Late Results (Up to 13 Years) Shows that CEA Treated Patients Have a Lower Risk of Late Adverse Events for Death than CAS Patients: Are There Confounders

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No Disclosures

• Recent RCTs suggest CAS is non-inferior to CEA
• Controversy exists around the external validity of these trials, as they may be limited by operator and institutional selection bias
• Paucity of high-quality, long-term data on the outcomes of CEA vs CAS in the real-world setting

Background

Objective

• To compare long-term (up to 13-yr) outcomes of patients treated with CEA and CAS, in the context of increased uptake of CAS in Ontario since 2005

Study Design

• Retrospective, population-based cohort study (2002-2015)
• Linked Ontario health administrative databases
  • Population, 13.5 million
  • Single-payer health system
  • Validated for CEA/CAS and stroke/MI coding
• Propensity Score Matched Analysis
  • 1 CAS : 2 CEA based on > 50 covariates

Results

Overall Cohort
15,525 Patients
13,410 CEA
2,115 CAS

Matched Cohort
6,282 Patients
4,172 CEA
2,110 CAS
Matched Cohort Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>CEA (N = 4,172)</th>
<th>CAS (N = 2,110)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>70±10</td>
<td>70±11</td>
</tr>
<tr>
<td>Female</td>
<td>33%</td>
<td>34%</td>
</tr>
<tr>
<td>Symptomatic Carotid</td>
<td>54%</td>
<td>53%</td>
</tr>
<tr>
<td>Comorbidity Score ≥ 2</td>
<td>38%</td>
<td>39%</td>
</tr>
<tr>
<td>CAD</td>
<td>27%</td>
<td>27%</td>
</tr>
<tr>
<td>CHF</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>COPD</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Prior CEA</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Urgent Admission</td>
<td>45%</td>
<td>46%</td>
</tr>
</tbody>
</table>

13-Yr Stroke + 30-D MI or Death

Outcome | CEA (N = 4,172) | CAS (N = 2,110) | Matched HR (95% CI) |
---------|-----------------|-----------------|---------------------|
13-Yr Stroke | 9.4%            | 13.1%           | 1.50 (1.21-1.86)     |
Stroke ≤ 30 Days | 3.8%            | 5.8%            | 1.54 (1.17-2.04)     |
Stroke > Day 30 | 5.9%            | 7.8%            | 1.44 (1.18-1.74)     |
13-Yr Death | 29%             | 36%             | 1.38 (1.28-1.50)     |
Death ≤ 30 Days | 1.1%            | 3.3%            | 3.07 (2.29-4.11)     |
Death > Day 30 | 28%             | 34%             | 1.31 (1.21-1.42)     |

Limitations

- Potential uncontrolled confounders
- Carotid lesion characteristics
- Hostile neck?
- Lifestyle factors (e.g., smoking status)
- Medication use
- No information on type of stroke or MI
Summary

- CAS is associated with **early and sustained 30-50%** higher risks of long-term stroke & death
- Differences driven by increased risks of stroke and death within 30 days and after 30 days with CAS
- Observed regardless of age, sex, carotid artery symptoms, year of procedure or diabetic history

Study Implications

- Raises concerns about the generalizability of recent CEA vs CAS RCTs to actual clinical practice
- Further work has identified stroke/death rates are lowest if CEA is performed by vascular surgeons, and continuous statin use after CEA and CAS reduces late cardiovascular events by 25%

Hussain et al. J Am HeartAssoc. 2018;7:e009745