Long term follow-up of 43 pure dural arteriovenous fistulae (AVF) of the lateral sinus

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Summary. Forty-three patients with arterio-venous fistulae of the dura of the transverse sinus with a complaint of tinnitus are reviewed, with a follow-up of 12 months to 11 years. 34 patients were embo-lized, 2 treated surgically, and 7 were untreated. Embolization appears to have been beneficial. The frequently benign nature of this abnormality must be emphasized, and serious psychological study of the patient must be made before deciding on therapy.

Key words: AVM (arterio-venous malformation) - Dura lateral sinus - Intracranial - Tinnitus - Embolization

Spontaneous intracranial arterio-venous malformations (AVM) located on the lateral sinus dura are, in general, benign and are relatively rare. Supra-selective angiography has made positive diagnosis easier, and the development of embolization techniques has led to renewed interest in treating these malformations. Embolization is the treatment of choice most frequently proposed in the literature. The most common indication for therapy is functional disturbance caused by the tinnitus. We report the outcome of 43 patients, 34 of whom were embolized, with a follow-up of 12 months to 11 years (mean: 40 months).

Material and method

Our experience from 1976 to 1980 was reported in a thesis [6] and this consisted of 33 patients, 23 of whom were embolized. Since 1980, 47 patients, have been seen, for a total of 80 lateral sinus dura arterio-venous malformations (LSDAVM's) evaluated through June 1984. A questionnaire was sent to most of the patients. The present study is a review of all patients in whom a follow-up of at least 1 year was possible, regardless of treatment: it includes 43 of the 80 cases which came to our attention. We noted that all these 43 patients had a complaint of tinnitus in their history (only 75 of the 80 had this symptom).

A clear female predominance was seen (28 females, 15 males). Age of onset of symptoms was between 19 and 82 (mean: 53 years). Only one case was bilateral. No left or right-sided preference was noted (24 were on the left side, 20 on the right).

A review of histories revealed one case with a recent episode of intracranial hypertension and seven with a history of cranial trauma (sometimes old). In only one case was there a probable association between trauma and the AVM: an occipital fracture six months prior to onset of tinnitus. Five patients had been treated for phlebitis of the lower extremities, in one case five times, and one patient had been treated for thrombophlebitis of the longitudinal sinus two months prior to discovery of the AVM. Three patients had undergone surgery for their AVM, in each case consisting of ligation of the external carotid or occipital artery. Presence of tinnitus is the hallmark of these lesions and was found in all 43 patients. It was graded mildly disturbing (6 cases), disturbing (18 cases) or highly disturbing (19 cases). The tinnitus constituted virtually the entire symptomatology. It was isolated in 33 cases, accompanied by headache in 6, by vertigo in 1, and by signs of increased intracranial pressure in 3, in 1 of whom it was the initial symptom. No intracranial hematoma was observed. A carotid doppler was performed in 19 cases: it constantly showed accelerated flow on the side of the AVM. Brain CT was
performed in only 4 cases. It was normal in 3; in the other case it showed hypervascularization of the tentorium. Digital venous angiography was performed once in this series and showed early venous return. Three aspects of the angiograms were studied: the appearance of the AVM’s, the nature of the feeding arteries, and the appearance of the venous drainage. The AVM was most often sited at the angle of the lateral sinus (20 cases), sometimes on the sigmoid sinus (12 cases), or at the origin of the jugular vein (2 cases), or at the level of the transverse sinus (9 cases). The lesion was only rarely highly localized (4 cases), most often being diffuse.

Study of the feeding arteries required supra-selective arteriography. They were found to be those commonly described in the literature. The occipital artery was a principle pedicle in 37 cases and an accessory pedicle in 3. Other arteries frequently involved were: the middle meningeal (17 cases), the posterior auricular (11 cases), the ascending pharyngeal (11 cases), the branches of the carotid siphon (8 cases) and the vertebral (11 cases). Less often involved were the superficial temporal and the cervical arteries (ascending and deep branches).

Venous drainage appeared normal in only 4 cases, with normal direction of flow into the lateral sinus and the internal jugular vein. In 4 cases, the lateral sinus appeared normal but was associated with opacification of either the mastoid veins or the superior petrosal sinus. In one case, opacification of the mastoid veins was associated with abnormalities of the lateral sinus. In another case, reflux reached the cavernous sinus and the ophthalmic veins. Twice, the only abnormality was a reduction in calibre or an irregular appearance of the sinus adjacent to the AVM. In 11 cases, it was not possible to demonstrate the integrity of the venous system, a segment of sinus remaining unopacified, but we were not able to confirm an occlusion. This was especially frequent in the lateral sinus above the AVM and in the internal jugular vein. Twenty frank abnormalities of the lateral sinus were observed, including partial occlusion of the lateral sinus (in 5 cases above the AVM, in 2, below) and segmental thrombosis of the internal jugular vein (2 cases). In one of the latter two cases, there was drainage into the cavernous sinus and then into the ophthalmic vein. In 10 cases, reflux reached the contralateral sinus. In

Fig. 1a, b. Mme AUG... 35 years. Rightsided tinnitus. a Right carotid angiography showing early filling of the jugular vein (●). The occipital artery (●) is the principle artery that supplies the fistula. The middle meningeal (→) artery is of normal width. b Selective angiography of the occipital artery