Use of tPA After Publication of ECASS III in the Get With The Guidelines-Stroke Registry

Steven R. Messé MD, Gregg C. Fonarow MD, Eric E. Smith MD MPH, Lisa Kaltenbach, DaiWai M. Olson PhD RN, Scott E. Kasner MD, and Lee H. Schwamm, MD
Presenter Disclosure Information

Steven Messé, MD
Research Grant; NIH (modest).
Speakers bureau; Boehringer-Ingelheim (modest).

The Get With The Guidelines®–Stroke (GWTG-Stroke) program is provided by the American Heart Association/American Stroke Association. The GWTG-Stroke Program is currently supported in part by a charitable contribution from Ortho-McNeil. GWTG-Stroke has been funded in the past through support from Boeringher-Ingelheim, Merck, Bristol-Myers Squib/Sanofi Pharmaceutical Partnership, and the AHA Pharmaceutical Roundtable.
The NINDS rtPA Stroke Study established that tPA given within 3 hours of acute ischemic stroke (AIS) improves the likelihood of good outcome.
- Only a small percentage of AIS patients receive this medication

In September 2008, ECASS III demonstrated that tPA given within 3 to 4.5 hours of AIS provides a more modest but still clinically meaningful improvement in outcome.
Background

• The American Heart Association subsequently published a Science Advisory in May 2009 recommending treatment of eligible AIS patients up to 4.5 hours from onset of symptoms.

• It remains uncertain what impact the publication of ECASS III has had on the utilization of tPA in clinical practice in the United States.
  – Did tPA use increase?
  – Did door-to-needle times increase?

The American Heart Association Get With The Guidelines Stroke (GWTG-Stroke) registry is a national quality improvement initiative and database that includes data from over 1,000,000 AIS patients treated at ~1,500 hospitals throughout the United States.
Methods
Methods

• We queried the GWTG-Stroke dataset to identify AIS patients eligible for tPA treatment
• Patients with in-hospital stroke and those who received IV tPA at an outside hospital were excluded.
• The primary outcome of interest was the proportion of eligible AIS patients who presented within 3.5 hours and received tPA by 4.5 hours.
Methods

• We compared clinical, demographic, and outcome measures for patients treated in the 3 to 4.5 hour window, dichotomized by pre- or post-ECASS III.

• We also evaluated the impact of ECASS III on patients treated within 3 hours
Results
Results

- We analyzed 600,538 AIS patients admitted to 1,465 hospitals between April, 2003 – April, 2010
  - 389,748 prior to and 210,790 after the print publication of ECASS III on September 25, 2008.
  - 102,961 presented within 3.5 hours and were eligible for tPA prior to ECASS III and 52,861 after
### Among Patients Treated 3 to 4.5 Hours

- The proportion of eligible AIS patients who presented within 3.5 hours and were treated within 4.5 hours increased after ECASS III
  - 18.8% vs. 27.7%, P<0.0001.
- Overall treatment increased in the 3 to 4.5 hour window

<table>
<thead>
<tr>
<th></th>
<th>Before ECASS III</th>
<th>After ECASS III</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of all strokes</td>
<td>0.4%</td>
<td>1%</td>
</tr>
<tr>
<td>Percent of tPA treated strokes</td>
<td>7%</td>
<td>12%</td>
</tr>
</tbody>
</table>
Among Patients Treated 3 to 4.5 Hours

- ECASS III: September, 2008
- AHA Advisory: May, 2009
Among Patients Treated 3 to 4.5 Hours

After ECASS III

- Onset-to-hospital-arrival time was longer
  - $90 \ (60 - 121) \ vs \ 112 \ (75 - 144) \ min, \ P < 0.0001$
- Door-to-needle time was shorter
  - $110 \ (77 - 140) \ vs \ 96 \ (69 - 131), \ P < 0.0001$
- Onset-to-needle time was longer
  - $195 \ (187 - 210) \ vs \ 205 \ (191 - 230), \ P < 0.001$
Among Patients Treated 3 to 4.5 Hours

