When better NOT to treat Asymptomatic Carotid Stenosis?

M. Storck, MD, PhD
Director
Dept. Vascular and Thoracic Surgery
Klinikum Karlsruhe
Academic Teaching Hospital
University Freiburg, Germany
When better not to treat
Asymptomatic Stenosis

m, 64 ys., asymptomatic

bilateral ACI stenosis 80% (Duplex-Scan)

history of oropharynx carcinoma, surgery

radiochemotherapy

tumor cachexia

PEG –feeding

nicotine abuse

short life expectancy
Temporal trends in CAS and CEA – Symptomatic vs. Asymptomatic

Hussain M et al. Stroke 2016;47:2923-2390
Clinical problems outside guidelines or RCT’s

„Hostile neck“

„Difficult access“
When not to treat?
If the complication rate is too high.....
(AHA limit of 3% too high?)

Postinterventional stroke following treatment of asymptomatic stenosis
In-Hospital Stroke Rates in Asymptomatic Patients: German National Registry 2003-2014 (52% asympt.)

Cochrane-Armitage-Trend test, p<0.0001

Patient characteristics and outcomes of carotid endarterectomy and carotid artery stenting: analysis of the German mandatory national quality assurance registry - 2003 to 2014

M. A. Kallmayer 1, P. Tsantilas 1, C. Knappich 1, B. Haller 2, M. Storck 2, T. Stadlbauer 1, A. Kühnl 1, A. Zimmermann 1, H.-H. Eckstein 1

### Table I.—Patient demographics by indication groups differentiated for carotid endarterectomy (CEA) and carotid artery stenting (CAS).

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<tbody>
<tr>
<td><strong>CEA</strong></td>
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<tr>
<td>No. of procedures</td>
<td>19,355</td>
<td>23,502</td>
<td>25,629</td>
<td>25,570</td>
<td>26,087</td>
<td>26,961</td>
<td>27,546</td>
<td>27,170</td>
<td>27,484</td>
<td>26,958</td>
<td>26,341</td>
<td>26,802</td>
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<tr>
<td>Male sex (%)</td>
<td>68.3</td>
<td>68.0</td>
<td>68.0</td>
<td>68.0</td>
<td>68.2</td>
<td>68.0</td>
<td>68.0</td>
<td>67.9</td>
<td>67.6</td>
<td>68.3</td>
<td>68.4</td>
<td>67.6</td>
<td>→ 0.078</td>
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<tr>
<td>Mean age (years)</td>
<td>68.9</td>
<td>69.5</td>
<td>69.7</td>
<td>69.8</td>
<td>70.2</td>
<td>70.4</td>
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<td>-</td>
<td>70.6</td>
<td>70.7</td>
<td>70.9</td>
<td>↑ &lt;0.001</td>
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**Indication group**

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<tbody>
<tr>
<td>Asymptomatic pts. (group A, %)</td>
<td>50.7</td>
<td>51.9</td>
<td>53.1</td>
<td>51.5</td>
<td>52.9</td>
<td>52.7</td>
<td>52.8</td>
<td>52.7</td>
<td>53.1</td>
<td>53.1</td>
<td>54.9</td>
<td>57.4</td>
<td>↑ &lt;0.001</td>
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<tr>
<td>Symptomatic pts elective (group B, %)</td>
<td>35.0</td>
<td>34.4</td>
<td>33.1</td>
<td>35.3</td>
<td>33.9</td>
<td>34.6</td>
<td>34.9</td>
<td>35.2</td>
<td>35.0</td>
<td>35.4</td>
<td>34.7</td>
<td>33.1</td>
<td>→ 0.887</td>
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<tr>
<td>Special indications for CEA (group C, %)</td>
<td>12.7</td>
<td>13.8</td>
<td>13.8</td>
<td>13.2</td>
<td>13.2</td>
<td>12.7</td>
<td>12.3</td>
<td>12.1</td>
<td>11.9</td>
<td>11.5</td>
<td>10.2</td>
<td>9.5</td>
<td>↓ &lt;0.001</td>
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<td><strong>CAS</strong></td>
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<td>No. of procedures</td>
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<td>-</td>
<td>6.176</td>
<td>5.817</td>
<td>6.054</td>
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<td>Male sex (%)</td>
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<td>-</td>
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<td>69.3</td>
<td>69.3</td>
<td>69.2</td>
<td>→ 0.391</td>
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<tr>
<td>Mean age (years)</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>68.9</td>
<td>69.2</td>
<td>69.3</td>
<td>↑ &lt;0.001</td>
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**Indication group**

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<tbody>
<tr>
<td>Asymptomatic pts. (group A, %)</td>
<td>-</td>
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<td>-</td>
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<td>-</td>
<td>41.7</td>
<td>52.8</td>
<td>53.3</td>
<td>↑ &lt;0.001</td>
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<tr>
<td>Symptomatic pts elective (group B, %)</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>25.2</td>
<td>26.5</td>
<td>27.0</td>
<td>↑ 0.025</td>
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<tr>
<td>Special indications for CEA (group C, %)</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>33.0</td>
<td>20.0</td>
<td>19.4</td>
<td>↓ &lt;0.001</td>
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</tbody>
</table>

