>0.529</td>
</tr>
<tr>
<td>30-day re-infection</td>
<td>11 (11)</td>
<td>3 (8)</td>
<td>8 (13)</td>
<td>0.523</td>
</tr>
</tbody>
</table>

SECONDARY OUTCOMES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total (n=101)</th>
<th>Obese (n=39)</th>
<th>Non-Obese (n=62)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-day readmission</td>
<td>18 (18)</td>
<td>6 (15)</td>
<td>12 (19)</td>
<td>0.791</td>
</tr>
<tr>
<td>30-day inpatient all-cause mortality</td>
<td>8 (8)</td>
<td>5 (13)</td>
<td>3 (5)</td>
<td>0.255</td>
</tr>
</tbody>
</table>

POSTER # 1381

Disclosures: The authors have nothing to disclose

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