Meta-Analyses Tell The True Story:
Both CEA and CAS Have Greater Risks In Patients
With A Contralateral ICA Occlusion

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Disclosure(s):
• None

A little relevant background…
• Impact of CCO on outcomes following CEA and CAS is controversial
• Occurs in ~10% of patients with carotid stenosis
• Overall greater disease burden “different disease”
• CMS: CCO = high risk = coverage

The Clinical Question that piqued our interest…
• Neurologist stated: “Stenting is safer in the setting of CCO”
• We responded: “Is it?”
• 2 questions:
  – What is the influence of CCO?
  – Can the impact of CCO be mitigated by procedure choice?

Contralateral Carotid Occlusion: Increased Risk of Stroke After CEA and CAS?
• Hypotheses regarding possible increased risk:
  – Intolerance to clamping due to reduced collateralization
  – High risk for hyper-perfusion syndrome and possibly cerebral hemorrhage
  – Overall greater disease burden “different disease”
• CMS: CCO = high risk = coverage

NASCET: Long-term prognosis and effect of endarterectomy in patients with symptomatic severe carotid stenosis and contralateral carotid stenosis or occlusion: results from NASCET

Gasecki AP. J Neurosurg 1995

<table>
<thead>
<tr>
<th></th>
<th>CCO</th>
<th>no CCO</th>
<th>CEA</th>
<th>Medical Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-DAY STROKE/DEATH</td>
<td>14.3%</td>
<td>5.1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2 YEAR STROKE RISK</td>
<td>20.4%</td>
<td>56.4%</td>
<td>68%</td>
<td>78%</td>
</tr>
</tbody>
</table>

*subset analysis
The influence of contralateral occlusion on results of carotid interventions from the SVS Registry

- Objective: Determine the influence of CCO on outcomes following CEA and CAS
- Primary Outcome:
  - Peri-procedural death, stroke, MI ("MACE")
- Cohort: SVS Vascular Registry
  - CCO: "high risk" drove CAS selection
  - No CCO:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>All patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-hospital adverse event</td>
<td>CCO (n = 1798), % (N)</td>
</tr>
<tr>
<td>Death, stroke, or MI</td>
<td>1.1 (19)</td>
</tr>
<tr>
<td>Mortality</td>
<td>1.1 (12)</td>
</tr>
<tr>
<td>Stroke</td>
<td>3.1 (41)</td>
</tr>
<tr>
<td>MI</td>
<td>0.3 (4)</td>
</tr>
</tbody>
</table>

In CEA patients, higher rate of stroke in patients with CCO compared to no CCO.

BUT NOW WE HAVE CAS...does that matter?

In CAS patients, no difference in outcomes.
CAS patients

<table>
<thead>
<tr>
<th>Procedure</th>
<th>CGO (n = 3128)</th>
<th>NIO-CGO (n = 5098)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death, stroke, or MI</td>
<td>2.7 (31)</td>
<td>3.2 (180)</td>
<td>.3167</td>
</tr>
<tr>
<td>Mortality</td>
<td>1.1 (12)</td>
<td>0.8 (453)</td>
<td>.2692</td>
</tr>
<tr>
<td>Stroke</td>
<td>2.1 (24)</td>
<td>2.2 (131)</td>
<td>.8244</td>
</tr>
<tr>
<td>MI</td>
<td>9.4 (4)</td>
<td>6.7 (353)</td>
<td>.2012</td>
</tr>
</tbody>
</table>

But...No difference in stroke rate with CAS in pts w CCO vs no CCO

Head to head comparison of stroke following CAS vs CEA equivocal:
p = 0.0502

Meta Analysis

LITERATURE REVIEW

Carotid Artery Endarterectomy Versus Carotid Artery Stenting for Patients with Carotid Stenosis: A Systematic Review and Meta-Analysis

Periprocedural Outcomes (within 30 Days)

There were no differences in:
- stroke (OR, 1.08; 95% CI, 0.72 - 1.61; P 7.1%)
- MI rates (OR, 1.39; 95% CI, 0.73 - 2.63; I² 0%) between the two groups

There was no significant difference in MACE (OR, 1.02; 95% CI, 0.43 - 2.19; I² 24%)

Patients in the CEA group had a significantly lower risk of 30-day mortality (OR, 0.46; 95% CI, 0.30 - 0.71; I² 0%)
Asymptomatic vs. Symptomatic pts

- Asymptomatic:
  - No significant difference between the two groups in:
    - stroke (OR, 1.39; 95% CI, 0.69 - 2.45; I², 0%)
    - MI (OR, 0.72; 95% CI, 0.32 - 1.60; I², 0%)
    - death (OR, 0.79; 95% CI, 0.36 - 1.78; I², 0%)

Symptomatic:
- No significant differences between the two groups in:
  - stroke (OR, 0.68; 95% CI, 0.20 - 2.29; I² 15.2%)
  - death (OR, 0.50; 95% CI, 0.04 - 6.60; I² 56.5%),
  - and MI rates (OR, 5.44; 95% CI, 0.86 - 34.46; I² 0%)


- Published 524
- Cochrane 68
- Embase 535
- Used a random effects model.
- Did not separate out CAS due to limited data
- No non-occluded control 18
- Duplicate data 8
- Abstract not on target 127
- Not available 2
- Insufficient data to extract 20
- Studies included 48

Summary

- Patients with CCO can safely undergo both CAS and CEA with similar risks of stroke, MI, and MACE
- CCO was a marker for overall worse condition
- Adverse events after either procedure seem to be within clinically acceptable standards
Summary

- CEA have a lower risk of 30-day periprocedural mortality
- Future studies can help further clarify the ideal approach for these patients.

Thank you