Critical carotid artery stenosis involving a persistent primitive hypoglossal artery: a case report

Laura Pride, MMSc, PA-C¹, Emily Lagergren, MD¹, David H. Hafner, MD, FACS¹
Disclosures

• None of the authors have any financial conflicts of interest to report
Case Report

• The patient is a 68 year-old female with hypertension and dyslipidemia

• Prior tobacco use

• Family history of premature cardiovascular disease

• Medications
  • Aspirin 81 mg daily
  • Hydrochlorothiazide 12.5 mg daily
  • Rosuvastatin 10 mg daily
  • Fish Oil 1200 mg daily
Case Report Cont’d

• Presented 2009 for evaluation of carotid stenosis
  • Initially referred after episode of diplopia
  • Carotid ultrasound
    • Rt: 16-49%
    • Lt: 0-15%

• Stable stenosis on annual visits until 2013
  • Changed insurance and transiently lost to follow up

• 2016 back for routine follow up
  • Rt: 50-79%
  • Lt: 16-49%
Case Report Cont’d

- February 2019 surveillance carotid duplex
  - Rt: 50-79% stenosis in proximal ICA, **80-99% stenosis in the mid ICA**
  - Lt: 16-49% stenosis

- Concerned she may have had a TIA but never sought care (diplopia)
- Started on clopidogrel 75 mg daily
Case Report Cont’d

• CTA head and neck ordered
Persistent Primitive Hypoglossal Artery

- One of the four segmental arteries that connect the anterior and posterior cerebral circulation in fetal development

![Diagram showing stages of development](image)
Persistent fetal anastomoses

- A) Trigeminal (1st)
- B) Otic (3rd)
- C) Hypoglossal (2nd)
  - <0.3% incidence
- D) Proatlantal (4th)
Diagnostic criteria

1. Artery arises as a robust branch of the cervical ICA at C1-C3 level

2. Enters the skull via hypoglossal canal (not foramen magnum)
3. It is the primary supply for the basilar artery

4. The ipsilateral vertebral artery and/or posterior communicating artery are hypoplastic or absent
Clinical implications

- Asymptomatic? Or posterior circulation TIA?
- Critical stenosis at the bifurcation with PPHA
  - Velocity 267/102 with ICA/CCA ratio of 4.3
- ICA is predominant supply to brainstem, cerebellum and right hemisphere
  - Potential for catastrophic ischemic event

TREAT
Interventional Planning

- CEA vs stenting
  - Cardiac risk stratification
    - Low risk
  - Height of lesion
    - Bifurcation at C1/C2 disc
    - Plaque predominates below bifurcation
  - Patient positioning
    - Ability to extend, rotate neck
  - Distal control
  - Shunting
CEA

• General Anesthesia
• Excellent patient positioning
• Shunting to the PPHA
• Bovine pericardial patch angioplasty
• Intra-operative duplex
• Surgical drain
Post-op

- Awoke neurologically intact
- No evidence of nerve injury
- Admitted to the ICU post-op for BP control – intermittently requiring nicardipine gtt over night
  - Normalized with home medications
- Discharged home POD #1 in excellent condition
Follow-up

- At 1 week follow-up
  - Doing well, no complaints
  - Incision well healed; staples removed

- 3 month follow-up
  - Doing well
  - Velocity 73/26
Clinical Importance

• Anterior and posterior cerebral circulation is dependent on internal carotid artery supply

• Increased propensity for atherosclerosis
  • Neo-bifurcation of the ICA means analogous flow dynamics to the carotid bulb

• Increased incidence of intracranial vascular pathology
  • Aneurysms
  • AVMs
Best Management

- Treatment
  - No RCTs data due to rarity – only case studies/series

- Increasing number of successful stenting (n=5 as of 2016)
  - Higher lesions (C1-C2)
  - Use of occlusion balloons +/- distal protection devices
    - Ischemia time
References


Thank you

- Questions?