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Scalp arteriovenous malformation

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Introduction: Scalp arterio-venous malformations (AVMs) are rare vascular malformations, which are characterized by abnormal fistulous connections between supplying arteries and draining veins without intervening capillary network in subcutaneous plane of scalp. The earliest accurate description of an AVM was by Wilham Hunter in 1757. Several names were used to describe scalp AVMs including aneurysma serpentinum, aneurysm racemosum, plexiform angiomas, and arteriovenous fistula. Brecht also used the expression cirsoid aneurysm to describe vascular malformations of the scalp in 1833. As a result of abnormal hemodynamics; veins progressively get dilated and tortuous and undergo aneurysmal dilatation, the so-called cirsoid aneurysm.

Most patients with scalp AVMs complain of headache, tinnitus and a subcutaneous mass with thrill. Enlargement of the mass over time can lead to worsening of these symptoms. While factors such as trauma, birth, and hormonal imbalance have been suggested as possible causes for the progression of these masses, the precise process of their growth remains to be established, as the natural history.

Surgery remains the goal standard in the management of these lesions but endovascular treatment have an increasing role as a sole treatment in small AV fistulas with unique feeding arteries or as a complement for surgical excision.

Methods: The authors describe the case of a nine years old boy with a midline frontal scalp AV fistula, the MRI an angiographic details, surgical technique, final result and review literature in Pubmed/MEDLINE database.

Results: The authors report the case of a nine years old boy complaining of a frontal subcutaneous mass that enlarges when sport activities. It had grow since the first complain some months before our evaluation. The mass was located at the midline of the upper forehead. It was pulsatile, soft, compressible, serpentine scalp lesion increasing on Valsalva associated with thrill and bruit. He underwent digital substraction angiography that showed an scalp AVM fístula supplied by bilateral superficial temporal arteries, bilateral medial meningeal arteries and bilateral ophthalmic arteries. The principal draining veins were scalp frontal veins but also the superior sagital sinus.

We performed a two-stage surgery, first excision of the superficial component (subgaleal and periosteum) and some weeks after the bone and dural components. He had an uneventful postoperative period. Digital substraction angiography one year after showed a small scalp AV fistula remaining at the frontal midline feeding from distal branches of one superficial temporal artery. There was an attempt to endovascular treatment but the final decision to leave part of the AV fistula to avoid the risk for skin necrosis.

Conclusions: Scalp AVM are very rare vascular lesions, specially in pediatric population. The pathogenesis and natural history are not well understood. Some authors state a growing pattern with an initial stage where the lesion is supplied by single or multiple feeders from extracranial carotid arteries, a second stage where additional feeders are captured from the intracranial external carotid artery through the skull bone, and a third stage, the nidus enlarges further because of additional feeding from the pial arteries of the internal carotid artery.

These lesions ar complex vascular malformations and a surgical challenge.