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SURGICAL NEUROLOGY INTERNATIONAL

SNI: Neurovascular

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Editor: Kazuhiro Hongo, M.D., Shinsui University, Matsomoto, Japan

Case Report

Middle meningeal artery aneurysm: Case report

E. Kpelao, K. A. Beketi, K. M. H. Ahanogbe, A. K. Moumouni, A. K. Doleagbenou, K. Egu, B. Ntimon[1], M. Tchaou[1], P. Egbohou[2]

Departments of Neurosurgery, [1]Radiology and [2]Intensive Care Unit, Sylvanus Olympio University Hospital Center, Togo

E-mail: *E. Kpelao – kpelas77@yahoo.fr; K. A. Beketi - bekthony@yahoo.fr; K. M. H. Ahanogbe - samsonahas@hotmail.com; A. K. Moumouni - makmas2003@yahoo.fr; A. K. Doleagbenou - achilledole@yahoo.fr; K. Egu - egukomi@gmail.com; B. Ntimon - cntimon@yahoo.fr; M. Tchaou - joseph_tchaou@yahoo.fr; P. Egbohuo - egbohou@gmail.com
*Corresponding author

Received: 24 April 17 Accepted: 16 July 17 Published: 01 August 17

Abstract

Background: Aneurysms of meningeal middle artery (MMA) are extremely rare. These aneurysms are of two types: true aneurysm and pseudoaneurysm. The true type is usually seen with pathologic conditions**.** Pseudoaneurysms, on the other hand, are associated with a skull fracture. Epilepsy caused by MMA aneurysm has never been described to our knowledge. We report a case of true aneurysm isolated from MMA revealed by epilepsy.

Case Description: A 57-year-old patient with a history of high blood pressure developed epilepsy which was treated by valproic acid. Initial scalp electroencephalography (EEG) showed seizure activity arising from the right temporal area. Epilepsy had become drug-resistant. Cerebral angiography revealed an aneurysm of the right middle meningeal artery without any other intraparenchymal anomaly. The interrogation did not reveal any history of family aneurysm. The patient underwent surgery with coagulation of the aneurysm and the MMA. The aneurysm was intradural in contact with the temporal cortex, and the surrounding brain tissues were preserved. The operative follow-up was favorable with amelioration of convulsions with a single antiepileptic. We planned to stop antiepileptic treatment according to electroencephalograms.

Conclusions: Aneurysms of the MMA are rare. Their mode of revelation by seizures is unusual. The factors of rupture are not known. When isolated, their physiopathology is identical to that of the aneurysms of the Willis polygon. Their management uses the same techniques as for other cerebral aneurysms.

Key Words: Aneurysm, epilepsy, middle meningeal artery

Access this article online

Website: www.surgicalneurologyint.com

DOI: 10.4103/sni.sni_159_17

Quick Response Code:

INTRODUCTION

Aneurysms of the meningeal middle artery (MMA) are extremely rare in comparison with the frequency of cerebral aneurysms. Aneurysms of the MMA are of two types: true aneurysm and pseudoaneurysm.[2,12] True aneurysm is usually seen with pathologic conditions such as Paget disease, hypertension, meningioma, and dural arteriovenous malformations and shares the same

How to cite this article: Kpelao E, Beketi KA, Ahanogbe K, Moumouni AK, Doleagbenou AK, Egu K, *et al.* Middle meningeal artery aneurysm: Case report. Surg Neurol Int 2017;8:172.
http://surgicalneurologyint.com/Middle-meningeal-artery-aneurysm:-Case-report/

histologic characteristics with cerebral aneurysms.[12] Pseudoaneurysms, on the other hand, are associated with a skull fracture causing a tear in the arterial wall in most cases. The incidence of epilepsy in patients with unruptured intracranial aneurysm is estimated to be about 2.9–5.0% in the literature; the most frequent localization of the epileptogenic aneurysms was on the middle cerebral artery (MCA), and in most case reports, the aneurysms were large or giant.[5,15] Epilepsy by the aneurysm of MMA has never been described to our knowledge. We report a case of isolated aneurysm from MMA revealed by epilepsy.

