

# Cerebrovascular cinematic rendering of multisystemic smooth muscle dysfunction syndrome

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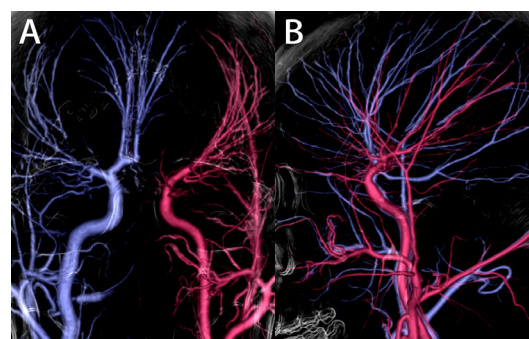
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GL and ML contributed equally.

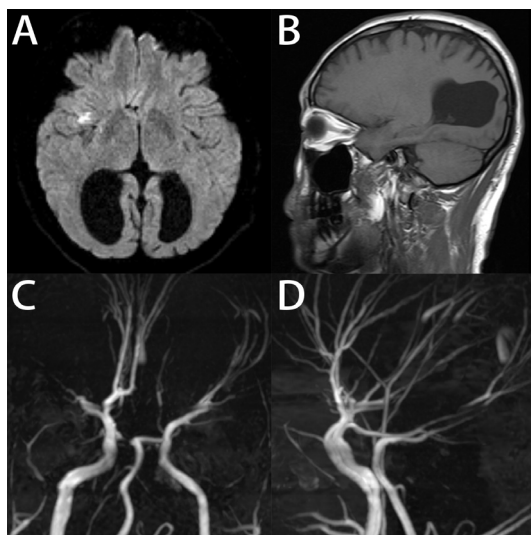
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A 45-year-old man diagnosed with multisystemic smooth muscle dysfunction syndrome (MSMDS) was referred for the evaluation of recurrent dizziness that had persisted for 2 years. MRI revealed a right frontal lobe cerebral infarction, enlargement of the bilateral ventricular trigones and hypoplasia of the corpus callosum (figure 1A,B). MRA showed occlusion of the right middle cerebral artery (figure 1C,D). Cinematic rendering of CTA highlighted characteristic cerebrovascular manifestations of MSMDS: dilatation of the internal carotid artery from the cavernous to the clinoid segments, stenosis and occlusion of the distal intracranial circulation and an abnormally straight course of intracranial arteries (figure 2, online supplemental video S1).<sup>1</sup> Cinematic rendering of CTA provides highly realistic



**Figure 2** Cinematic rendering of CTA images of cerebral angiography in orthostatic (A) and lateral (B) positions. Cinematic rendering of CTA clearly depicts the anatomic contours of the bilateral internal carotid arteries; the photorealistic images produced by cinematic rendering could help neurosurgeons better familiarise themselves with this rare disease and its characteristic cerebrovascular manifestations.



**Figure 1** MRI and MRA imaging. (A) Diffusion-weighted image showed right frontal lobe cerebral infarction (red arrow) and trigone of bilateral ventricles enlargement (white arrow). (B) T1 axial section showed hypoplasia of the corpus callosum. (C) Coronal and (D) sagittal MRA showed occlusion of the M1 segment of the right middle cerebral artery.

3D reconstructed images, enabling multi-angle and multi-plane rotational visualisation of vascular structures. This technique offers significant educational value, aiding neurointerventionalists in preoperative planning and improving communication between neurosurgeons and patients.<sup>2</sup> There are currently no standard indications for neurosurgical revascularisation for MSMDS, which may be due in part to the paucity of reported cases and the high risk of postoperative stroke in the limited number of cases.<sup>1,3</sup> Nevertheless, given the progressive nature of MSMDS and the risk of recurrent strokes, early surgical intervention may be considered in selected cases to prevent further neurological deterioration. MSMDS is an autosomal dominant condition caused by a mutation in the ACTA2 gene.<sup>4</sup> Neurosurgeons should suspect MSMDS in patients presenting with recurrent strokes and characteristic cerebrovascular findings, and early genetic investigations should be prioritised to confirm the diagnosis.<sup>5</sup>



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