



## DURABLE CLOSURE OF UNRUPTURED NON SACCULAR SUPERIOR CEREBELLAR ARTERY ANEURYSM AND LITERATURE REVIEW OF SPONTANEOUS INTRACRANIAL ANEURYSM REGRESSION.

### Neurology

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### ABSTRACT

Spontaneous regression of intracranial aneurysms is rare. Only 18 pseudoaneurysms of the superior cerebellar artery have been reported in the literature, the minority of which are located in the cortical segment. An incidentally discovered asymptomatic unruptured cortical segment side wall superior cerebellar aneurysm that demonstrated spontaneous sustained closure has not been reported. This raises the question of considering a conservative approach to treatment with noninvasive serial monitoring, instead of high risk endovascular or surgical management in select patients with such aneurysms.

### KEYWORDS

#### INTRODUCTION

Spontaneous regression of intracranial aneurysms is rare. Documented spontaneous long term durable occlusion of an unruptured broad neck side wall superior cerebellar artery aneurysm has not been previously reported.

#### Case report

A 68-year-old female presented with a history of acute onset left paramedian occipital headache with no associated nausea vomiting, photophobia or neck stiffness. She denied having blurred vision, dizziness, speech difficulties, swallowing problems, abnormal sensations, abnormal movements or weakness. She had no preceding history of trauma or infection and had no significant comorbidities. Her vital signs and physical examination were unremarkable. A focal abnormality in the right paramedian ambient cisternal space was identified by non-contrast CT and MRI of the neurocranium (Fig 1 A and B). A diagnostic catheter based cerebral angiographic study revealed a broad neck 9 mm cortical segment right superior cerebellar artery aneurysm with parent vessel incorporation and intra-aneurysmal contrast stasis (Fig 2 A,B and C). She opted not to have the aneurysm treated by surgical or endovascular means. Her symptoms resolved within a few days. Follow up CT angiography (CTA) of the head obtained two years after discovery demonstrated complete resolution of the aneurysm relative to the initial study (Fig 3 A and B).

#### DISCUSSION

Varied terminology has been used to describe non saccular aneurysms. Descriptors include pseudo, fusiform, truncal and dissecting aneurysms. The majority arise as a result of an underlying vessel dissection [1]. Spontaneous closure of intracranial pseudoaneurysms followed by unanticipated recurrence and enlargement has been described [2]. Occlusive thrombosis of a distal cortical superior cerebellar artery aneurysm after nine months has been reported in a patient with multiple additional aneurysms in whom an aneurysm at the basilar artery and SCA junction was endovascularly treated [3]. Subsequent flow alteration may be postulated as a cause for distal aneurysm closure. Long term durable occlusion of an isolated asymptomatic idiopathic unruptured broad neck side wall cortical segment superior cerebellar artery (SCA) aneurysm has not been previously reported. The location and subsequent complete sustained aneurysm regression in our case is more likely to represent an idiopathic unruptured pseudo aneurysm with spontaneous resolution. There are no described reports for closure of aneurysms at this location.

Only 18 pseudoaneurysms of the SCA have been reported in the literature with the majority in the anterior pontomesencephalic (44%) and lateral pontomesencephalic segments (38%). The remainder being cortical [1]. Patients present either with subarachnoid hemorrhage or ischemia. Pseudo aneurysms lack the full complement of an arterial wall and are either subintimal or subadventitial. These occur mostly

along the side walls of intracranial vasculature as in our case, and are more likely to rupture. Intracranial vasculature lacks an external elastic lamina and have a thinner adventitia. The posterior circulation is more predisposed to adventitial disruption and is therefore vulnerable to SAH. The hemorrhagic risk for rupture is additionally based on the extent to which there is disruption of the media and in dissection types that have only blood entry into the layers of the vessel wall [4]. Histologically pseudoaneurysms are characterized by a perforated or attenuated adventitial layer with or without external thrombus or fibrous tissue, external to the injured segment. Trauma, infection and iatrogenic injury are the most frequent causes. Idiopathic pseudo aneurysm formation may be consequent to diffuse or localized parent vessel atherosclerotic disease [5]. True saccular aneurysms by comparison are a localized focal expansion of all three layers without external thrombus formation in the absence of rupture. Physiologic response to vessel injury confirmed by cadaveric identification of smooth muscle cell proliferation and thrombus formation may be postulated as mechanisms by which pseudo aneurysm occlusion occurs [6]. Spontaneous closure of a cervical vertebral artery pseudo aneurysm has been described and is more commonly identified in the anterior circulation under the alternate descriptive term of blister aneurysms [7]. Spontaneous resolution of an unruptured side wall superior cerebellar pseudoaneurysm in a patient without any of the above mentioned etiologic factors has not been previously reported.