CASE REPORT

A 57-year-old patient, nonsmoker and occasional drinker, with a history of high blood pressure who had suffered from seizures for 18 years concomitant to the discovery of high blood pressure. Initial scalp electroencephalography (EEG) showed seizure's activity arising from the right temporal area. A noninjected cerebral computed tomography (CT) scan was then performed without abnormality. It was then treated as vascular epilepsy by vaproic acid. The drug resistance of this epilepsy motivated cerebral angiography. The neurological examination was normal. Cerebral angiography revealed an aneurysm of the right middle meningeal artery without any other intraparenchymal anomaly [Figure 1]. Magnetic resonance imaging was not done. There was no familial case of aneurysm and no history of head trauma. The patient underwent surgery with coagulation of the aneurysm and the MMA. The aneurysm was intradural in contact with the right temporal cortex, surrounding brain tissues were preserved. The operative follow-up was favorable with amelioration of convulsions with a single antiepileptic for 1 year. We plan to stop antiepileptic treatment according to electroencephalograms.

DISCUSSION

The aneurysm of the MMA is rare.[2,12] When associated with intracranial diseases, this pathology generates enough hemodynamic stress on the external carotid flow to be possibly responsible for these aneurysms. This suggests that increased hemodynamic stress contributes to the formation of MMA aneurysms.[1] About 70–90% of traumatic MMA pseudoaneurysms are also associated with fracture across the MMA.[7,9] Tearing of the arterial wall by skull fracture or by separation of the dura mater and bone has been suggested.[14] When no risk factors were noted, it was suggested that pathophysiology is similar to that of the aneurysms of the Willis polygon. Indeed, Hassler reported that, after MMA passes through the foramen spinosum, the structure is identical with the intracranial arteries, and medial defects are common at the bifurcation. Such medial defects are the most

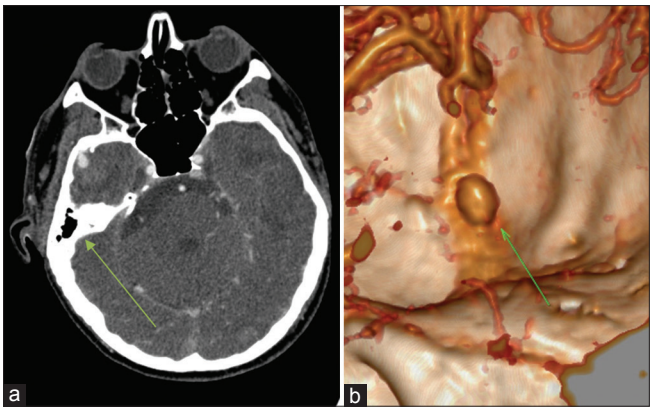

Figure 1:Aneurysm of the right middle meningeal artery in contact with the temporal cortex at angioscanner (a), visualization in 3D reconstruction (b)

important pathogenetic factor in the formation of intracranial saccular aneurysms.[4,6,13] We retain this mechanism in the occurrence of the aneurysm in our patient because the only risk factor that she presented was high blood pressure. Although some aneurysms were found incidentally, several have presented with epidural, subdural, subarachnoid, intraparenchymal, or intraventricular hemorrhage.[1,2] The mode of revelation by convulsions is unusual in this pathology. In our cases, seizures were caused by the MMA. This hypothesis was supported by the correlation between localization of the aneurysm and epileptic focus determined by EEG. Several mechanisms have been postulated to explain the seizures caused by unruptured intracranial aneurysm that can be transposed for the MMA.[3,8,10,11,16] It is explained in our case by the irritation of the temporal cortex by the aneurysm. Drug resistance may indicate the evolutionary character of the aneurysm or a prerupture phase. The natural history of nontraumatic MMA aneurysms is unclear because of their rarity. Breakdown factors are not known. Some authors recommend that treatment be carried out without any delay because of the risk of rupture. No established therapy exists, however, and the choice of surgical versus endovascular treatment of MMA aneurysms may be determined by other factors, such as the need for surgical evacuation of a hematoma.[12] Both surgical and endovascular therapies (coils, glue) have been performed successfully.[2,14] In our patient, the existence of an irritative focal syndrome resistant to medical treatment gave us the surgical indication, even if the aneurysm was not broken. In contrast to nontraumatic true aneurysms, which have a good prognosis, the prognosis in traumatic pseudoaneurysms has been reported to be generally poor.[2]

CONCLUSIONS

Aneurysms of the middle meningeal artery are rare. Their mode of revelation by the seizures is unusual. The factors

of rupture are not known. They are often posttraumatic or the consequence of perturbation of the cerebral circulation induced by other associated pathologies. When isolated, their physiopathology is identical to that of the aneurysms of the polygon of Willis. Their management uses the same techniques as for other cerebral aneurysms.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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