

Cerebellar Arteriovenous Malformation with Multiple Distal Aneurysms of the Posterior Inferior Cerebellar Artery

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Purpose: To discuss the computed tomographic and angiographic findings of a case with multiple peripheral aneurysms of the posterior inferior cerebellar artery in association with a cerebellar arteriovenous malformation.

Methods: The computed tomography and angiography examinations were performed.

Results: The computed tomography revealed subarachnoid hemorrhage and directed the radiological evaluation. The exact nature of the vascular pathology was demonstrated by angiography and the diagnosis was stated.

Conclusion: Simultaneous occurrence of multiple intracranial aneurysms and arteriovenous malformations is a rare finding and their coexistence in the posterior fossa is extremely uncommon. *Ann Med Sci* 2000;9:30-32

Key words: Arteriovenous malformations, aneurysms, angiography ataxia, dysmetria and nystagmus.

The association of intracranial aneurysms and arteriovenous malformations (AVMs) is well known, but their coexistence in the posterior fossa is a rare finding¹. Aneurysms of cerebellar arteries usually arise at the origin, although they may occur more distally, especially when they are seen with AVMs¹⁻³.

In this report a rare case of multiple peripheral aneurysms of the posterior inferior cerebellar artery (PICA) found in association with a cerebellar AVM is described, and the literature concerning aneurysms of PICA, cerebellar AVMs and combined intracranial vascular abnormalities are discussed.

Case Report

A 57-year-old previously healthy woman was admitted to the hospital with sudden onset of headache, dizziness, nausea and vomiting. Premorbid history was insignificant. Complete neurological examination showed nuchal rigidity, abnormal gait with truncal

ataxia, dysmetria and nystagmus. Emergency computed tomography (CT) examination revealed subarachnoid and intraventricular hemorrhage (Fig. 1). After contrast injection a slightly lobulated enhancing lesion in the inferior vermis and the right cerebellar hemisphere was seen but artifacts obscured a more informative study. These images were not suitable for demonstrating the AVM with aneurysms, but the enhancement of a cerebellar lesion with the findings of subarachnoid and intraventricular hemorrhage, directed the urgent evaluation of the vertebral arteries during the angiographic examination.

A subsequent pancerebral digital subtraction angiography was performed with Toshiba DFP 50A and the right vertebral artery injections demonstrated a cerebellar AVM in addition to three aneurysms of the right PICA located at the anterior, posterior medullary and supratonsillar segments (Fig. 2). The patient underwent surgical operation for trapping of the right PICA aneurysms and excision of the AVM within ten days.

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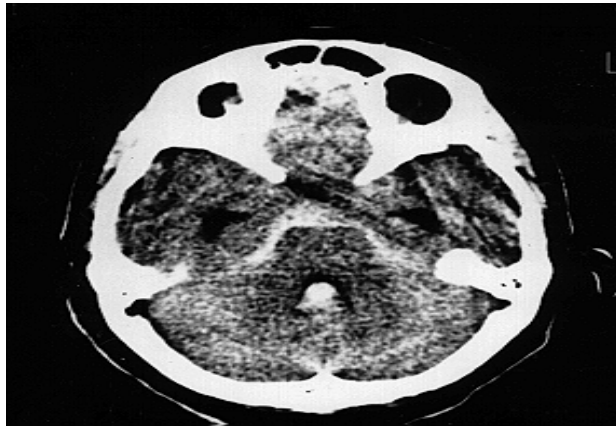


Figure 1 : Axial precontrast CT image demonstrates subarachnoid hemorrhage in the ambient cistern (predominantly on the right) and intraventricular hemorrhage in the fourth ventricle.

