Rocuronium Versus Succinylcholine in the Traumatically Injured Brain: A Prospective, Pilot Study

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Background

- In 2014, approximately 2.9 million emergency department (ED) visits in the United States resulted from traumatic brain injury (TBI).1
- Severity of brain injury is typically assessed using the Glasgow Coma Scale (GCS).
- A GCS score of 9-12 is considered moderate and 3-8 considered severe.2
- Patients who present with TBI often require rapid sequence intubation (RSI) to protect their airway.
- Animal models have demonstrated an increase in mortality in patients exposed to rocuronium, which prompted concern in TBI.3
- Recent retrospective data suggests increased mortality in patients exposed to rocuronium compared to succinylcholine.4

Objective

To assess mortality among other outcomes following RSI with rocuronium compared to succinylcholine.

Methods

Design

Prospective, observational cohort

Inclusion Criteria

- Patients enrolled from September 2018 through June 2020
- Presentation to ED with TBI
- Administration of either succinylcholine or rocuronium for RSI
- Age ≥ 18 years of age

Exclusion Criteria

- Pregnancy
- Paralytic agent other than succinylcholine or rocuronium administered
- Surgical airway placed
- Cardiac arrest prior to intubation
- Intubation prior to ED arrival

Results

TABLE 1. Demographics

<table>
<thead>
<tr>
<th></th>
<th>Rocuronium (n=18)</th>
<th>Succinylcholine (n=42)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years), mean</td>
<td>51.1</td>
<td>46</td>
<td>0.35</td>
</tr>
<tr>
<td>Sex (male), n (%)</td>
<td>14 (77.8)</td>
<td>36 (89.7)</td>
<td>0.45</td>
</tr>
<tr>
<td>Body mass index, mean</td>
<td>27.3</td>
<td>27.3</td>
<td>0.78</td>
</tr>
<tr>
<td>Home anticoagulant use, n (%)</td>
<td>2 (11.1)</td>
<td>5 (11.9)</td>
<td>0.93</td>
</tr>
<tr>
<td>Home antiplatelet use, n (%)</td>
<td>3 (16.7)</td>
<td>3 (7.1)</td>
<td>0.35</td>
</tr>
<tr>
<td>Initial GCS score, mean</td>
<td>6</td>
<td>7</td>
<td>0.38</td>
</tr>
<tr>
<td>13-15, n (%)</td>
<td>0 (0)</td>
<td>5 (11.9)</td>
<td></td>
</tr>
<tr>
<td>9-12, n (%)</td>
<td>4 (22.2%)</td>
<td>8 (19.1)</td>
<td>0.42</td>
</tr>
<tr>
<td>3-8, n (%)</td>
<td>14 (77.8)</td>
<td>29 (69.1)</td>
<td></td>
</tr>
<tr>
<td>Seizure prophylaxis, n (%)</td>
<td>15 (83.3)</td>
<td>33 (71.4)</td>
<td>0.33</td>
</tr>
</tbody>
</table>

TABLE 2. Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Rocuronium (n=18)</th>
<th>Succinylcholine (n=42)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-hospital mortality, n (%)</td>
<td>5 (27.8)</td>
<td>14 (33.3)</td>
<td>0.67</td>
</tr>
<tr>
<td>In-hospital survival, n (%)</td>
<td>6 (33.3)</td>
<td>8 (19.1)</td>
<td>0.23</td>
</tr>
<tr>
<td>Discharge home</td>
<td>5 (27.8)</td>
<td>11 (26.2)</td>
<td>0.90</td>
</tr>
<tr>
<td>Transfer to rehab</td>
<td>6 (33.3)</td>
<td>8 (19.1)</td>
<td></td>
</tr>
<tr>
<td>Transfer to long term care</td>
<td>2 (11.1)</td>
<td>9 (21.4)</td>
<td>0.34</td>
</tr>
<tr>
<td>Length of stay, days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In-hospital</td>
<td>9.5 ± 7.8</td>
<td>13 ± 12.5</td>
<td>0.43</td>
</tr>
<tr>
<td>ICU</td>
<td>5.7 ± 6.8</td>
<td>7.4 ± 6.6</td>
<td>0.39</td>
</tr>
</tbody>
</table>

Conclusions

Primary Endpoint

- No difference was observed in the incidence of in-hospital mortality.

Secondary Endpoints

- No difference was observed in in-hospital outcomes or ICU LOS.
- Rocuronium does not confer a mortality benefit based on preliminary results. Patient enrollment is ongoing.

References

4James E. Cottrell.

Disclosures

Authors of this presentation have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this presentation.