P: P-value of the Cochran-Armitage test for trend. ↓ = decreasing trend, ↑ = increasing trend, → = no significant trend
## Characteristics of trials

<table>
<thead>
<tr>
<th>Characteristics of trials</th>
<th>SAPHIRE</th>
<th>CAVATAS</th>
<th>CREST</th>
<th>Brooks (Lexington II)</th>
<th>ACT-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total randomized</td>
<td>334</td>
<td>505</td>
<td>2502</td>
<td>189</td>
<td>1453</td>
</tr>
<tr>
<td>Lost to follow-up</td>
<td>14,4%</td>
<td>k.A.</td>
<td>2,6%</td>
<td>9%</td>
<td>k.A.</td>
</tr>
<tr>
<td>Embolic protection device</td>
<td>95,6%</td>
<td>0,0%</td>
<td>96,1%</td>
<td>0,0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Follow-up (median, years)

- CAS overall: 3,0
- CEA overall: 5,0
- 4-years FU: 8,5%
- 10,3%

### Study endpoints of asymptomatic study participants

<table>
<thead>
<tr>
<th>CAS</th>
<th>CEA</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any stroke incl. periprocedural period</td>
<td>6,1%</td>
<td>0,41</td>
</tr>
<tr>
<td>Any stroke excl. periprocedural period</td>
<td>3,8%*</td>
<td>0,92</td>
</tr>
<tr>
<td>Any stroke after 48 months incl. periprocedural period</td>
<td>0,9%</td>
<td>4,1%</td>
</tr>
<tr>
<td>Ipsilateral stroke and lethal and non-lethal myocardial infarction incl. periprocedural period</td>
<td>0,9%</td>
<td>4,1%</td>
</tr>
<tr>
<td>Primary combined endpoint (death, any stroke or myocardial infarction within 30 days or ipsilateral stroke after 1 year)</td>
<td>3,8%</td>
<td>3,4%</td>
</tr>
<tr>
<td>Periprocedural death or major stroke</td>
<td>0,6%</td>
<td>0,6%</td>
</tr>
<tr>
<td>Periprocedural minor stroke</td>
<td>2,4%</td>
<td>1,1%</td>
</tr>
</tbody>
</table>
When better not to treat?
If the indication is wrong....

Figure 1. The proportional effectiveness of carotid provision divided into three levels for each country. 1. (Highly effective): >50% stenosis symptomatic men, >50% stenosis symptomatic female ≥75 years old. 2. (Moderately effective): ≥50% stenosis in asymptomatic men, ≥50% stenosis in symptomatic female <75 years old, <75 asymptomatic female with ≥50% stenosis. 3. (Not effective): <50% stenosis, asymptomatic stenosis in female ≥75 years. D.m. = data missing.
When better not to treat?
If the patient is too old for CAS...

Age dependent complications rates in CAS (but not CEA)

4 RCT’s

Carotid Stenting Trialist’s Collaboration.
The Lancet 2016; 387:1305-311
Age Distribution
German National Registry 2003 - 2014
n=327 452

CEA : n= 309 405
CAS : n= 18 047
Carotid stenting dialysis patients – does it make sense?

Fig 2. All-cause mortality after carotid artery stenting (CAS) comparing symptomatic and asymptomatic patients.

When better not to treat: Unilateral carotid stenosis simultaneous with cardiac bypass surgery

Stroke rate 8.9% in asymptomatic stenosis!
Who decides which treatment?

- Interventionalist
- Vascular Surgeon
- Neurologist
ESVS Guidelines 2017

Recent (<6 months) symptoms of stroke/TIA:

No

- Imaging of carotid artery disease by Duplex ultrasound, CTA and/or MRA
  - Carotid stenosis 60-99%
  - Carotid stenosis <60%

  Life expectancy >5 yrs? Favourable anatomy? No feature suggesting higher stroke risk on BMT?
  - No
    - CEA + BMT should be considered (Class IIa B)
  - Yes
    - CEA + BMT may be considered (Class IIb B)

Yes

- Imaging of carotid artery disease by Duplex ultrasound, CTA and/or MRA
  - Occlusion or near occlusion
    - Yes
      - CEA + BMT is recommended (Class I A)
    - No
      - CAS + BMT should be considered if high-risk for CEA (Class IIa B)

Does the Internet help to decide?

Take my pills, the risk of stroke is only 1%, per year, this cannot be topped!

Choose surgery, the risk is below 1.5%, it is easy and evidence based!

Stenting is super, a stented vessel is better than a stenosed vessel, it is minimal invasive, you can go home immediately!
Thank you for your attention!
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