RUPTURED ANEURYSM OF AN AZYGOS ANTERIOR CEREBRAL ARTERY

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SUMMARY :

A case of saccular aneurysm of the azygos anterior cerebral artery is reported. Aneurysms of the azygos anterior cerebral artery are extremely rare. Clinical, radiological and operative findings are described in detail and the pertinent literature is reviewed.

KEY WORDS :

Anterior cerebral artery, Azygos anterior cerebral artery, Saccular aneurysm.

The most primitive pattern of anterior cerebral artery occurs in fishes, reptiles, amphibians and birds. In these animals no anterior communicating artery exists, so there is no real circle of Willis and the two anterior cerebral arteries lie parallel, without communication, on the medial aspect of the olfactory lobe. In snakes, tortoises and crocodiles, however, the anterior cerebral arteries may unite to form a common midline vessel which has been called the azygos (unpaired) artery (14). The occurrence of an azygos anterior cerebral artery is a relatively uncommon developmental anomaly of the circle of Willis in human beings. In this vascular anomaly the distal (A_2) segment of both anterior cerebral arteries are represented by a single common vessel from which arise all major vessels supplying most of the medial aspect of the cerebral hemispheres and the corpus callosum.

Aneurysms of the azygos anterior cerebral artery are extremely rare and a cooperative study on subarachnoid hemorrhage by Locksley contained no report of an azygos anterior cerebral artery aneurysm (15). We were able to collect only 29 cases (1-14, 16-21) and we are reporting an additional case. The interesting point of the 29 collected cases is that (17) (58 %) of them were from Japan (1,3,4,6,7,9,10,11, 12,16,17,18,20).

CASE REPORT

This 48-year-old right-handed man was perfectly well until five days prior to admission, when he suddenly developed a severe headache associated with nausea. He was hospitalized elsewhere after the onset of symptoms and was later transferred to our unit.

The patient had a history of subarachnoid hemorrhage 28 years before and on admission he was suffering from neck pain.

Examination: Physical examination showed a well-developed normotensive man and his neurological examination was unremarkable except for mild neck stiffness. Subarachnoid hemorrhage was verified by lumbar puncture and the xanthochromic CSF obtained at lumbar puncture demonstrated 600 red blood cells/cu mm. Post-contrast computerized tomography of the brain revealed the presence of clot in the interhemispheric fissure and the aneurysm itself at the level of lateral the ventricles (Fig.1) Bilateral percutaneous carotid arteriograhy was performed and on

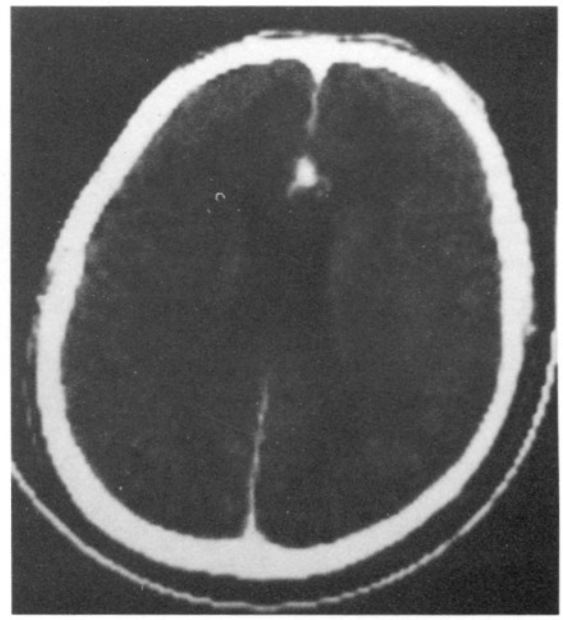

Fig. 1 : Computerized tomography revealing the aneurysm itself.

