71st Annual Meeting of the Working Group for Oral and Maxillofacial Surgery
Bad Homburg 18.05.2023 until 19.05.2023

Interventional and surgical therapy of temporal high-flow AV malformation- overtreatment or state of the art?

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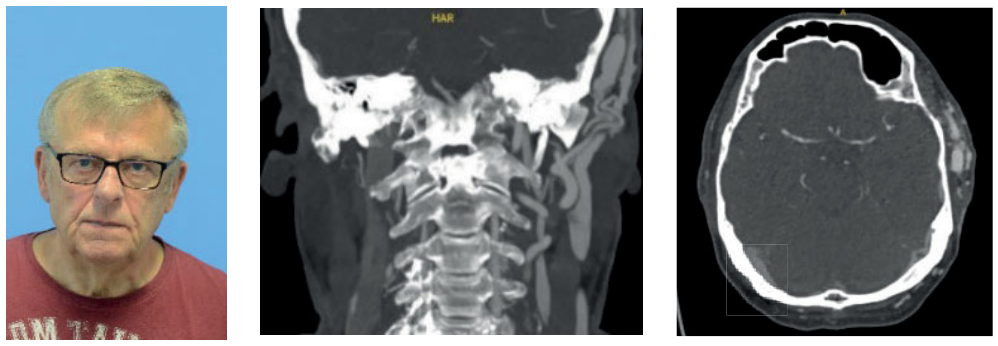
Introduction

Arteriovenous malformations (AVM) are congenital vascular deformities growing in the brain tissue or its immediate vicinity that are able to infiltrate their environment. They consist of a nidus into which feeding arterial vessels open, whereas venous vessels lead out oft he nidus. However, because AVM often is a confusing tangle, it is difficult to distinguish the single elements. By definition, the nidus is where the arteries have a short-circuit connection with veins without an intervening capillary bed. This results in high blood pressure and flow in the veins, which may be dilated and perforate. If an AVM bleeds spontaneously, it may become "symptomatic," i.e., cause discomfort. Estimating the likelihood of bleeding from AVM is nearly impossible for individual cases; overall, the annual incidence of bleeding is thought to be between 1 - 4%.

Initial Situation

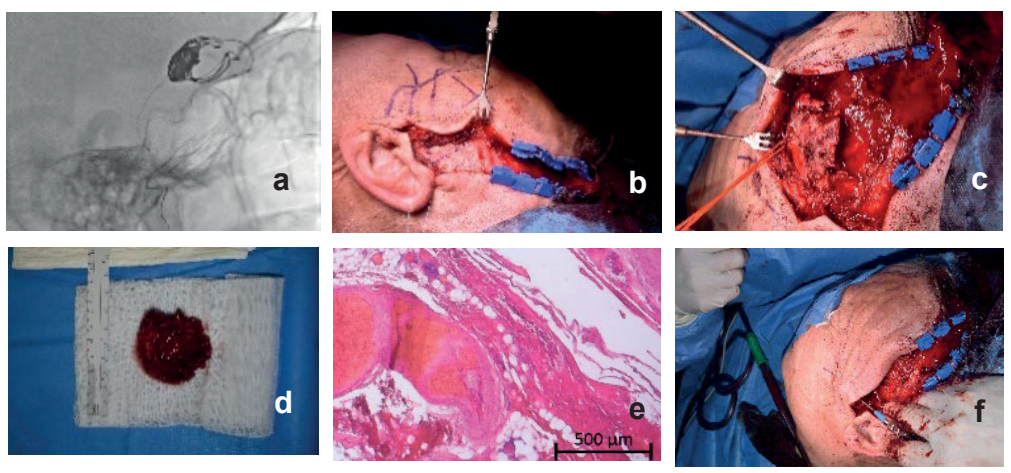
In the present case, we report on a 70-year-old patient with an AV malformation of the temporal region on the left who was presented to our clinic on a consultative basis in July 2022 due to a left jugular vein inflow congestion that had been progressive for about three years with backflow into the left temporal region. Furthermore, the patient complained of repeated flow noises with tinnitus occurring under resting conditions and of a buzzing on the left temporal side as well as pain when touching the clinically slightly raised soft tissue alteration. The CT scan of the supra-aortic vessels showed marked extra-cranial vascular ectasia left temporal with contrast of the external and internal jugular veins already in the arterial phase, primarily with high-flow AV fistula. Cerebral panangiography was then performed for further diagnosis. This confirmed the presence of an extra-cranial galeal arteriovenous high-flow malformation with arterial supply mainly from branches of the superficial temporal artery and venous drainage mainly via the left external jugular vein.

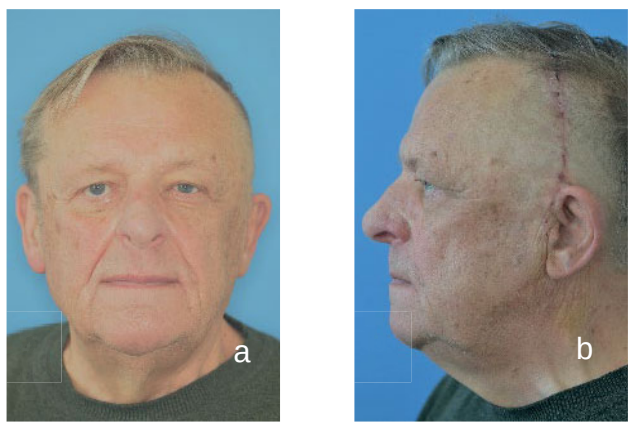


▲Fig.1: Initial findings
a) Arteriovenous malformation of the face with extensive tumour-like growth in the temporal area on the left side
b) b+c) CT angiography showing a capillary vascular malformation in the temporal area on the left side

Therapy and progression

Fig.2: Surgical procedure and histology
a) Preoperative circulatory elimination of AVM with transvenous (coils & liquid embolization PHIL 25) and transarterial (balloon, coils) embolization
b+c+d) Surgical removal
e) Histopathological section in HE stain: embedded in subcutaneous fat, vascular lesion with irregularly configured venous and arterial vascular structures. (Scale: see in image below right)
f) Immediately after removal, nerve stimulation (VII cranial nerve)





▲Fig.3 a+b: Postoperative findings
Three weeks postoperative, a cosmetically and functionally pleasing result is seen.

The AVM was first interventionally eliminated by our neuroradiologists performing a combined transvenous-transarterial intervention. One week later, we finally surgically removed the meanwhile largely embolized tumor via a hemicoronal approach. Thus, due to neuroradiological intervention prior to our surgery, no relevant intraoperative bleeding occurred.

Discussion and conclusion

According to current therapeutic standards, larger AVM are usually first embolized via catheter and are then completely surgically removed in the further course. In our experience, an interval of one week between embolization and surgery is optimal.

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