ALTEPLASE FOR ACUTE ISCHEMIC STROKE IN THE EMERGENCY DEPARTMENT

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PURPOSE
To determine whether alteplase door-to-needle time (<45 minutes vs ≥45 minutes) influences a patient’s functional status at hospital discharge

BACKGROUND
• Stroke is the fifth most common cause of death and a leading cause of disability in the United States
• Alteplase is an effective treatment for Acute Ischemic Stroke (AIS), however its utility is diminished when there is a delay in administration
• Alteplase is a high-risk medication associated with intracranial hemorrhage
• Administration of alteplase within 4.5 hours has shown to correlate with improvement in in-hospital mortality and functional outcomes at hospital discharge
• With this known benefit, there continues to be a need to identify the ideal administration window for optimization of patient outcomes
• A previous study found a significant association between longer door-to-needle times (specifically >45 minutes) and increased in-hospital mortality and readmission rates
• Currently, the rapid administration of alteplase is the focus of many stroke centers, with a goal of <45 minutes from hospital arrival
• Even though administration of alteplase within 45 minutes has shown mortality benefit in previous studies, it is unknown whether this earlier administration of alteplase is associated with an improvement in quality of life

METHODS
IRB-approved, single center, retrospective, cohort study

• >18 years old
• Received alteplase within 4.5 hours of symptom onset for AIS in the emergency department (ED)
• Pregnancy
• Prisoners
• mRS=2 at baseline
• Patients without documented mRS at discharge

A total of 200 patients who presented to Advocate Christ Medical Center ED between December 2018 – March 2022 were identified. This sample size is based on feasibility.

RESULTS

Primary Endpoint:
• Patient functional status at the time of hospital discharge, measured by mRS

Secondary Endpoints:
• Barriers to early administration of alteplase
• Onset-to-arrival (min), median (IQR)
• Door-to-needle (min), median (IQR)
• Onset-to-needle (min), median (IQR)
• Large vessel occlusion, n(%)
• Thrombectomy, n(%)
• EMS hospital arrival mode, n(%)

Safety Endpoints:
• Any intracranial hemorrhage (ICH)
• Symptomatic ICH
• In-hospital mortality rate
• Alteplase administered for stroke mimic

RESULTS (CONT.)

Demographics

<table>
<thead>
<tr>
<th>Outcome</th>
<th>&lt;45 min</th>
<th>≥45 min</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maltese, n(%)</td>
<td>38 (54.3)</td>
<td>33 (45.2)</td>
<td>0.2776</td>
</tr>
<tr>
<td>Age (years), median [IQR]</td>
<td>66 [59-79]</td>
<td>63 [57-73]</td>
<td>0.2178</td>
</tr>
<tr>
<td>NIHSS, median [IQR]</td>
<td>7 [4-15]</td>
<td>7 [4-13]</td>
<td>0.5587</td>
</tr>
<tr>
<td>VAN positive, n(%)</td>
<td>37 (52.9)</td>
<td>43 (58.9)</td>
<td>0.7660</td>
</tr>
<tr>
<td>Baseline mRS</td>
<td>0, n(%)</td>
<td>54 (77.1)</td>
<td>1, n(%)</td>
</tr>
<tr>
<td>Onset-to-arrival (min), median (IQR)</td>
<td>42 [27-71]</td>
<td>49 [33-95]</td>
<td>0.0864</td>
</tr>
<tr>
<td>Door-to-needle (min), median (IQR)</td>
<td>35.5 [31-41]</td>
<td>63 [53-80]</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Onset-to-needle (min), median (IQR)</td>
<td>79 [63-106]</td>
<td>119 [94-177]</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Large vessel occlusion, n(%)</td>
<td>41 (58.6)</td>
<td>51 (69.9)</td>
<td>0.1588</td>
</tr>
<tr>
<td>Thrombectomy, n(%)</td>
<td>22 (31.4)</td>
<td>13 (17.8)</td>
<td>0.0583</td>
</tr>
<tr>
<td>EMS hospital arrival mode, n(%)</td>
<td>58 (82.9)</td>
<td>54 (74.0)</td>
<td>0.2486</td>
</tr>
</tbody>
</table>

Secondary Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>&lt;45 min</th>
<th>≥45 min</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>mRS at discharge:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2, n(%)</td>
<td>22 (31.4)</td>
<td>48 (68.6)</td>
<td>0.9920</td>
</tr>
<tr>
<td>≥2, n(%)</td>
<td>23 (31.5)</td>
<td>50 (70.8)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome</th>
<th>&lt;45 min</th>
<th>≥45 min</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICH LOS days, median [IQR]</td>
<td>2 [1-3]</td>
<td>2 [1-3]</td>
<td>0.7594</td>
</tr>
<tr>
<td>Hospital LOS days, median [IQR]</td>
<td>4 [3-7]</td>
<td>4 [3-7]</td>
<td>0.3576</td>
</tr>
<tr>
<td>Death in hospital, n(%)</td>
<td>5 (7.1)</td>
<td>4 (5.5)</td>
<td>0.7416</td>
</tr>
<tr>
<td>Readmission for stroke/cardiac-related events within 90 days, n(%)</td>
<td>6 (8.6)</td>
<td>5 (6.9)</td>
<td>0.3720</td>
</tr>
</tbody>
</table>

CONCLUSIONS
• No difference in functional outcome comparing early versus delayed administration of alteplase
• Trend towards increased incidence of symptomatic ICH in early administration group, with statistically significant increase of any ICH
• Obtaining consent and neuroimaging were the biggest contributors for delayed alteplase administration

LIMITATIONS
• Retrospective chart review
• Single center study
• Feasibility study

Future Direction
• Continue data collection

REFERENCES