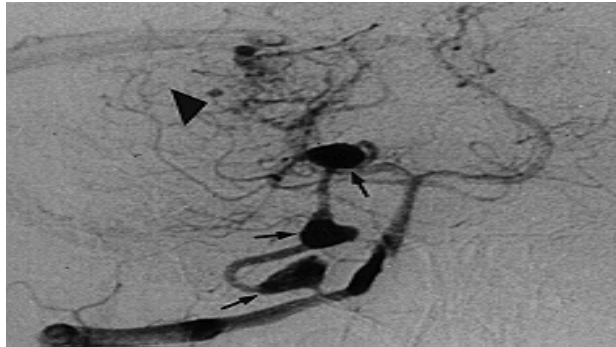


Figure 2a.

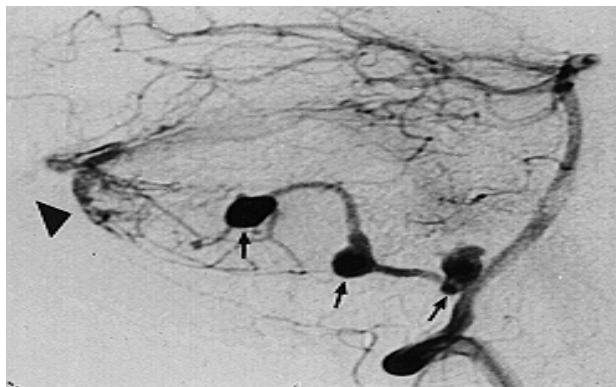


Figure 2b.

Figure 2a-b : Right vertebral angiograms (anteroposterior "a" and lateral "b" views) demonstrate three aneurysms (arrows) located at the anterior medullary, posterior medullary and supratonsillar segments along the right PICA feeding the cerebellar AVM (arrow heads).

Discussion

Simultaneous occurrence of multiple intracranial vascular abnormalities is a rare finding. However, in 2.7 to 14% of patients with AVMs, an intracranial aneurysm is found as well and 37% of them being located on a main feeding artery of the AVM^{1,3}. Only 0.1% of patients with an aneurysm also have a coexistent AVM¹. AVMs of the posterior fossa account for 5 to 7% of all intracranial AVMs^{1,4,5}. Aneurysms of the PICA represent only 0.5 to 0.7% of all intracranial aneurysms and they are usually seen at the junction of the PICA and the vertebral artery, but occasionally may be found more distally. There are only few reports demonstrating multiple aneurysms of the PICA¹. Association of intracranial aneurysms with AVMs were tried to be explained by three hypotheses; the first is the incidental occurrence of these two vascular abnormalities; the second is vascular developmental defect; and the third is the hemodynamic effects caused by increased blood flow through the feeding artery of the AVM which results in aneurysm formation^{1-3,5,6}. The latter hypothesis is supported by the higher incidence of distal PICA aneurysms found in association with AVMs and the gradual disappearance of feeding vessel aneurysms after surgical removal of AVM^{1-3,6}. Azzam² reported development of three feeding artery aneurysms in three years follow up of a case of cerebellar AVM which showed progression of the AVM.

Just as in our case, subarachnoid hemorrhage is the most common presentation of the patients with coexistent aneurysms and AVMs³. However, it is often not possible to determine the source of the hemorrhage, preoperatively. In our case the location of blood on CT scan, the size and configuration of both the aneurysms and the AVM, and the absence of localized vasospasm on digital subtraction angiography did not give any clue for the determination of which abnormality was the source of the bleeding. The risk of hemorrhage from an aneurysm appears higher than that from an AVM and an estimation of an increased risk can be considered with their coexistence^{1,2,7-9}. Embolization of the cerebral AVM's and aneurysms is an alternative treatment method¹⁰ which should be considered for this patient but optimum treatment of these lesions is based in part on a knowledge of the procedure and hemodynamic alterations associated with the AVM's and operation was considered to be a more effective method for achieving obliteration of the feeding artery aneurysms and AVM. In summary, the occurrence of coexistent multiple distal PICA aneurysms and cerebellar AVM is extremely rare, and the hypothesis that the formation of intracranial aneurysms is a result of acquired degenerative changes caused by hemodynamic stress resulting from the increased blood flow of the feeding arteries of the AVM may be accepted as the best explanation of the etiology.

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