

Case Report

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Frontobasal Aneurysm: Relatively a Rare Neurosurgical Entity

Distal Anterior Cerebral Artery (DACA) aneurysms are rarer. Its more so with the aneurysm of fronto basal branch of DACA. These aneurysms are smaller in size and are multiple in number in many instances. They rupture easily and present with intracerebral hemorrhage (ICH) in addition to subarachnoid hemorrhage (SAH).

Here we present a male patient with SAH and left frontal base interhemispheric ICH. CT angiography showed multiple small aneurysms at right frontobasal artery. Successful clipping of all the aneurysms was done in the single sitting by left pterional craniotomy and subfrontal and interhemispheric approach.

Keywords: frontobasal aneurysm, SAH, surgery

Distal anterior cerebral artery (DACA) ie A2 segment and more distal branches are one of the uncommon locations for intracerebral aneurysms. Though not clear, total incidence of aneurysm in this location is reported to be about 1 %.^{1,5,6,7,10} More common location in this region is branches of A2 just inferior to or anterior to genu of corpus callosum or pericallosal artery. The rarest one in this region is frontobasal branch.^{6,7} The aneurysms in this location have some typical morphological features like small in size, broad base, multiple in number etc.¹⁰ Moreover they have higher tendency of rupture due to lack of arachnoid support in this region. So they need prompt and appropriate treatment.

Frontobasal artery is the first branch of A2 segment arising just distal to anterior communicating artery running to the base of frontal lobe. It is also known as Medial Orbitofrontal artery distal to which arises frontopolar artery. The lateral counter part of this artery is lateral Orbitofrontal artery which is a brach of middle cerebral artery.

Aneurysms arising from frontobasal artery are reported to be rare, it is more so with multiple ones. Here we present a case of multiple aneurysms arising from the frontobasal branch of anterior cerebral artery which were clipped successfully.

Case Report

A 50-year-old male patient presented to the emergency unit with severe headache and loss of consciousness since 2 days back. After primary evaluation, CT scan was done which showed anterior interhemispheric hemorrhage with small frontobasal intracerebral hematoma (**Figure 1**). CT angiography showed two saccular aneurysms in the frontobasal branch of left anterior cerebral artery (**Figure 2**). Surgical clipping was planned through left frontal craniotomy and combined interhemispheric and subfrontal approach. Interhemispheric and subfrontal dissection was done. Distal branch of A2 segment of left anterior cerebral artery just distal to anterior communicating

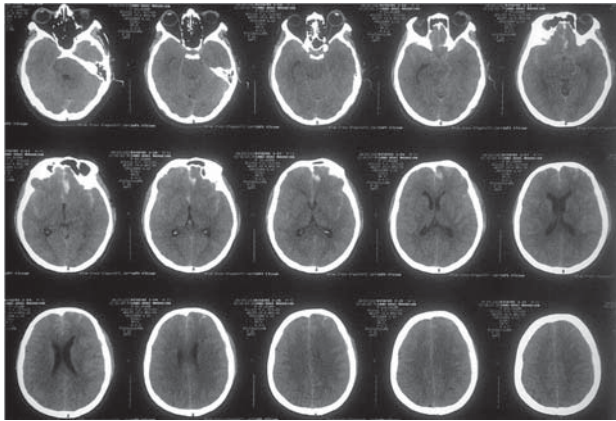


Figure 1: CT scan of brain showing subarachnoid hemorrhage and tiny intracerebral hemorrhage in interhemispheric fissure and bilateral sylvian fissure

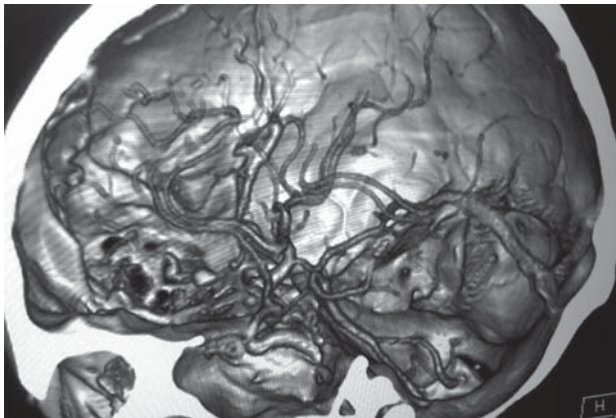


Figure 2: CT angiography of cerebral vessels showing two saccular aneurysms in the frontobasal branch of left anterior cerebral artery

artery was identified from interhemispheric/ subfrontal approach. Frontobasal artery identified and traced more distally. A tiny microaneurysm was identified arising from the trunk of the parent artery which was coagulated with bipolar coagulator and wrapped with hemostatic agent. A saccular aneurysm was identified at the bifurcation of the parent artery. Aneurysm was clipped. After clipping the aneurysm, further distal dissection showed another saccular aneurysm which was also clipped successfully. There were total 3 aneurysms treated in the same sitting.

Patient was monitored in ICU for one day and in general ward for another few more days and was discharged from hospital on 6th post operative day without any neurological deficit (Figure 3).

