Case 16296

Accessory middle cerebral artery stroke
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Section: Neuroradiology
Area of Interest: Neuroradiology brain
Procedure: Diagnostic procedure
Imaging Technique: MR
Imaging Technique: CT-Angiography
Imaging Technique: CT
Special Focus: Ischaemia / Infarction Case Type: Clinical Cases
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Patient: 68 years, female

Clinical History:
A 68-year-old woman presented abruptly motor aphasia and right facial asymmetry. No significant personal or family medical history were reported.

Imaging Findings:
The cranial CT without IVC showed no early signs of acute ischemia (ASPECTS 10) (figure 1).

The CT angiogram of supra-aortic trunks with MIP reconstruction (figure 2) showed an arterial branch originating from the proximal portion of segment A1 of the left anterior cerebral artery (blue arrow) which followed the path of the left middle cerebral artery. A filling defect in it was appreciated (yellow arrows).
In the 3D reconstruction (figure 3) an abrupt stop of the arterial branch described was observed.

DWI sequence and ADC map (figure 4) highlighted restricted diffusion in the anterior left insular cortex. The MRI also showed left fronto-opercular region and left superior temporal gyrus infarction (not shown).

Discussion:
Intracranial vascular anomalies involving the middle cerebral artery (MCA) are rare. There are two known types of double-M1 segments of the MCA, including an accessory MCA (AMCA) and a duplicated MCA (DMCA). Both types are classified according to the point of origin. The most widely accepted classification is the Teal’s classification, which proposes that the term accessory MCA is restricted to the anomalous artery that arises from the anterior cerebral artery (ACA). [1]

The incidence of the accessory artery is reported to be 0.3–4.0%. It runs parallel to the course of the MCA and supplies some of the MCA territory. [2,3]

MCA’s vascular variations are asymptomatic. In case of an occlusion of the AMCA, the clinical presentation will depend on the territory irrigated by this branch and on the collateral supply of the patient in this area.

The key features of the diagnosis are based on the image. Angiographic CT and angiographic MRI may show
vascular anomalies and their complications, but when detailed vascular anatomy is needed, conventional angiography is superior. [4]

The main differential diagnosis is the occlusion of the duplicated MCA (DMCA). According to the classification of Teal, in this case, the anomalous artery arises from the distal portion of the internal carotid artery, and not from the ACA [1]. Furthermore, some literature have reported that the DMCA seems to irrigate predominantly the anterior temporal lobe and the AMCA seems to irrigate more frequently the anterior frontal lobe [2].

Knowledge of the MCA’s anomalous configuration is essential in neurosurgical and neuro-interventional practice. It is really important to understand the collateral blood supply in ischemic stroke scenarios. [2,3]

The association of the AMCA with cerebral aneurysm is well known, but there are few cases described that involve the AMCA to an ischemic event. [3]

As there is literature on endovascular treatment of AMCA aneurysms [4], there is not much literature on the treatment of AMCA stroke [3]. It seems logical to think that the correct treatment would be that of a MCA stroke. As always we will have to take into account the patient’s characteristics. The main therapeutic options would be intravenous fibrinolysis or neurovascular interventionism.

Teaching points:
- Intracranial vascular anomalies of the MCA are rare.
- They include the duplicated MCA and the accessory MCA.
- The differential diagnosis between them is established by the origin of the artery.
- There are few cases described that involve the AMCA to an ischemic event.

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Accessory middle cerebral artery stroke, Occlusion of a duplicated MCA, Occlusion of the MCA

Final Diagnosis: Accessory middle cerebral artery stroke

References:


Description: No early signs of acute ischemia are seen (ASPECTS 10). Origin: Complejo Hospitalario de Navarra, Spain.
**Description:** The study shows an arterial branch (yellow arrow) originating from the proximal portion of segment A1 of the left ACA which follows the path of the left MCA. **Origin:** Complejo Hospitalario de Navarra, Spain.
**Description:** The study shows an arterial branch (yellow arrow) originating from the proximal portion of segment A1 of the left ACA (blue arrow) which follows the path of the left MCA. **Origin:** Complejo Hospitalario de Navarra, Spain.
Description: 3D reconstruction of the Willis’ circle anatomy. Origin: Complejo Hospitalario de Navarra, Spain.
Figure 4

Description: b1000 DWI sequence highlights restricted diffusion in the anterior left insular cortex.

Origin: Complejo Hospitalario de Navarra, Spain.
Description: ADC map shows restricted diffusion in the anterior left insular cortex. Origin: Complejo Hospitalario de Navarra, Spain.