

Case Report

Mixed aneurysm: A new proposed nomenclature for a rare condition

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Abstract

Background: Mixed intracranial aneurysms are vascular lesions appearing in the ruptured saccular aneurysms whose blood is contained by perivascular tissues forming another cavity called pseudoaneurysm. All cases until now have been reported in the literature with subarachnoid hemorrhage.

Case Description: A 65-year-old woman presented with multiple brain aneurysms with no history of subarachnoid hemorrhage. Endovascular treatment was chosen for left-sided aneurysms [lateral carotid wall (LCW) and posterior communicating (PCom)]. After the embolization of the LCW aneurysm, the patient developed a left third nerve palsy. A head computed tomography scan was immediately performed which did not show any SAH. The control angiography demonstrated PCom aneurysm with intraaneurysmal contrast retention even in the venous phase, along with modification of the aneurismal sac format, leading to diagnoses of mixed aneurysm. The PCom aneurysm was successfully coiled and an operation was performed to clip the right side aneurysms. The patient was discharged after 10 postoperative days.

Conclusion: Mixed intracranial aneurysm has special radiological characteristics that should be promptly recognized to offer the best treatment.

Key Words: Brain aneurysm, dissection, endovascular

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INTRODUCTION

Intracranial pseudoaneurysm formation due to ruptured nontraumatic saccular aneurysm is extremely rare. All the cases described till date presented with subarachnoid hemorrhage,^[3] or with formation during arteriography performance, called formation of a pseudoaneurysm in real time.^[1] In the present reported case, we present an aneurysm that caused cranial nerve paralysis by mechanical compression and formation of a pseudoaneurysm without subarachnoid hemorrhage.

CASE REPORT

We report the case of a 65-year-old female patient being investigated for chronic headache. During a magnetic

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resonance imaging (MRI) study, on suspicion of multiple intracranial aneurysms, the patient was referred to the neurosurgery service for further investigation and treatment of possibly vascular aneurysmal malformations. Digital cerebral angiography showed aneurysms located at the posterior communicating artery (PCom) bilaterally, supraclinoid left carotid lateral wall (LWC), and at anterior communicating artery (ACoM) [Figure 1]. The treatment choice was endovascular coiling of the aneurysms located at the left side followed by microsurgery on the right side to treat the saccular aneurysmatic PCom and ACoM.

First embolization of the saccular aneurysm of the left LCW artery was performed with good angiographic and clinical results; however, on the first day after embolization, the patient developed sudden left side third nerve injury. Computed tomography (CT) of the head was immediately performed, which did not show any SAH, and hence, the third nerve paralysis was attributed to edema of the coiled aneurysmal sac.

After 7 days, a new angiography was performed to evaluate the previous coiling of the left LCW and to coil the left PCom. The LCW was nicely coiled; with respect to the left PCom, there was intraaneurysmal contrast retention even in the venous phase of the angiography along with modification of the aneurysmal sac format

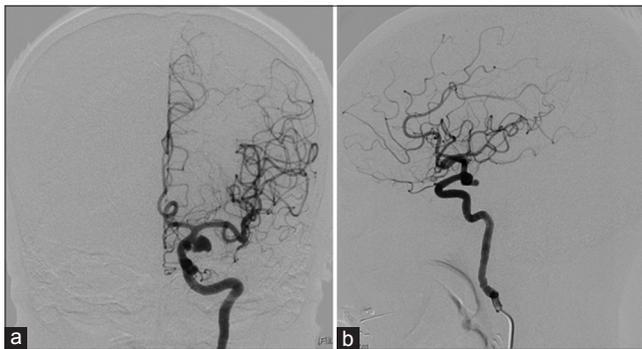


Figure 1: (a) Left internal carotid AP and lateral (b) aneurysms of lateral carotid wall and PCom aneurysm



Figure 2: (a) Left internal carotid demonstrating two saccular aneurysms; (b) the coiled LWC aneurysm and Pcom aneurysm with format modification; (c) the contrast medium retention even in the venous phase

[Figures 2 and 3], which indicated the possibility of pseudoaneurysm formed due to previous intrawall break because there was a previous angiogram showing the same saccular aneurysm without dissection signals. Although aware of the risk of the transoperative rupture, we chose the endovascular technique for treating this lesion in a subtotal manner exclusion because it was assumed to be a permeable cervix because of desiccant injury substance.

At this time, after embolization treatment in the left side aneurysms, a microsurgery was performed by right mini-modified orbitozygomatic approach^[2] to clip both the aneurysms (PCom and ACoM) in the same procedure.

DISCUSSION

A pseudoaneurysmatic injury occurs by total rupture or part of the arterial wall and consequent blood extravasation contained by perivascular tissue maintaining the continuity between the true lumen and the cavity neofromada, which is known as false lumen; in some cases, this occurs at the place where there is a saccular aneurysm and the injury forms a mixed aneurysm.^[5,9]

At present, there is no clear definition of what terminology should be adopted for this type of injury; cavitations pseudoaneurysm, mixed aneurysms, ghost aneurysm, or saccular aneurysms associated with dissection.^[7] The authors prefer the terminology of mixed aneurysms by histology and accurately describe the process of the formation of this type of injury, although the reported cases provide little or no histological information.

