Late Results of ICSS Do Not Show Equivalence of CAS & CEA
CEA Still Wins For Symptomatic Carotid Stenosis.

A/Prof Anne L. Abbott
Neurologist
School of Public Health & Preventive Medicine
Monash University, & The Alfred Hospital,
Melbourne, Australia

Disclosures
My academic work has been funded only by independent grants & family subsidies
This presentation is proudly supported by the Bupa Health Foundation

Stenting is an Alternative to CEA

But NOT an Equivalent or Similar Alternative

Three Methods…Bonati et al, Lancet, 2014

Give the impression that long-term procedural outcomes for SCS are similar/equivalent using results from the ICSS…

‘Long-term’, any stroke was 1.7 x more common with CAS ($p<0.001$).
But the prevalence of worst strokes was similar…’ (mRS $\geq 3$, ‘disabling strokes’)

1. COVER UP
The Modified Rankin Score (mRS, Wikipedia)

0. No symptoms
1. Able to carry out all usual activities despite some symptoms
2. Able to look after own affairs without assistance but unable to carry out all previous activities

*All strokes are disabling!

The Most Severe & Fatal Strokes
Just the Tip of the Iceberg of Brain Damage!

<table>
<thead>
<tr>
<th>n</th>
<th>%</th>
<th>Excess</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS</td>
<td>52</td>
<td>6.1</td>
</tr>
<tr>
<td>NP</td>
<td>1.7#</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;3 mRS Strokes</td>
<td>119</td>
</tr>
<tr>
<td>&gt;1 mRS (All) Strokes</td>
<td>427*</td>
</tr>
<tr>
<td>&gt;1 New DWI Lesion(s)</td>
<td>50</td>
</tr>
</tbody>
</table>

NP= Not Powered to show lack of a clinically significant difference (HR 1.06, 95% CI 0.72-1.57)
* Scaled up from a sub-group, Bonati et al, 2010
# Statistically significant excess CAS risk, Bonati et al, 2010, 2015

2. SMOKE SCREEN

‘By 1 year & 5 yrs about equal CEA & CAS patients had any disability.’

ICSS: All-Cause Disability at 1 & 5 years after CAS & CEA (mRS)

ICSS: All-Cause Disability at 1 & 5 Yrs (mRS ≥1)

<table>
<thead>
<tr>
<th></th>
<th>New Stroke Disability &lt;120 days*</th>
<th>Any Disability 1 Year</th>
<th>Any Disability 5 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS, n=853</td>
<td>P = 0.002</td>
<td>P = 0.70</td>
<td>P = 0.98</td>
</tr>
<tr>
<td>7.6%</td>
<td>= 60%</td>
<td>= 70%</td>
<td></td>
</tr>
<tr>
<td>CEA, n=857</td>
<td>4.1%</td>
<td>60%</td>
<td>70%</td>
</tr>
</tbody>
</table>

* 1.9 X more likely to have a CAS caused stroke, P=0.002 (Brown et al, 2010 + Bonati et al, 2015)

3. ERROR

‘CAS-caused stroke is compensated by CEA-caused clinical heart attack.’
30-Day Procedural Risks: CEA vs CAS

<table>
<thead>
<tr>
<th>Study</th>
<th>n</th>
<th>30-Day Stroke</th>
<th>30-Day c.MI</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEA</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CREST: 30-day stroke 1.8 times > with CAS, 
& 30-day MI was 2 times > with CEA
Inclusion of MI achieved "statistical equipoise"!

BUT 4.5 times more likely to have a 30-day stroke than 30-day MI (250/56, P < 0.001)
CAS causes more 30-day stroke/MI death than CEA, Bonati et al 2010. Impacts long-term

Late Results of ICSS Do Not Show Equivalence of CAS & CEA...

* All strokes are disabling & matter (CAS ≈2X risk in ICSS + others)
* Late all-cause disability & heart attacks do not compensate for CAS-caused strokes.

CEA Wins for SCS BUT Evidence of Benefit over Medical Treatment Alone is Limited & 21-34 years old!

Acknowledgements

The Modified Rankin Scale (mRS)

0. No symptoms
1. Able to carry out all usual activities despite some symptoms
2. Able to look after own affairs without assistance but unable to carry out all previous activities
3. Requires some help, but able to walk unassisted
4. Unable to attend to own bodily needs without assistance, & unable to walk unassisted
5. Requires constant nursing care & attention, bedridden, incontinent
6. Dead

Measuring disability/dependence in daily activities (Wikipedia)

All Strokes Are Disabling!

ICSS Stroke Definition was Clinical:
signs of cerebral dysfunction

>24hrs

Brown et al, 2010