Is Redo CEA More Risky For Stroke & Cranial Nerve Injury Than Primary CEA in Asymptomatic Patients? Should This Influence the Choice Of Treatment Medical Alone Or CAS?

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Presenter Disclosure Information

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Principal Investigator at Johns Hopkins:
1. CREST
2. ACT I
3. CAPTURE II
4. CHOICE
5. FREEDOM
6. ROADSTER
7. SAPHIRE W
8. ROADSTER II
9. CREST II
10. CREST Companion Study
11. ROADSTER Long-Term Follow up Study

Recipient of the Society of Vascular Surgery Seed Grant “VasoVasorum Volume and Stroke Prediction”

Disclosure Carotid

Proctor to train surgeons on how to perform safe TCAR (Silk Road Medical)

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Carotid Artery Revascularization

• ~ 140,000 carotid revascularizations yearly in the US
• Annual US costs for CEA ~ $21 Billion

Restenosis after CEA

• Rates of restenosis after CEA range from 6 to 22% in observational studies.
  • CREST restenosis rate:
    ➢ 6.3% at 2 years
    ➢ 12.2% (CAS) vs. 9.7% (CEA) at 10 years
    (Hazard ratio: 1.24; 95% CI: 0.91 to 1.70)
Pathophysiology

- First postoperative Duplex: Technical
- Up to one year after normal initial study: Intimal Hyperplasia
- Beyond 1-2 years is associated with atherosclerosis

Stroke

Outcomes of Primary and Secondary Carotid Artery Stenting

- CASAPICEA associated with lower 30-day Stroke/Death (OR 0.60, CI: 0.37-0.96, p=0.04) vs Primary CAS in symptomatic patients.
- Odds of tachycardia lower after CASAPICEA (OR 0.32, CI: 0.26-0.39, p=0.001) and redo-CAS (OR 0.55, CI: 0.39-0.78, p=0.001) vs Primary CAS.
- Odds of Hypotension lower after CASAPICEA (OR 0.41, CI: 0.35-0.48, p=0.001) and redo-CAS (OR 0.66, CI: 0.50-0.86, p=0.003) vs Primary CAS.
- No difference in stroke/death at 1-year.

Redo vs. Primary CEA

Redo Carotid Endarterectomy Versus Primary Carotid Endarterectomy

Ali F. AbuRahma, MD; Tucker G. Jennings, MD; John T. White, MD; Lisa Tarakji, Patrick A. Robinson, MD

547 primary CEA procedures, 124 redo CEA.
30-day Stroke: 4.4% vs. 0.8%, P=0.015
Cranial Nerve Injury: 11% vs. 5.3%, P<0.001 (Mostly transient)
Similar rates of stroke-free survival and freedom from 50% recurrent stenosis at 1, 3, and 5 years

Redo vs. Primary CEA

Managing Recurrent Carotid Artery Disease with Redo Carotid Endarterectomy: A 10-year Retrospective Case Series

1324 consecutive CEA procedures (192 redo CEA, 26 redo redo CEA)
30-day Stroke: 2.2% vs. 0.6%, P=NS
No death
Cranial Nerve Injury: 4.4% vs. 13% (Mostly transient)

All CEA in VQI between 2003 and 2016
Primary vs. Redo-CEA

30-day Outcomes

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Primary (n = 67,749)</th>
<th>Redo (n = 13,669)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cranial nerve injury, %</td>
<td>14.9</td>
<td>14.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>History of CVA, %</td>
<td>13.0</td>
<td>10.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>History of COPD, %</td>
<td>14.8</td>
<td>28.3</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Diabetic dependence, %</td>
<td>1.0</td>
<td>1.0</td>
<td>0.75</td>
</tr>
<tr>
<td>Preoperative @ Warren use, %</td>
<td>63.0</td>
<td>63.0</td>
<td>0.0003</td>
</tr>
<tr>
<td>Preoperative stroke use, %</td>
<td>77.6</td>
<td>82.6</td>
<td>0.01</td>
</tr>
<tr>
<td>Preoperative aspirin or P2Y12 inhibitor use, %</td>
<td>88.1</td>
<td>90.2</td>
<td>0.0003</td>
</tr>
<tr>
<td>ASA class, %</td>
<td>I 0.7</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>II 6.4</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III 76.2</td>
<td>70.6</td>
<td>&lt;0.001</td>
<td></td>
</tr>
<tr>
<td>IV 19.5</td>
<td>23.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V 9.5</td>
<td>8.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General anesthesia, %</td>
<td>91.0</td>
<td>90.1</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Cranial Nerve Injury

- Primary CEA: 3.8%
- Redo-CEA: 4.4% (P=0.24)

*The transient or permanent nature of these injuries is not ascertained due to insufficient data
11/14/2018

Risks Associated With Primary and Redo Carotid Endarterectomy in the Endovascular Era

Christopher J. Albers, MD; Michael S. Rhee, MD; Kim Y. Jang, MD; Subhash C. Jain, MD; Muhammad R. Kass, MD; Evan S. Kass, MD; Christopher J. Albers, MD; Muhammad R. Kass, MD; Evan S. Kass, MD

• 2863 patients met inclusion criteria, CEA: 1047 (37%), CAS: 1816 (63%)
• Higher 30-day and 1 year mortality (aOR: 2.83, 95% CI: 1.13-7.14, p=0.03) with redo-CEA compared with CAS after prior ipsilateral CEA
• Similar stroke (aOR, 0.54, 95% CI: 0.20-1.45, p = 0.22) and MI (aOR: 0.98, 95% CI: 0.31-3.10, p=0.97).

CAS has been popularized as an alternative to CEA in high risk patients

The use of an FDA-approved or cleared embolic protection device is required. If deployment of the embolic protection device is not technically possible, and not performed, then the procedure is not covered by Medicare.

Patients at high risk for CEA are defined as having significant comorbidities and/or anatomic risk factors (e.g., across stents or prior surgical endarterectomy) and would be poor candidates for CEA. Significant comorbid conditions include but are not limited to:
• Congestive heart failure (ChF) class III/IV
• Left ventricular ejection fraction (LVEF) <30%
• Unstable angina
• Uncontrolled cardiac arrhythmia
• Advanced cerebrovascular disease
• Prior CEA with recurrent stenosis
• Prior stroke/TIA or multiple TIAs
• Other conditions that were used to determine patients at high risk for CEA in the prior surgical series studied. These conditions, such as MSAH, CARNESI, EFUS, M1 TIA, and NIVOSC E.

Take Home Points

• In patients with prior ipsilateral CEA, redo-CEA is associated with more adverse outcomes, especially in asymptomatic patients.
• CAS is a safer option in patients who requires revascularization.
• BUT, we need more studies comparing best medical management vs. revascularization in patients with Ax restenosis.

Thank you!