Namura *et al.* described, for the first time, the mixed aneurysms as cavitation pseudoaneurysms,^[8] in all cases with subarachnoid hemorrhage and angiographic presentation of the aneurysmal lesion from the beginning with typical radiological features. We believe that our case is unique because the patient had undergone performed cerebral angiography 1 week earlier with the usual radiological characteristics of a saccular aneurysm and because a week later, following third nerve palsy, a

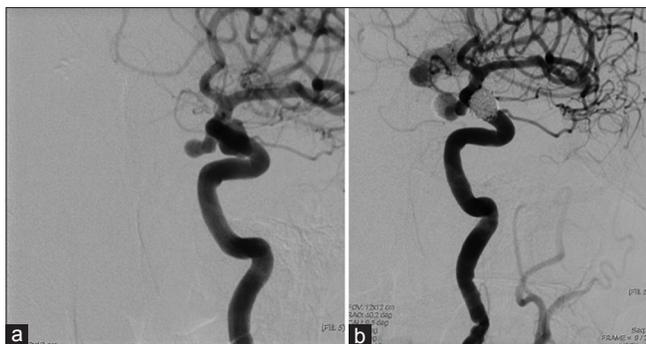


Figure 3: (a) Left internal carotid projection demonstrating two saccular aneurysms; (b) the coiled LWC aneurysm and Pcom aneurysm with format modification

new angiography was performed which showed evidence of mixed aneurysmal lesion with obvious radiological characteristics.

The characteristics of mixed aneurysms are related to the aneurysmal fundus and neck shape changings. The present report showed this changings through previous angiography, as well as the usual clinical picture concerning the third nerve palsy. Therefore, it appears that the rupture of the aneurysmal sac caused the formation of a thrombus and contained the SAH formation with consequent compression of the third nerve. In addition, it revealed a slow opacification and retention of contrast intrasaccular even at venous phase, which is an important indicator of pseudoaneurysmatic formation.

It must be emphasized that the format change characteristics and contrast retention are shared with any pseudoaneurysm, however, what distinguishes this case from the others is angiographic evidence of the modification of aneurysmal sac format. There is also a tendency to incorrectly attribute this type of injury to partially thrombosed aneurysms.^[7]

There is no agreement regarding the treatment of mixed aneurysms. Lempert *et al.*^[6] reported transoperative rupture during embolization in three cases, however, other authors suggested that embolization be restricted to the true aneurysm segment. In this case, being aware of the possibility of rupture, we opted for the endovascular treatment because it is a suitable-sized aneurysm, and it

was thought that there was a safe distance between the neck and the aneurysmal wall for microcatheterization without extensive manipulation of the aneurysmal wall.^[4]

Furthermore it is important to note that there was a portion of false aneurysmal sac, however, there was certainly a real wall portion, which allowed the implantation of detachable microcoils as usual.^[8]

CONCLUSION

Mixed aneurysmal lesions are rare but very particular characteristics, which should be readily recognized to offer the best treatment for this type of condition.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. D'Urso PI, Loumiotis I, Milligan BD, Cloft H, Lanzino G. "Real time" angiographic evidence of "pseudoaneurysm" formation after aneurysm rebleeding. *Neurocrit Care* 2011;14:459-62.
2. Figueiredo EG, Deshmukh P, Nakaji P, Shu EB, Crawford N, Spetzler RF, *et al.* An anatomical analysis of the mini-modified orbitozygomatic and supra-orbital approaches. *J Clin Neurosci* 2012;19:1545-50.
3. Ide M, Kobayashi T, Tamano Y, Hagiwara S, Tanaka N, Kawamura H. Pseudoaneurysm formation at the rupture site of a middle cerebral artery aneurysm--case report. *Neurol Med Chir* 2003;43:443-6.
4. Ito H, Morishima H, Onodera H, Wakui D, Uchida M, Sase T, *et al.* Acute phase endovascular intervention on a pseudoaneurysm formed due to rupture of an anterior communicating artery aneurysm. *BMJ Case Rep* 2014;2014.
5. Larson PS, Reisner A, Morassutti DJ, Abdulhadi B, Harpring JE. Traumatic intracranial aneurysms. *Neurosurg Focus* 2000;8:e4.
6. Lempert TE, Halbach VV, Higashida RT, Dowd CF, Urwin RW, Balousek PA, *et al.* Endovascular treatment of pseudoaneurysms with electrolytically detachable coils. *AJNR Am J Neuroradiol* 1998;19:907-11.
7. Mori K, Kasuga C, Nakao Y, Yamamoto T, Maeda M. Intracranial pseudoaneurysm due to rupture of a saccular aneurysm mimicking a large partially thrombosed aneurysm ("ghost aneurysm"): Radiological findings and therapeutic implications in two cases. *Neurosurg Rev* 2004;27:289-93.
8. Nomura M, Kida S, Uchiyama N, Yamashita T, Yoshikawa J, Yamashita J, *et al.* Ruptured irregularly shaped aneurysms: Pseudoaneurysm formation in a thrombus located at the rupture site. *J Neurosurg* 2000;93:998-1002.
9. Yanamadala V, Lin N, Zarzour H, Frerichs KU, Walcott BP, Thomas AJ, *et al.* Endovascular coiling of a ruptured basilar apex aneurysm with associated pseudoaneurysm. *J Clin Neurosci* 2014;21:1637-40.