



## Image Report

# Massive intracerebral hemorrhages due to peripheral middle cerebral artery aneurysm rupture: A case report with a surgical video

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## ABSTRACT

**Background:** Saccular aneurysm in the distal segment of the middle cerebral artery (DMCA) occurs very rarely and often represents with a rupture. We report a successful surgical case of a DMCA aneurysm rupture with large cerebral and subarachnoid hemorrhage.

**Case Description:** A 44-year-old female presented a sudden onset headache and coma (the Glasgow Coma Scale was 3). Head computed tomography (CT) revealed a subarachnoid hemorrhage around the right Sylvian fissure and large intracranial hematoma in the right parietal lobe. The CT angiography showed a saccular aneurysm in the peripheral cortical segment of the right angular branch of the right DMCA. We decided to perform a right craniotomy to evacuate hematoma and interrupt the aneurysm. Just after the dural incision, the aneurysm ruptured again. We applied a temporary clip on the artery proximal to the aneurysm before excising it.

**Conclusion:** Aneurysm in DMCA can be treated safely with surgical excision and risk of sudden recurrent hemorrhage needs to be anticipated.

**Keywords:** Distal middle cerebral artery aneurysm, Intracerebral hemorrhage, Surgery video

## INTRODUCTION

Saccular aneurysm in the distal segment of the middle cerebral artery (DMCA) without a bacterial origin is a very rare occasion, consisting 1.1–7% of all middle cerebral artery (MCA) aneurysms. Little is known regarding its natural history or its management. Herein, we report a case of DMCA rupture without a bacterial origin accompanied by a large intracerebral hemorrhage and needed microsurgical excision of the aneurysm and evacuation of hematoma.

## CASE PRESENTATION

A 44-year-old female presented with a severe, sudden onset headache accompanied by vomiting. She had no history of head trauma, infectious disease, and hypertension. Upon admission, the patient's Glasgow Coma Scale (GCS) score was 3. Routine blood analysis performed immediately upon admission was normal. Cardiac ultrasound examination revealed no valvular disease or any

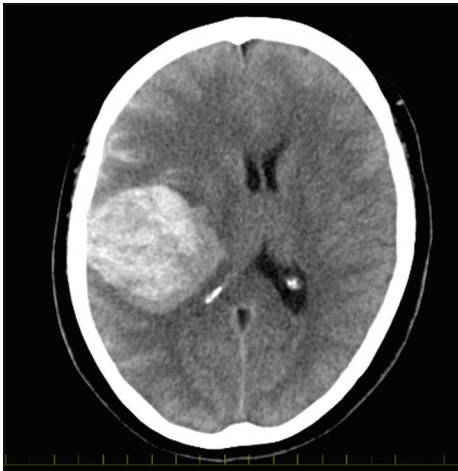
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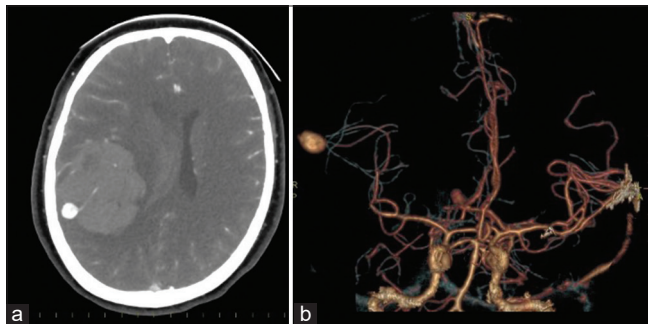
other abnormal findings. Neurological examination revealed left hemiplegia and right pupil dilation. Head computed tomography (CT) revealed a subarachnoid hemorrhage around the right Sylvian fissure and large intracranial hematoma (ICH) in the right parietal lobe [Figure 1]. The CT angiography revealed a saccular aneurysm in the peripheral cortical segment of the right angular branch of right DMCA [Figure 2].

