Drip ‘n Ship vs. Mothership for Endovascular Treatment
Modeling the Best Transportation Outcomes in California and Alberta

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Background

• There is uncertainty about how patients outside of endovascular-capable or Comprehensive Stroke Centers (CSC) access Endovascular treatment (EVT) for acute ischemic stroke.
• The role of the non-endovascular-capable Primary Stroke Centers (PSC) that can offer thrombolysis with alteplase but not EVT is unclear.
• A key question is whether average benefit is greater with early thrombolysis at the closest PSC before transportation to the CSC (Drip ‘n Ship), or with PSC by-pass and direct transport to the CSC (Mothership).
• Ideal transportation options for California, USA and Alberta, Canada were mapped based on the location of their CSCs and PSCs.

Methods

• For those who received both EVT and alteplase, probability models were developed from the ESCAPE trial’s decay curves for good outcome defined as mRS 0-2 at 90 days.
• To determine the benefits of alteplase alone, probability models were extracted from the Get With The Guidelines decay curve.

The Constants Fed into the Model

<table>
<thead>
<tr>
<th>Model</th>
<th>Drip ‘n Ship</th>
<th>Mothership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset to FMR</td>
<td>30 min</td>
<td>30 min</td>
</tr>
<tr>
<td>DNT to PSC</td>
<td>30, 60, 90 minutes</td>
<td>30, 60, 90 minutes</td>
</tr>
<tr>
<td>Time in scene</td>
<td>25 minutes</td>
<td>25 minutes</td>
</tr>
<tr>
<td>Scene to door</td>
<td>Geographic Model</td>
<td>Geographic Model</td>
</tr>
<tr>
<td>Door to needle</td>
<td>30, 60, 90 minutes</td>
<td>30, 60, 90 minutes</td>
</tr>
<tr>
<td>Needle to door out</td>
<td>20</td>
<td>N/A</td>
</tr>
<tr>
<td>CSC to CSC</td>
<td>Geographic Model</td>
<td>N/A</td>
</tr>
<tr>
<td>Door to reperfusion</td>
<td>115 minutes</td>
<td>115 minutes</td>
</tr>
</tbody>
</table>

Results & Conclusions

In the figure:

• Green regions represent a greater probability of good outcome via Mothership.
• Red indicates that Drip ‘n Ship is best.
• Orange indicates that either option yields a similar outcome (+/- 2.5%).
• The color tint increases (becomes brighter) as the probability of good outcome decreases.
• Grey indicates areas with sparse infrastructure.

Conclusions: The role of a PSC in close proximity to a CSC remains significant only when the PSC is able to achieve both a DNT of 30 minutes or less and a needle-to-door out time of 20 minutes.

Legend:
DTN=Door-to-Needle; PSC=Primary Stroke Centre; FMR= First Medical Contact

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