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Unilateral olfactory bulb volume loss due to arteriovenous malformation

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Olfactory bulb (OB) volume may be affected by many diseases. Olfactory atrophy with reductions in the volume of the OB may be observed in patients with Parkinson's disease, acute major depression, mild cognitive impairment and Alzheimer's disease, bilateral sinonasal polyposis, normal pressure hydrocephalus and idiopathic intracranial hypertension, and total laryngectomy and those who smoke [1–5]. Unilateral OB volume loss may be seen in fracture of the cribriform plate, tumors, metastases, granulomas and other lesions of the OBs or tracts, olfactory fossa meningioma, and vascular anomalies associated with a persistent primitive olfactory artery. Cerebral arteriovenous malformation (AVM) is a congenital vascular malformation characterized by arteriovenous shunt through a collection of tortuous vessels without an intervening capillary bed. AVM can cause steal phenomenon that results in hypoperfusion and focal atrophy in the adjacent neural parenchyma.

Herein, we represent a 21-year-old man with an AVM located at the right frontal lobe. Computed tomography angiography showed the right middle cerebral artery (MCA) and the right anterior cerebral artery (ACA) as feeding arteries (Fig. 1a). The right "orbitofrontal artery" was smaller than the left one (Fig. 1b). Also, the right OB volume seemed lower than the left OB volume (Fig. 1c). The right and left OB volumes were measured as 56.4 and 80.2 mm^3, respectively, on 3D T2 STIR SPACE sequence (Fig. 1d).

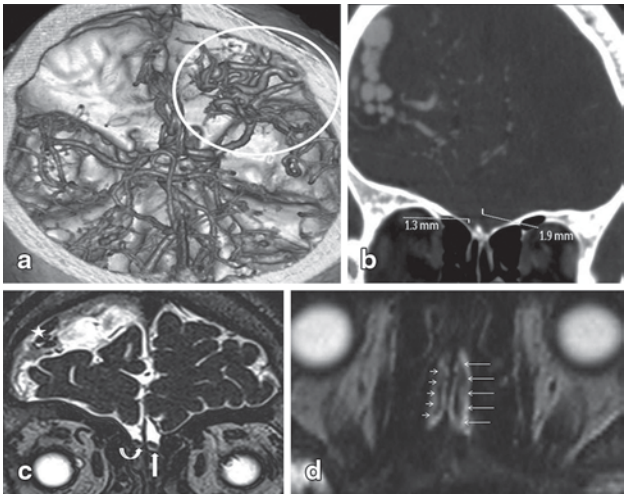

Fig. 1 **a** Volume rendering image of the multidetector CT angiography after cranial vault removed, an AVM located at the frontobasal and lateral region of the right frontal lobe is seen (white circle). Increased in caliber MCA and ACA branches are also delineated. **b** On coronal multidetector CT angiography image, the right orbitofrontal artery is smaller than the left orbitofrontal artery in caliber. Enhancement of the feeding arteries and draining veins of the AVM are well delineated at the right frontal lobe. **c** Coronal 3D T2 STIR SPACE image shows a small caliber right OB (curved arrow) and normal caliber left OB. Note that, draining veins of the AVM (star) and frontal lobe volume loss adjacent to the AVM are also seen. **d** Axial 3D T2 STIR SPACE image shows the small size right OB (small arrows) and the normal size left OB (long arrows).

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Conflict of interest

The authors declare that there are no actual or potential conflicts of interest in relation to this article.

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