

CLINICAL IMAGE

Large Arterial Ring Formed between the M1 and M2 Segments of the Right Middle Cerebral Artery Diagnosed with MR Angiography

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Case Report

A 67-year-old man underwent cerebral MRA using a 3 tesla scanner with a standard 3D time-of-flight MRA protocol (22.0-ms repetition time, 3.45-ms echo time, 17° flip angle, 20.0 cm × 20.0-cm field of view, 0.65-mm slice thickness).

Assessment of maximum-intensity-projection (MIP) images of MRA revealed a large arterial ring formed from the fusion of a small artery arising from the middle M1 segment of the right middle cerebral artery (MCA) with one of the proximal branches of the M2 segment (Fig. 1). We created 3D partial volume-rendering (VR) images to depict the variation more clearly and confirm the anomalous artery (Fig. 2).

Discussion

Variations of the MCA develop during the 35th to 40th day in the embryo,¹ when incomplete fusion or partial persistence of the arterial plexus comprising the anterior cerebral artery and MCA results in fenestration or duplicate origin of the vessel. Thus, MCA variations are common at the proximal M1 segment. Fenestration of the MCA is rare with reported prevalence in 0.20 to 0.30% in an MRA series.² The fenestration is usually small with a slit-like configuration.

Gailloud et al.³ reported that an early branching temporopolar artery was seen to arise from the inferior limb of the fenestrated segment. This finding suggests that early branching temporopolar arteries may participate in the formation of MCA fenestration. In our patient, the inferior limb of the arterial ring can be regarded as this early branching temporopolar artery.

Our extensive literature review uncovered no report of an arterial ring of the M1-M2 junction of the MCA resembling that of our patient. We suggest that such arterial rings have been overlooked. The superimposition of arterial branches may prevent clear depiction of arterial fusion on 2D cerebral angiography. 3D MRA may overcome this limitation to aid their differentiation. Thus, the 3D depiction of vessels in VR images may permit superior diagnosis of such



Fig. 1 MRA obtained using a 3 tesla scanner. Image of slightly left anterior oblique projection of maximum-intensity-projection (MIP) shows a large arterial ring of the M1-M2 junction of the right middle cerebral artery. The arrow indicates the point of arterial fusion.

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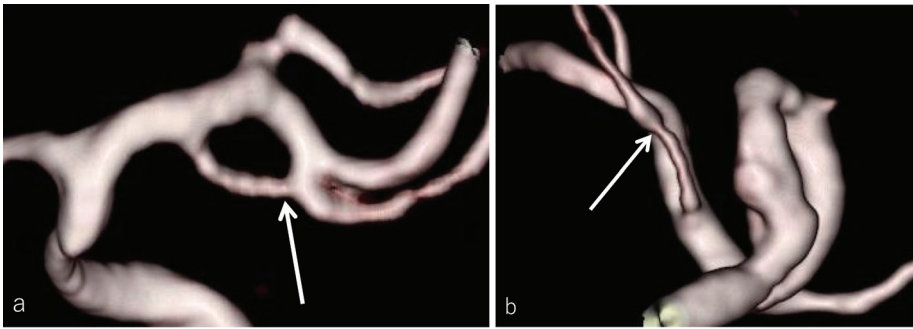


Fig. 2 Postero-anterior (a) and infero-superior (b) projections of partial volume-rendering (VR) image of MRA clearly depict the point of arterial fusion (arrows).

extremely rare fusion to that of the MIP images of MRA usually used in daily clinical practice to diagnose lesions of the cerebral arteries.

The clinical significance of such a large arterial ring is that one channel of the ring may provide important collateral circulation when the other is occluded.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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