Up to 3% of ruptured aneurysms demonstrate complete closure on follow up angiography. The reasons for spontaneous closure is found in the biophysical and dynamic properties of blood flow in and out of aneurysms as well as the physics of the aneurysm sac itself, resulting in spontaneous intra saccular thrombosis [8]. In the acute rupture setting spontaneous closure may be due to the increase in intracranial pressure. The increased pressure external to the aneurysm and its parent artery reduces blood flow into and out of the aneurysm progressively resulting in blood stasis. [9]. Spontaneous occlusion occurs more frequently in large saccular aneurysms. Large aneurysms allow for intraluminal stasis of blood flow. Blood stagnates in certain areas within the large lumen leading to increased blood viscosity that results in intra aneurysmal thrombosis and aneurysm closure [9]. Iodinated contrast media used for diagnostic cerebral angiography is an activator of coagulation upon contact with blood [10]. Nonionic contrast media in particular has been shown to cause intra-aneurysmal thrombosis, rendering a false negative invasive investigation for a ruptured aneurysm [11]. The geometry of the aneurysm sac can affect visualization of the aneurysm. If an aneurysm has an elongated neck, thrombus may form across the neck leading to intra-aneurysmal thrombosis [12].

Treatment options for SCA aneurysms in the context of rupture include microsurgical clipping, wrapping, STA-SCA bypass with trapping or endovascular coiling with or without parent vessel sacrifice [1, 13]. In aneurysms causing ischemic events treatment includes anti aggregating or anticoagulation medications [1]. This to our

knowledge is the first reported case of an incidentally discovered asymptomatic unruptured side wall superior cerebellar aneurysm that demonstrated spontaneous sustained closure. This raised the question of considering a conservative approach with noninvasive serial monitoring instead of high risk endovascular or surgical management in select patients.

Hayakawa T, Yokota J. Spontaneous disappearance and reappearance of a ruptured cerebral aneurysm: one case found in a group of 33 consecutive patients with subarachnoid hemorrhage who underwent repeat angiography. *Neurol Res.* 2000;22(6):583-587.

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**Figures**

**Figure: 1 A and B**

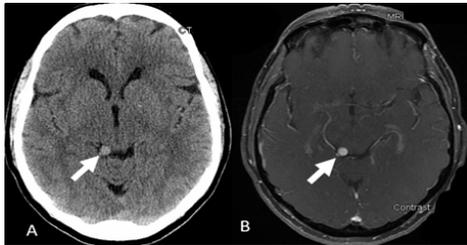


Figure 1 : A and B : Comprable axial sections CT non contrast (A) and MRI with gadolinium(B) through the head, demonstrating a focal abnormality in the right ambient cisternal space (white arrows).

**Figure: 2 A B and C**

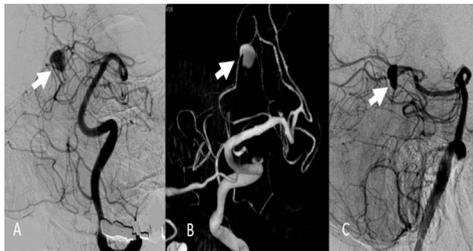


Figure 2: A,B and C: Frontal projection (A), latera projection (B) digital subtraction angiography and shaded surface 3D rendition in the oblique projection (C) left vertebral artery injection confirms a broad neck right superior cerebellar artery aneurysm (white arrows).

**Figure 3: A and B**

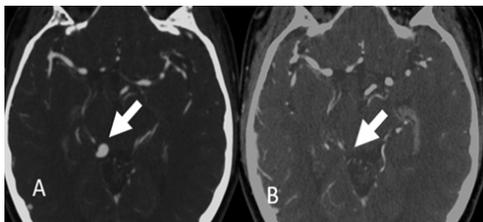


Figure 3 A and B: Follow up CT angiogram (B) as compared to the initial study (A) shows complete resolution of the aneurysm.

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