Fever and Leukocytosis are Poor Predictors of Infection in Patients Receiving Extracorporeal Membrane Oxygenation

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Disclosures/Disclaimer

• No disclosures

• The views expressed are those of the authors and do not reflect the official views or policy of the Department of Defense or its Components
Background

• Patients on ECMO are at high risk of nosocomial infection
  • e.g. bloodstream infections, VAPs, UTIs, surgical site infections
• Infections are difficult to identify due to fixed parameters on ECMO circuit
• Temperature and WBC are often used clinically, but their utility in identifying infections is unclear
Methods

• Single center, retrospective study
• Influenza or COVID-19 patients requiring ECMO from December 2014 – December 2020
• Analyzed cultures drawn from patients without clinical decompensation
• Temperature and WBC measured on day of culture collection and 24 hours prior
  • 24-hour data to assess for significant change that may indicate infection
• Statistics: Chi-squared and Mann-Whitney U as appropriate
Results

230 patients received ECMO during study period

45 (20%) patients with COVID-19 or Influenza

137 infectious work-ups (3.04 per patient)

86 (63%) work-ups without decompensation

165 total cultures (1.91 per workup)

Figure 1. Flow chart depicts inclusion criteria with resultant 165 total cultures included in study.
Table 1 – Demographics

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, median (IQR)</td>
<td>44 (36-53)</td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>38 (84%)</td>
</tr>
<tr>
<td>Hours on ECMO, median (IQR)</td>
<td>360 (183-666)</td>
</tr>
<tr>
<td>Diagnosis</td>
<td></td>
</tr>
<tr>
<td>COVID-19, n (%)</td>
<td>25 (56%)</td>
</tr>
<tr>
<td>Influenza, n (%)</td>
<td>20 (44%)</td>
</tr>
<tr>
<td>True Infection, total</td>
<td>10</td>
</tr>
<tr>
<td>Blood Stream Infection, total</td>
<td>6</td>
</tr>
<tr>
<td>Respiratory Infection, total</td>
<td>3</td>
</tr>
<tr>
<td>Urinary Tract Infection, total</td>
<td>1</td>
</tr>
</tbody>
</table>
### Table 2 – Low Culture Positivity Rates

<table>
<thead>
<tr>
<th></th>
<th>True Positive</th>
<th>Contaminants</th>
<th>Total Cultures</th>
<th>True Positive Rate</th>
<th>Contamination Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Cultures</td>
<td>6</td>
<td>3</td>
<td>73</td>
<td>8.2%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Respiratory Cultures</td>
<td>3</td>
<td>6</td>
<td>39</td>
<td>7.7%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Urine Cultures</td>
<td>1</td>
<td>5</td>
<td>53</td>
<td>1.9%</td>
<td>9.4%</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>14</td>
<td>165</td>
<td>6.1%</td>
<td>8.5%</td>
</tr>
</tbody>
</table>
Isolated Organisms

• True positives
  • *P. aeruginosa* (3), *S. epidermidis* (2), *S. aureus* (2), *E. faecalis*, *E. faecium*, *E. coli*

• Contaminants
  • *Candida spp.* (11), *S. epidermidis* (3)
Figure 2 - No Difference in Temperature or WBC in Infectious Versus Non-infectious Etiologies

Figure 2. Maximum values recorded on day of culture workup and 24 hours prior.
Discussion/Conclusion

• Fever and leukocytosis were commonly seen during ECMO course and were frequent prompts for culture workup

• There was no difference in median temperature and WBC between patients with true infection and patients without infections

• More research is needed to help determine factors associated with infections in patients receiving ECMO
Discussion/Conclusion

• Fevers and leukocytosis often prompt empiric antibiotics concerns for resistance

• Increased laboratory and pathology costs associated with frequent cultures
Questions?
References


