Evaluation of Vancomycin-Resistant Enterococci Colonization and Infection Rates in Adult Liver Transplant Patients

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BACKGROUND

- Patients undergoing liver transplantation (LT) are at increased risk of vancomycin-resistant enterococci (VRE) colonization
- Colonization in this population may lead to higher infection and mortality rates post-LT
- Medications linked to higher VRE acquisition rates include proton pump inhibitors (PPI), 3rd generation cephalosporins, fluoroquinolones, meropenem, metronidazole and vancomycin
- Aurora Health Care implemented a VRE screening protocol in November 2014 to help identify at-risk patients

OBJECTIVES

Primary Objectives
- Determine the VRE infection rate post-LT
- Identify the risk factors associated with VRE infection

Secondary Objective
- Determine baseline colonization rates prior to transplantation

METHODS

- Retrospective review of patients undergoing LT from January 2013 through June 2016
- VRE rectal swabs were obtained per protocol for LT waitlist patients starting in November 2014
- VRE infection identified with labs and confirmed via chart review

Statistical Analysis

- Continuous variables described using mean and standard deviation or median and interquartile range
- Categorical variables described using frequency and percentages
- Competing risks analysis used to calculate VRE infection rates with competing event defined as graft loss or death post-LT
- Cox proportional hazards model used to identify predictors of post-LT VRE infection
- Forward stepwise selection used to identify the final multivariable model

RESULTS

Table 1: Demographic Overview

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Total Liver Transplants</th>
<th>Age at Transplant</th>
<th>Male Gender</th>
<th>Race: Caucasian</th>
<th>Ethnicity: Hispanic/Latino</th>
<th>Deceased Cardiac Donor (DCD)</th>
<th>Re-Transplant</th>
<th>Combined Organ</th>
<th>MELD</th>
<th>MELD ≥ 31</th>
<th>Donor Age</th>
<th>Post-LT LOS (days) Median (Q1-Q3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Liver Transplants</td>
<td>127</td>
<td>57.3 ± 9.4</td>
<td>81 (63.6%)</td>
<td>118 (92.9%)</td>
<td>20 (15.7%)</td>
<td>41 (32.3%)</td>
<td>2 (1.6%)</td>
<td>27 (21.3%)</td>
<td>29.3 ± 8.5</td>
<td>59 (46.5%)</td>
<td>44.2 ± 16.7</td>
<td>10 [8-19]</td>
</tr>
</tbody>
</table>

Table 2: Univariate Model Predicting VRE Infection

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Hazard Ratio (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (decades)</td>
<td>1.10 (0.71-1.70)</td>
<td>0.68</td>
</tr>
<tr>
<td>Female Gender</td>
<td>2.37 (1.06-5.28)</td>
<td>0.04</td>
</tr>
<tr>
<td>Transplants Post-Protocol</td>
<td>1.19 (0.53-2.70)</td>
<td>0.67</td>
</tr>
<tr>
<td>Race: Caucasian</td>
<td>2.03 (0.27-15.0)</td>
<td>0.49</td>
</tr>
<tr>
<td>Ethnicity: Hispanic/Latino</td>
<td>0.80 (0.24-2.70)</td>
<td>0.73</td>
</tr>
<tr>
<td>DCD Recipient</td>
<td>1.04 (0.45-2.43)</td>
<td>0.93</td>
</tr>
<tr>
<td>Combined Organ</td>
<td>1.87 (0.77-4.54)</td>
<td>0.16</td>
</tr>
<tr>
<td>MELD ≥ 31</td>
<td>2.58 (1.10-6.02)</td>
<td>0.03</td>
</tr>
<tr>
<td>Donor Age (decades)</td>
<td>0.96 (0.76-1.21)</td>
<td>0.74</td>
</tr>
<tr>
<td>Post-LT LOS (weeks)</td>
<td>1.10 (1.02-1.19)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

CONCLUSIONS

- VRE colonization pre-LT was not significantly associated with VRE infection post-LT
- Female gender, higher MELD, longer post-LT LOS and pre-LT meropenem were associated with increased risk of VRE infection in univariate models
- Longer post-LT LOS and pre-LT meropenem were independent predictors of VRE infection in final multivariable model most likely identifying sicker patients and their susceptibility to VRE infection

REFERENCES


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