Total occlusion of the internal carotid artery – not a benign condition

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NO DISCLOSURES RELATED TO THE TOPIC
The overall risk of stroke from a chronically occluded internal carotid artery (ICAO) is around 5%–7% per year despite receiving the best available medical therapy. This has been theoretically attributed to ipsilateral compromised cerebral perfusion.

Types of ICAO

Hasan D. et.al J Neurosurg. 2018
ICA occlusion, type A
Influence of the circle of Willis on leptomeningeal collateral flow in anterior circulation occlusive stroke: Friend or foe?

n=159

Fig. 1. CT angiography showing acute occlusion of the proximal portion of the middle cerebral artery on the right side and patency of the anterior temporal artery (Panel A). The cross-flow through the anterior communicating artery and contralateral posterior communicating artery (PCoA) is visible (Panel B, C). However, ipsilateral PCoA is absent (Panel D). Example of good leptomeningeal collaterals (Panel E).

Anterior Temporal Artery presence was associated with good leptomeningeal collaterals (OR 8.13). The effect of ATA was most pronounced in MCA M1 occlusions, and that of Anterior Communicating Artery was most pronounced in ICA occlusions.

Millesi K. et.al Journal of the Neurological Sciences 396 (2019)
It has been proposed that the incidence of ICAO has dramatically decreased due to medical therapy and only a small percentage of patients develop clinical symptoms.

Yang C., Bogiatzi C., Spence JD JAMA Neurol. Sept.2015

C. Liapis
Ipsilateral carotid stenosis severity and medical therapy in previously asymptomatic patients admitted with carotid-mediated stroke

Medical therapy alone is unlikely to be sufficient stroke prevention for patients with significant carotid stenosis.

Klarin D. et.al J Vasc Surg 2018
Chronic complete occlusion of ICA

- Retrospective review of prospectively collected data of patients presented with ICA occlusion excluding atrial fibrillation cases.
- Period: 1987 – 2017 n=274
- Variables of interest
  - atherosclerotic risk factors
  - symptomatology of ICA occlusion at the time of diagnosis
  - degree of contralateral ICA stenosis
  - type of ICA plaque based on Duplex scan
  - coagulation screening for antiphospholipid syndrome (APS); (2014 – 2017):
    - Lupus anticoagulant, anticardiolipin, anti-b2 glycoprotein antibodies
RESULTS

• 274 patients (82.5% males, mean age: 65.6±9.7 years)
  - RICA occlusion: 132 pts (48.2%)
  - LICA occlusion: 137 pts (50.0%)
  - Bilateral occlusion: 5 pts (1.8%)
  - 279 ICA occlusions

• Patients characteristics
  - DM (29.6%)
  - Hypertension (91.6%)
  - CAD (46%)
  - Smoking (83.9%)
  - Use of Statins (45%)
  - Antiplatelets (65%)

Among 25 recent pts with ICA occlusions:
- 60 % (+) Antiphospholipid syndrome
RESULTS

- **Symptomatology at the time of diagnosis**
  - acute stroke: 46%
  - TIA: 17.5%
  - visual field deficit: 5.5%
  - ataxia / vertigo: 4%
  - decrease in level of consciousness: 2.9%

- **Asymptomatic patients: 24.1%**
Severity of ICA Stenosis

Contralateral ICA Stenosis
- Low <50%
- Moderate 50 – 69%
- High 70 - 99%

Occluded ICA
- Occlusion 100%

47.6% 17.1% 35.3%

- more than 1/3 of the patients had high grade contralateral ICA stenosis
ICA plaque type I-II was more predominant in occluded ICAs (p = 0.01)
Echolucent plaques were 1.6 times more prevalent among the occluded ICAs than in non-occluded ICAs in univariate analysis.

### Table: Carotid Plaque Type

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>OR</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carotid Plaque Type</td>
<td>I-II</td>
<td>1.55</td>
<td>1.09-2.21</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>III-IV</td>
<td></td>
<td>REF</td>
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</tbody>
</table>

**ICA Stenosis and Plaque type**

- **Plaque Type**
  - I – II (echolucent)
  - III – IV (echogenic)

**Occluded ICA**

- Echolucent plaques were 1.6 times more prevalent among the occluded ICAs than in non-occluded ICAs in univariate analysis.
CONCLUSIONS

• Patients with Internal Carotid Artery Occlusion have **significant atherosclerotic risk factors** and are mainly **symptomatic** at the time of diagnosis.

• **Antiphospholipid syndrome** may play a significant role in manifestation and/or clinical progression of ICAO.

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• Plaque echolucency is more prevalent among occluded ICAs, indicating that a more “aggressive” plaque type may lead to occlusion.

• These data suggest that intensive treatment, including intervention, is needed in the management of patients with high grade ICA stenosis, especially with echolucent plaques.
Thank you for your attention