Discussions

As explained above frontobasal artery aneurysms are rare entity in neurosurgery. There are plenty of case reports of distal A2 aneurysm other than that originating from

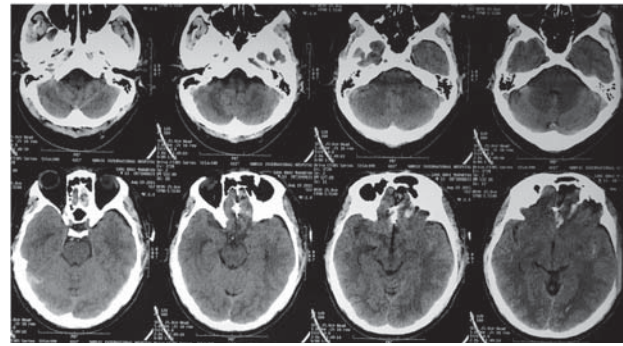


Figure 3: Post Op CT scan of brain showing post operative changes and clip insitu in interhemispheric fissure

frontobasal artery.² However, only few cases have been reported about the cases arising from frontobasal artery. Sekerci et al found <3% of DACA in their total series of intracranial aneurysms.¹⁰ However, they didn't find any in frontobasal artery. The commonest location they found was junction of pericallosal and callosomarginal artery. They also found significant proportion of cases with multiple aneurysms as was in our case.

Distal A2 aneurysms tend to rupture easily irrespective of their size due to arachnoid support in this anatomical location.⁵ Therefore they need prompt and appropriate treatment. We clipped the aneurysm on 2nd post rupture day.

These aneurysms usually present with intracerebral hemorrhage or intraventricular hemorrhage in addition to subarachnoid hemorrhage due to their wide base.⁵ Our case also presented with small intracerebral hematoma. Martin et al also reported multiple aneurysms in more than 50% of cases in their series.⁵ Our case also had multiple aneurysms as has been mentioned in other literatures.

Occasionally, these aneurysms need to be trapped and the parent artery need to be sacrificed due to their huge size, morphological structure such as fusiform in shape or due to anatomical location. Instead, bypass surgery is needed to maintain the circulation.^{2, 8, 11}

These aneurysms are difficult to locate due to their deep location and smaller parent arteries.⁴ They are located in the narrow interhemispheric space. The present technology is to use the neuronavigation not to miss the aneurysm as mentioned by Kim TS et al.³ Therefore we went through two approaches, interhemispheric and subfrontal to exactly locate the aneurysm. Though it was difficult to exactly find the aneurysm, we could successfully clip all the aneurysms.

Endovascular coiling is another way of treating these lesions. Since we don't have this technology yet in Nepal, we straightly went for clipping.⁹

DACA aneurysms are said to have poorer prognosis due to above mentioned complications and surgical difficulties.⁹ It is more so in case of multiple aneurysms. Despite all the difficulties and technical limitation, we successfully treated all the aneurysms in the single sitting.

References

1. Alurkar A, Karanam LS, Oak S, Nayak S. Endovascular treatment of fusiform A2 aneurysm with parent artery occlusion. **Surg Neurol** **30**: 199-202, 2014
2. Chen PR, Abla AA, McDougall CG, Spetzler RF, Albuquerque FC. Surgical techniques for unclippable fusiform A2-anterior cerebral artery aneurysms and description of a frontopolar-to-A2 bypass. **World Neurosurg** **81**: 441, 2014
3. Kim TS¹, Joo SP, Lee JK et al. Neuronavigation-assisted surgery for distal anterior cerebral artery aneurysm. **Minim Invasive Neurosurg** **50**:140-144, 2007
4. Lee JW, Lee KC, Kim YB, Huh SK. Surgery for distal anterior cerebral artery aneurysms. **Surg Neurol** **70**: 153-159, 2008
5. Lehecka M¹, Dashti R, Hernesniemi J et al. Microneurosurgical management of aneurysms at the A2 segment of anterior cerebral artery (proximal pericallosal artery) and its frontobasal branches. **Surg Neurol** **70**: 232-246, 2008
6. Lehecka M¹, Dashti R, Lehto H, Kivisaari R, Niemelä M, Hernesniemi JA. Distal anterior cerebral artery aneurysms. **Acta Neurochir Suppl** **107**:15-26, 2010
7. Lehecka M, Porras M, Dashti R, Niemelä M, Hernesniemi JA. Anatomic features of distal anterior cerebral artery aneurysms: a detailed angiographic analysis of 101 patients. **Neurosurgery** **63**: 219-228, 2008
8. Moon HS, Kim TS, Joo SP. Surgical treatment of giant serpentine aneurysm of A2-a3 segment distal anterior cerebral artery: technical case report. **J Korean Neurosurg Soc** **52**: 501-504, 2012
9. Saponiero R, Toriello A, Locatelli G et al. Distal anterior cerebral artery aneurysms: endovascular or surgical treatment? A case report. **Neuroradiol J** **21**: 251-254, 2008
10. Sekerci Z, Sanlı M, Ergün R, Oral N. Aneurysms of the distal anterior cerebral artery: a clinical series. **Neurol Neurochir Pol** **45**: 115-120, 2011
11. Walcott BP, Nahed BV, Kahle KT, Sekhar LN, Ferreira MJ. Cerebrovascular bypass and aneurysm trapping for the treatment of an A2-segment anterior cerebral artery pseudoaneurysm and herniation through a skull base defect following trauma. **J Clin Neurosci** **19**: 149-151, 2012