A right craniotomy was done immediately to evacuate the ICH and excise the aneurysm. Following dural incision, a massive arterial hemorrhage occurred due to re-ruptured of the aneurysm. We applied a temporary clip proximal to the aneurysm to stop the bleeding. We checked both proximal and distal arterial courses of the aneurysm, confirmed a limited blood supply within the cerebral cortex with ICH, and removed the aneurysm from the angular artery [Video 1].

Therapeutic approaches for cerebral vasospasm following SAH post-surgery included ventricular drainage, induced hypertension and blood volume expansion, and antiplatelet therapy. Post-operatively, left hemiplegia recovered gradually



**Figure 1:** Non enhanced computed tomography scan showed a large hematoma and subarachnoid hemorrhage on the right parietal lobe.



**Figure 2:** The enhanced computed tomography (CT) scans in axial showed the saccular aneurysm in the cortical segment of the right angular artery (a). The 3D CT-angiography rendering (b).

with physical rehabilitation. The patient was discharged from the hospital 8 weeks after admission with GCS of 15 and classified as grade 3 on the modified Rankin scale.

## DISCUSSION

PMCA without a bacterial origin is very rare condition, consisting 1.1–7% of all MCA aneurysms.<sup>[1,4,5]</sup> Due to its rarity, little is known regarding its natural history and management. However, half of the ruptured PMCA had ICH and highly rebled, which is directly related to poor outcome.<sup>[2,3]</sup> This clinical entity's problem is the need for emergency evacuation for massive ICH due to PMCA rupture. However, no study reported on its best surgical management.

Concerning its high rebleeding rate, some reports referred an association between rebleeding and the external ventricular drainage, which is an effective treatment to immediately decrease intracranial pressure (ICP). A sudden ICP decrease may be related to rebleeding. This fit to our case, in which rebleeding was seen following craniotomy.

Progression in the field of endovascular treatment (EVT) enables surgeons to treat PMCA rupture.<sup>[5]</sup> Baltacioglu reported a successful case of coil embolization of PMCA. LvN reported four cases of ruptured PMCA with EVT, which were all treated for parent artery occlusion, using coil and glue. One case needed surgical ICH evacuation. From our experience, EVT might be considered in the case accompanied with a small hematoma, while those with large hematoma, direct surgery is superior to EVT for ruptured DMCA aneurysm cases.

## CONCLUSION

Here, we report a successful treatment of a PMCA rupture with a large ICH. We have to be ready to perform microsurgery promptly in the case of rebleeding.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. Ahn JY, Han IB, Joo JY. Aneurysm in the penetrating artery of the distal middle cerebral artery presenting as intracerebral

- haemorrhage. *Acta Neurochir (Wien)* 2005;147:1287-90; discussion 1290.
2. Calvacante T, Derrey S, Curey S, Langlois O, Fréger P, Gérardin E, *et al.* Distal middle cerebral artery aneurysm: A proposition of microsurgical management. *Neurochirurgie* 2013;59:121-7.
  3. Dashti R, Hernesniemi J, Niemelä M, Rinne J, Lehecka M, Shen H, *et al.* Microneurosurgical management of distal middle cerebral artery aneurysms. *Surg Neurol* 2007;67:553-63.
  4. Elsharkawy A, Lehečka M, Niemelä M, Billon-Grand R, Lehto H, Kivisaari R, *et al.* A new, more accurate classification of middle cerebral artery aneurysms: Computed tomography angiographic study of 1, 009 consecutive cases with 1, 309 middle cerebral artery aneurysms. *Neurosurgery* 2013;73:94-102; discussion 102.
  5. Lv N, Zhou Y, Yang P, Li Q, Zhao R, Fang Y, *et al.* Endovascular treatment of distal middle cerebral artery aneurysms: Report of eight cases and literature review. *Interv Neuroradiol* 2016;22:12-7.

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