

# Complete spontaneous thrombosis of a non-giant middle cerebral artery aneurysm: report of two cases

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## ABSTRACT

Spontaneous intra-aneurysmal thrombosis occurs in approximately 50% of giant intracranial aneurysms. The incidence of this process is associated to location, size, and origin, and the natural history of spontaneous thrombosis occurrence in non-giant aneurysms is rare and still unclear. We describe two non-giant middle cerebral artery (MCA) aneurysms that spontaneously thrombosed and comment the aspects of the literature.

## KEYWORDS

Intracranial aneurysm, embolism, intracranial thrombosis, middle cerebral artery.

## RESUMO

**Trombose espontânea de aneurisma da artéria cerebral média: relato de dois casos**

Trombose intra-aneurismática espontânea ocorre em aproximadamente 50% dos aneurismas intracranianos gigantes. A incidência é associada a localização, tamanho e origem, e a história natural da ocorrência de trombose espontânea em aneurismas não gigantes é rara e ainda indefinida. Descrevemos dois aneurismas de artéria cerebral média com trombose espontânea e comentamos os aspectos da literatura.

## PALAVRAS-CHAVE

Aneurisma intracraniano, embolia, trombose intracraniana, artéria cerebral média.

## Introduction

Spontaneous intra-aneurysmal thrombosis is a well-documented phenomenon that has been noted in approximately 50% of giant intracranial aneurysms (defined as having exceeded 25 mm in maximum diameter),<sup>1</sup> as well as being the topic of many case reports. The incidence of this process varies depending on location, size, and origin, and several of which have been found in various locations;<sup>2</sup> however, the natural history of spontaneous thrombosis occurrence in non-giant aneurysms is rare and still unclear. Following, we describe two non-giant middle cerebral artery (MCA) aneurysms that spontaneously thrombosed.

of an acute pancreatitis. On admission, he had a grand mal seizure. There was no previous medical history of convulsions, head trauma, drug or alcohol abuse, and there was no family history of epilepsy. A cranial computed tomography (CT) revealed the existence of calcification at the right Sylvian fissure, compatible with a middle cerebral artery aneurysm. CT angiography demonstrated the presence of a saccular aneurysm at the right M1-M2 segment of MCA bifurcation, partially thrombosed, with a maximum diameter of 8 mm. Digital cerebral angiography confirmed a complete thrombosis of the right MCA aneurysm. The patient was treated with antiepileptic medications and progressed favorably, returning home without any deficits 20 days later following his admission.

## Case reports

### Case 1

The patient was a 73-year-old man with a history of DM and cardiac disease, and was admitted because

### Case 2

An 87-year-old woman, with no significant medical history, was admitted due to a sudden Broca aphasia. A cranial CT revealed a calcified nodular image at left Sylvian fissure, and distal inferior temporal ischemic area.

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CT angiography was performed and demonstrated a left middle cerebral artery aneurysm. Digital cerebral angiography evidenced a complete thrombosis of the aneurysm. The patient received conservative management and presented progressive language recovering with continuous physiotherapy and phonoaudiology follow-up.

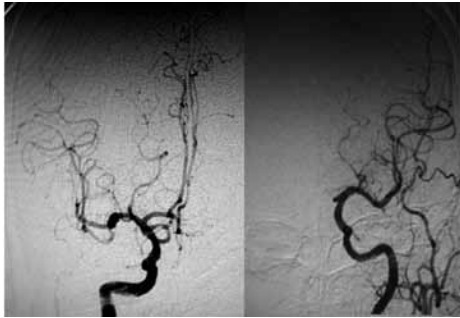


Figure 1 - Cerebral digital angiography: Left: thrombosed right MCA aneurysm; Right: thrombosed left MCA aneurysm. MCA - middle cerebral artery.

