Carotid Angioplasty- current experience of a brazilian single center

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Disclosures

Speaker name: Ana Carolina Silveira

I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s): LINC sponsored by Cordis Johnson & Johnson / Cardinal Health

- I do not have any potential conflict of interest
Dante Pazzanese Institute

- Public hospital
- Carotid angioplasty since 1996
- 100-120 carotid procedures/y
- Requirement of minimum of 5 years of specialization in vascular/endovascular surgery
- Endarterectomy x carotid angioplasty – gold standard?
- Carotid duplex ultrasound + Arteriography
Retrospective study

- 203 patients → from 10/2014 until 06/2017
- 47-86 years, mean 67.3 y
- 73.4% men
- 93.6% hypertensive
- 45.3% diabetic
- 84.2% dyslipidemic
- 53.2% beta blockers
- 61.1% former smokers, 12.3% smokers
- 11.3% creatinine > 1.5 mg/dl
- 5% arrhythmia, 1% pacemaker
- 47.8% coronary disease
- 2.5% actinic
Retrospective study

- 149 asymptomatic, 54 symptomatic (mean - 37.3 days)

- Arteriographic findings:
  - 56.3% arch type I
  - 34.4% arch type II
  - 9.3% arch type III
  - 32.3% bovine trunk
  - 5.7% vertebral stenosis > 60%
  - 14.9% vertebral total occlusion
Goal 1- peri-operative ischemic events

Periprocedural rate(< 30 days)

0.5% major stroke → 0.5% death – 1/203
2% minor stroke – 4/203
3.5% transient ischemic attack – 7/203

94 % “stroke -free” patients discharged home day after angioplasty

Brott, T.G., et al. CREST investigators. Stenting versus Endarterectomy for Treatment of Carotid- Artery Stenosis. N Engl J Med, 2010. vol. 363. p.11-23 ( major stroke 0.9 ±0.3%, minor stroke 2.9 ±0.5%)


Goal 2- factors associated with increased periprocedural ischemic events

- Age - Elderly patients are more likely to have peri-operative ischemic events ($p = 0.051$, Mann-Whitney Test )

Khan, M. Qureshi, A. Factors Associated with Increased Rates of Post-procedural Stroke or Death following Carotid Artery Stent Placement: a Systematic Review. J Vasc Interv Neurol, 2014. p.11-20. (age > 80 y, symptoms, arch type III $\rightarrow$ higher 30-day stroke rates)
Goal 2- factors associated with increased periprocedural ischemic events

- Aortic arch - no statistical significance – p=0.621

Khan, M. Qureshi, A. Factors Associated with Increased Rates of Post-procedural Stroke or Death following Carotid Artery Stent Placement: a Systematic Review. J Vasc Interv Neurol, 2014. p.11-20. (age > 80 y, symptoms, arch type III → higher 30-day stroke rates)
Goal 2- factors associated with increased periprocedural ischemic events

- Aortic arch – bovine trunk or arch type III X arch type I or II- no statistical significance – \( p=0.157 \)

Khan, M. Qureshi, A. Factors Associated with Increased Rates of Post-procedural Stroke or Death following Carotid Artery Stent Placement: a Systematic Review. J Vasc Interv Neurol, 2014. p.11-20. (age > 80 y, symptoms, arch type III → higher 30-day stroke rates)
Goal 2- factors associated with increased periprocedural ischemic events

- Pre-operative symptoms - no statistical significance – $p=0.087$

Khan, M. Qureshi, A. Factors Associated with Increased Rates of Post-procedural Stroke or Death following Carotid Artery Stent Placement: a Systematic Review. J Vasc Interv Neurol, 2014. p.11-20. (age > 80 y, symptoms, arch type III $\rightarrow$ higher 30-day stroke rates)
Goal 2- factors associated with increased periprocedural ischemic events

- Contralateral total carotid occlusion - no statistical significance – $p=0.416$

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Goal 2- factors associated with increased periprocedural ischemic events

- Vertebral stenosis or total occlusion - no statistical significance – p=0.09

Goal 3- open cell x closed cell stent

Type of stent

- 76.2% open cell stent (Precise®)
- 18.8% closed cell stent (Wallstent® / X act®)
- 2.5% hybrid (Crystallo®)
- 2.5% expandable-balloon stent (common carotid artery/ ostial lesions)

Pre-dilatation

- 27.6% patients

Post- dilatation

- 98% patients
Goal 3- open cell x closed cell stent

Embolic Protection device
- 22.7% occlusion system (Moma®)
- 72.9% filter system (36.5% Angioguard®, 18.2% Emboshield®)

Compare
1- Periprocedural ischemic events - open x closed cell stent
2- Use of atropine/ dopamine – open x closed cell stent
Goal 3- open cell x closed cell stent

- Ischemic events- Major stroke (1), Minor stroke + transient ischemic attack (2) - no statistical significance – p=0.081


Goal 3- open cell x closed cell stent

- Ischemic events- Any stroke or transient ischemic attack - no statistical significance – $p=0.065$


Goal 3- open cell x closed cell stent

- Use of atropine – no statistical significance – \( p=0.101 \)


Goal 3- open cell x closed cell stent

- Use of dopamine – no statistical significance – $p=0.552$


Limitations - Bias

- retrospective study - small sample, heterogeneous groups
- public hospital - licitation
- learning curve x “teaching hospital”

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<thead>
<tr>
<th></th>
<th>Open cell</th>
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</thead>
<tbody>
<tr>
<td>Symptomatic patients</td>
<td>41/154 (26.6%)</td>
<td>11/38 (28.9%)</td>
<td>0.839</td>
</tr>
<tr>
<td>Contralateral Total Carotid Occlusion</td>
<td>25/144 (17.4%)</td>
<td>9/38 (23.7%)</td>
<td>0.36</td>
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<tr>
<td>Age (mean ± SD )</td>
<td>67.14 ± 8.05</td>
<td>68.08 ± 6.59</td>
<td>0.266</td>
</tr>
<tr>
<td>Gender</td>
<td>112/154 (72.7%)</td>
<td>30/38 (78.9%)</td>
<td>0.538</td>
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</tbody>
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Limitations - Bias

- ischemic events – CT, MRI, transcranial doppler (TCD) x neurologic evaluation/CT only on “stroke-patients” x silent/subclinical cerebral embolization

- atropine/ dopamine (post-procedure hypotension) – indirect measurement – chronic radial force
Conclusions

- **Goal 1** - peri-operative ischemic events
  Carotid angioplasty is, today, a safe alternative to endarterectomy, with acceptable perioperative risks – **94% “stroke free” patients**

- **Goal 2** - factors associated with increased periprocedural ischemic events
  - Significant – age \( p = 0.051 \)
  - Non-significant – aortic arch \( p = 0.157 \), contralateral total carotid occlusion \( p = 0.416 \)
  - Non-significant but.... tendency (?) - pre-operative symptoms \( p = 0.087 \), vertebral stenosis or total occlusion - no statistical significance – \( p = 0.09 \)

- **Goal 3** - open cell x closed cell
  - Non significant – periprocedural ischemic events \( p = 0.065 \), atropine \( p = 0.101 \), dopamine \( p = 0.552 \)
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