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Angiographic Incidental Finding of an Accessory Middle Cerebral Artery: Case Report

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Disclosure

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Introduction

- The accessory middle cerebral artery (aMCA) is a rare congenital vascular abnormality with an angiographic incidence of 0.32%.
- Anatomically, this vessel originates directly from the anterior cerebral artery (ACA) and acts as collateral circulation for the middle cerebral artery (MCA).
- The aMCA is not exempt of cerebrovascular diseases such as aneurysms, cerebral infarctions, moyamoya disease, arteriovenous malformations, etc.
- Preservation of its blood flow is fundamental as it may provide blood supply to the frontal lobe and basal nuclei.
- We present a case in which cerebral angiography revealed an incidental aMCA in a 67-year-old patient diagnosed with a transient ischemic attack (TIA) secondary to carotid atherosclerosis.
Case Presentation

- 67-year-old female patient with history of hypertension in treatment with losartan, and type 2 diabetes in treatment with metformin.
- Presented a 30 min. episode of aphasia with spontaneous resolution and without sequelae.
- A TIA secondary to atherosclerosis was diagnosed.
- Cerebral angiography revealed 85% stenosis of left extracranial carotid artery.
- Carotid endarterectomy was performed.
- During angiography, an atypical presentation of the right MCA was observed.
Figure 1. Digital-subtraction angiography (DSA) oblique projection, showing CCA.

Figure 2. Digital-subtraction angiography (DSA) AP projection, showing right aMCA (arrow) originating from proximal right A1 (type 1 of Teal’s classification).
Discussion

- The term aMCA is used when the anomalous vessel originates directly from the ACA.
- The aMCA may be a persistent embryonic anastomosis between the ACA and the main MCA trunk as the MCA trunk has developed later than the ACA, with the latter being an extension of the primitive internal carotid artery (ICA), and can be considered as an ACA branch.
- Anatomically, an aMCA mainly acts as collateral circulation for the MCA, supplying the anterior frontal lobe and basal nuclei.
- Cerebral aneurysms are encountered more frequently in cases with anatomic variations, such as an aMCA; however, the reason for this association is still vague.
Teal classification of aMCA:
- Type 1: originates in the proximal segment of the ACA.
- Type 2: originates in the distal segment of the ACA. When the artery originates from the distal A1 segment, in the region of transition from the A1 to A2 segment.

Manelfe classification:
- Type I*: an anomalous vessel that arises from the internal carotid artery at a point proximal to its bifurcation
- Type II: an artery arises from the proximal segment of A1.
- Type III: an additional artery branches from the distal A1 segment.

*In Teal classification, a Manelfe type 1 variation is considered a duplicated MCA. Manelfe types II and III are considered as true accessory MCA.
Handa (1983) proposed that the aMCA is a variant of the hypertrophied recurrent artery of Heubner (RAH). For some authors, this theory is not adequate for three reasons:

1. First, the recurrent artery trunk is known to penetrate through the anterior perforated substance, going to the subcortex.
2. Second, perforating arteries do not always branch from the aMCA.
3. Third, the recurrent artery may coexist with an aMCA.
Conclusion

- Ignorance of variant anatomical features are the cause of approximately 10% of medical errors such as iatrogenesis, diagnostic errors, and treatment complications, especially with the raise of mechanical thrombectomy procedures.
- We prefer Teal’s over Manelfe’s classification as Teal differentiates a duplicated MCA from an aMCA.
- When the caliber of the variant artery is equal to the main artery, it may be difficult to differentiate between a duplicated MCA and an aMCA.
- The aMCA should not be considered a variant of the hypertrophied recurrent artery of Heubner.
- An aMCA is a benign condition.
- When clipping aMCA aneurysms, it is essential to preserve its blood flow as it may supply functionally important brain areas.
- In our case, the aMCA was an incidental finding and in the absence of it the patient evolution would have been the same.