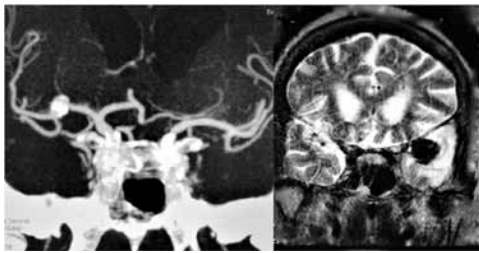


Figure 2 - Left: CT angiography presenting right MCA aneurysm; Right: coronal MRI presenting left MCA aneurysm.

## Discussion

Thrombosis of an aneurysm is frequently seen in cases of giant aneurysm, and several case studies on complete thrombosis have been reported;<sup>1</sup> however, cases in which the thrombosis occurs in non-giant aneurysms are rare. Spontaneous intra-aneurysmal thrombosis has been noted in approximately 50% of giant intracranial aneurysms (defined as any aneurysms that has exceeded 25 mm in maximum diameter).<sup>1,3</sup>

Total thrombosis of the aneurysm is estimated to occur with a frequency of 1% to 20%;<sup>3</sup> nevertheless, it is a rare situation in non-giant aneurysms. Although other biophysical and dynamic parameters contribute to the balance between thrombogenesis and thrombolysis within the aneurysm, the volume-to-neck ratio of the aneurysm appears to be the major contributing factor.<sup>4</sup> In fact, the relationship between the fundus size and the aneurysm's neck determines the degree of turbulence or stagnation of blood inside the lesion. In aneurysms with a relatively small neck, intraluminal thrombosis may occur. Spontaneous aneurysm thrombosis during treatment with antifibrinolytic drugs can be caused by local

inhibition of plasminogen activators in and around the aneurysm wall. Since the natural history of spontaneous thrombosed aneurysms is still unclear, it is not possible to predict when it may recanalize. Cohen *et al.*<sup>2</sup> reported a case of complete thrombosis followed by spontaneous recanalization of a giant MCA aneurysm. This may occur in giant unruptured intracranial aneurysms; however, this mechanism is poorly understood. Liquefaction of the thrombus and subsequent intrathrombotic dissection by blood flow is one possible explanation.

The incidence of spontaneous thrombosis of intracranial aneurysms varies according to location, size, and origin, and several of which have been found in different sites.<sup>5</sup> The clinical manifestations of unruptured giant aneurysms are primarily due to the mass effect. Depending on location, these symptoms include headaches, cranial nerve compressions, transient ischemic attacks or multifocal cerebral infarcts by dislodged intra-luminal thrombus, as described in case 2. Only 10%-15% of intracranial aneurysms are symptomatic, with the majority being identified incidentally during evaluation for other conditions. In case 1, diagnosis occurred during investigation of seizures. Such manifestation is unusual in unruptured cerebral aneurysms and rarely included in the differential diagnosis of patients presenting epilepsy. Giant aneurysms are reported to cause epileptic seizure more often than smaller ones.

Digital intra-arterial angiography is the tried and true method for the diagnosis and analysis of the aneurysm's anatomy, but there is no consensus regarding the management of spontaneously thrombosed aneurysms. Continuous follow-up will provide information about their natural history.

## References

1. Morley TP, Barr HW. Giant intracranial aneurysms: diagnosis, course, and management. *Clin Neurosurg.* 1969;16:73-94.
2. Cohen JE, Rajz G, Umansky F, Spektor S. Thrombosis and recanalization of symptomatic nongiant saccular aneurysm. *Neurol Res.* 2003;25(8):857-9.
3. Whittle IR, Williams DB, Halmagyi GM, Besser M. Spontaneous thrombosis of a giant intracranial aneurysm and ipsilateral internal carotid artery. Case report. *J Neurosurg.* 1982;56(2):287-9.
4. Black SP, German WJ. Observations on the relationship between the volume and the size of the orifice of experimental aneurysms. *J Neurosurg.* 1960;17:984-90.
5. Edner G, Forster DM, Steiner L, Bergvall U. Spontaneous healing of intracranial aneurysms after subarachnoid hemorrhage. Case report. *J Neurosurg.* 1978;48(3):450-4.

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