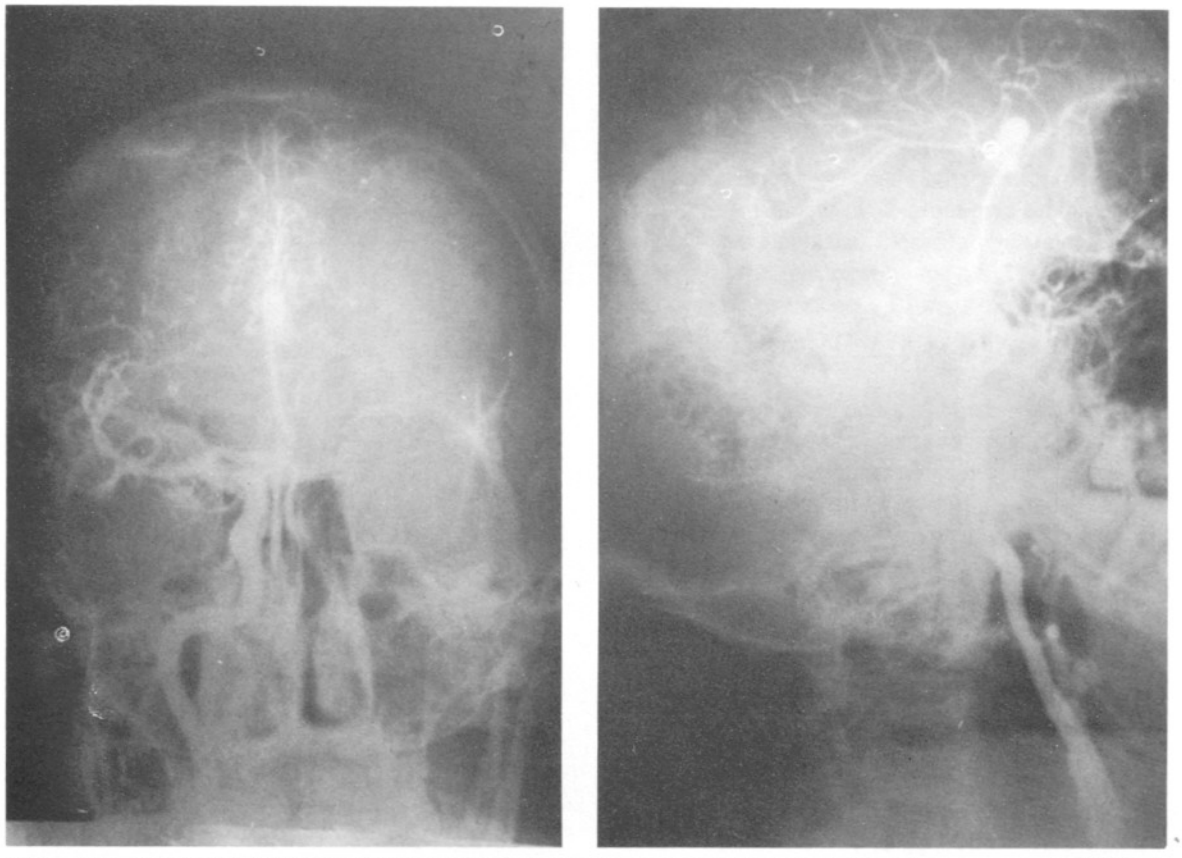

Fig.2-3 : Anteroposterior and lateral views of the right carotid angiogram show azygos anterior cerebral artery and an aneurysm at the distal end.

both the right and left angiograms a distal end aneurysm of the azygos anterior cerebral artery was seen (Fig.2-3). The azygos anterior cerebral artery was extending to the genu of the corpus callosum and posteriorly it divided into two branches, feeding both hemispheres.

At operation a right frontal parasagittal craniotomy was performed. The right and left A_1 segments were exposed. The right A_1 segment was larger than the left and both were joined together to form a 5cm azygos anterior cerebral artery. The aneurysm had developed at the bifurcation of the azygos anterior cerebral artery and was located 3cm away from its origin. Clipping of the neck of the aneurysm was undertaken. The patient was discharged without any neurological deficit.

DISCUSSION

According to Yaşargil, Wilder was the first to describe the fusion of both A_2 segments to form a single artery and introduced the term arteria termatica in 1885 (21). This artery perfusing the surface of both hemispheres is also known as the unpaired pericallosal stem artery, unpaired anterior cerebral artery, common anterior cerebral trunk and azygos pericallosal artery.

Baptista described three types of anomaly occurring in the distal anterior cerebral artery: 1 - an unpaired anterior cerebral artery, in which a single anterior cerebral artery feeds both cerebral hemispheres, 2 - a bihemispheric anterior cerebral artery where both right and left anterior cerebral arteries are present, but one is rudimentary and most of the major branches to both hemispheres arise from the dominant one, 3 - a triple anterior cerebral artery with the accessory anterior cerebral artery arising from the anterior communicating artery(2). Yaşargil added one more variation to this classification and described the third A_2 segment which gives the bihemispheric branches(21).

It is presumed that azygos anterior cerebral arteries arise at about the fortieth day of gestation from the fusion of two anterior cerebral arteries arising from the medial branch of the pirimitive olfactory artery. It is a well known fact that azygos anterior cerebral arteries often accompany midline anomalies

such as agenesis of the corpus callosum, holoprosencephaly, hydranencephaly, defects of the septum pellucidum, meningomyelocele, lipoma and arteriovenous malformation (3,11,14,16,17).

Baptista reviewed the literature and found that of 2153 brains studied, 23 had azygos anterior cerebral arteries. In his own series of 381 brains there was only one (2). In a study of carotid angiograms of 7782 patients only 17 azygos pericallosal arteries were diagnosed (5). So it can be presumed that the incidence of this anomaly in the general population is less than 1 %.

On the other hand Pool and Potts have postulated that the incidence of aneurysms of the pericallosal arteries is higher in patients with an azygos anterior cerebral artery (19). Huber supported this suggestion and reported the incidence of aneurysm formation in a series of angiographically demonstrated azygos pericallosal arteries to be 41.1 % and he concluded that the highest incidence of aneurysm occurs at the bifurcation of a large unpaired pericallosal artery(5). So it can be presumed that an azygos anterior cerebral artery itself may be a cause of an aneurysm in this region because of the marked effects on the circulatory dynamics.

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