Door-to-needle time did not vary by onset-to-treatment time

<table>
<thead>
<tr>
<th>Onset-to-treatment time</th>
<th>Door-to-needle time</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 - 3.5 hours</td>
<td>101 (70 - 132)</td>
</tr>
<tr>
<td>3.5 - 4 hours</td>
<td>106 (73 - 146)</td>
</tr>
<tr>
<td>4 - 4.5 hours</td>
<td>105 (75 - 149)</td>
</tr>
</tbody>
</table>
## Among Patients Treated 3 to 4.5 Hours

<table>
<thead>
<tr>
<th></th>
<th>Pre-ECASS III</th>
<th>Post-ECASS III</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=1478</td>
<td>N=1806</td>
<td></td>
</tr>
<tr>
<td>Age*</td>
<td>72 (59 – 81)</td>
<td>70 (58 – 81)</td>
<td>0.36</td>
</tr>
<tr>
<td>Female</td>
<td>50.1 %</td>
<td>49.7 %</td>
<td>0.80</td>
</tr>
<tr>
<td>White</td>
<td>75.0 %</td>
<td>72.1 %</td>
<td>0.07</td>
</tr>
<tr>
<td>HTN</td>
<td>75.8%</td>
<td>79.1%</td>
<td>0.03</td>
</tr>
<tr>
<td>DM</td>
<td>29.3%</td>
<td>26.6%</td>
<td>0.10</td>
</tr>
<tr>
<td>Initial NIHSS*</td>
<td>11 (7 – 17)</td>
<td>10 (6 – 17)</td>
<td>0.005</td>
</tr>
</tbody>
</table>
## Among Patients Treated 3 to 4.5 Hours

<table>
<thead>
<tr>
<th></th>
<th>Pre-ECASS III N=1478</th>
<th>Post-ECASS III N=1806</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptomatic ICH (NINDS)</td>
<td>7.3%</td>
<td>5.4%</td>
<td>0.01</td>
</tr>
<tr>
<td>Length of stay, days*</td>
<td>5 (3 – 9)</td>
<td>5 (3-7)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Discharge Destination</td>
<td></td>
<td></td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Died</td>
<td>11 %</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Hospice</td>
<td>5 %</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Transfer to Acute Care Facility</td>
<td>6 %</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>28 %</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>Skilled Nursing Facility</td>
<td>18 %</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>32 %</td>
<td>37%</td>
<td></td>
</tr>
</tbody>
</table>
Patients Treated Within 3 hours
Patients Treated Within 3 Hours

- The proportion of eligible AIS patients presenting within 2 hours and treated within 3 hours increased after ECASS III
  - 56% vs. 72%, P<0.0001
- Overall treatment increased in the <3 hour window

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</thead>
<tbody>
<tr>
<td>Percent of all strokes</td>
<td>5%</td>
<td>6%</td>
</tr>
<tr>
<td>Percent of tPA treated strokes</td>
<td>92%</td>
<td>87%</td>
</tr>
</tbody>
</table>
Among Patients Treated Within 3 Hours

- After publication of ECASS III
  - Onset-to-hospital-arrival time was unchanged
    - 50 (IQR 35 – 70) vs 51 (IQR 36 – 72)
  - Door-to-needle times decreased
    - 79 (IQR 60 – 100) vs 75 (IQR 58 – 98) minutes
  - Onset-to-needle time was similar
    - 138 (IQR 113 – 160) vs 136 (110 – 160)
TPA Use Over Time
Limitations

- Data were collected by medical chart review
- Residual measured and unmeasured confounding variables may have influenced the findings.
- Hospitals that participate in GWTG-Stroke have an inherent interest in improving stroke care
- The longer term impact of ECASS III remains uncertain
Conclusions
Conclusions

• An increased percentage of eligible patients have received tPA since the publication of ECASS III
  – both in the 3 hour window and, to a greater extent, the 3 to 4.5 hour window

• The increased use and expanded time window has come without negatively impacting patients treated in < 3 hours.
Conclusions

- These results are similar to what was reported by the SITS-ISTR assessment of tPA utilization in Europe
  - tPA use expanded in both time windows after ECASS III

Conclusions

- Overall, treatment rates of eligible patients in the 3 to 4.5 hour time window are still low and additional education efforts should be made to alert clinicians to the potential for treatment in the expanded window.
- Median door-to-needle times are greater than the recommended 60 minutes
Questions?