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Stroke Images: Added value of ultra-high resolution 7T MRI in dural arteriovenous fistulas

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Contributions

TESTUD.B: Data acquisition, drafting/revising the manuscript, study concept or design, and analysis or interpretation of the data

CARLES. X: Drafting/revising the manuscript, and analysis or interpretation of the data

COSTES. C: Data acquisition

HAK. J-F: Drafting/revising the manuscript, and analysis or interpretation of the data

GUYE. M: Drafting/revising the manuscript, and analysis or interpretation of the data

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Supplemental Material: Video S1

A 65-year-old man presented with binocular diplopia secondary to trochlear nerve palsy, pulsatile tinnitus and left retroauricular headache for several months. 3T MRI (figure 1) revealed transverse-sigmoid sinus dural arteriovenous fistula without abnormalities in the IV nerve pathway. Trochlear nerve palsy was attributed to cavernous reflux via the petrous sinuses. Cerebral angiography showed predominant involvement of the occipital artery, the neuromeningeal trunk, with an enlarged meningo-hypophyseal trunk and lateral tentorial arteries, but just a slow late cavernous reflux, suggesting another etiology for the trochlear nerve palsy. 7T high-resolution coronal T2-WI TSE imaging¹ enhanced by the fusion with cerebral angiography (figure 2 and video S1) showed an abnormal contact in favor of compression of the trochlear nerve by dilated lateral tentorial arteries and a presumably consecutive thickening of the tentorium cerebelli.

In clinical practice, 7T MRI² can be useful for understanding pathophysiology and supporting therapeutic decision-making.

Key point:

The ultra-high resolution of 7T MRI could bring added value to the clinical management of cardiovascular pathologies.

References

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2. Sui B, Sannananja B, Zhu C, Balu N, Eisenmenger L, Baradaran H, Edjlali M, Romero JM, Rajiah PS, Li R, et al. Report from the society of magnetic resonance angiography: clinical applications of 7T neurovascular MR in the assessment of intracranial vascular disease. *J NeuroIntervent Surg*. 2023;jnis-2023-020668.

Figures

Figure 1

3T Brain MRI highlights a normal midbrain at the level of the trochlear nerve nucleus on the axial T2-WI TSE (A). Time of flight (B-C) shows arterialized blood in the sigmoid sinus with enlarged feeding arteries passing through the left occipital bone (arrowheads), high signal at the posterior part of the left cavernous sinus and dilated vascular structures along the left tentorium cerebelli (arrows).

Figure 2

High-resolution 7T coronal T2-WI TSE sequence (A) showing trochlear nerves in their cisternal segments (arrows) and a secondary thickening of the left tentorium cerebelli with a split appearance (arrowheads). Lateral view of the left internal carotid angiography (B) showing an enlarged meningo-hypophyseal trunk and tentorial arteries (asterisk). Coronal T2-WI TSE fused with the coronal reformatted images of selective rotational angiography of the left carotid artery (C) shows enlarged lateral tentorial arteries (asterisk) along the edge of the tentorium and between its folds in close contact with the left trochlear nerve.