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Case Report

Thrombosed Large Middle Cerebral Artery Aneurysm in an 18 Year Old Man: A Case Report

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Abstract

An aneurysm is a dilatation of a blood vessel typically an artery and is caused by many factors including injury, diseases such as atherosclerosis or sepsis and congenital defect. Intracranial aneurysms affect 5% of the population. Spontaneous thrombosis of a saccular aneurysm is known to occur in about 40% of giant aneurysms with a greater number in paediatric age group when compared with adult. However, spontaneous thrombosis of a non-giant (<2.5cm) aneurysm is less common.

H. I. is an 18 year old male student who presented with six months history of headache and one month history of seizure. The headache was generalized and throbbing in nature. He is not a known hypertensive, diabetic or sickle cell disease patient. Initial computed tomography (CT) images showed a brilliantly enhancing bilobed mass lesion over the posterior part of frontal horn of the right lateral ventricle. A repeat CT six months later showed a filling defect and calcification at the periphery of the lesion and CT angiography (CTA) revealed a thrombosed aneurysm in the right middle cerebral artery. It measures 2.3cm in its widest transverse diameter and the stalk length measures 0.5cm.

We report a case of thrombosed large right middle cerebral artery (MCA) aneurysm in an adult patient diagnosed with computed tomographic imaging.

Keywords; large aneurysm; thrombosis; adult, computed tomographic angiography

Introduction

An aneurysm is a dilatation of a blood vessel typically an artery and is caused by many factors including injury, diseases such as atherosclerosis or sepsis and congenital defect [1]. Aneurysms are more common in females with male to female ratio of 1:1.37 [2]. They are more common after the age of fifty in females but occur earlier in males [2]. Intracranial aneurysms affect 5% of the population and middle cerebral artery aneurysm account for about 14% to 20% of all intracranial aneurysms [3]. The unruptured aneurysms are morphologically classified into saccular or fusiform and these aneurysms may involve considerable length of the artery. Spontaneous thrombosis of a saccular aneurysm is known to occur in about 40% of giant aneurysms3. This occurs with a greater number in paediatric age group compared to adult4. It may be symptomatic secondary to mass effect or stroke. However, spontaneous thrombosis of a non-giant (<2.5cm) aneurysm is less common [3].

Below is reported a case of thrombosed large middle cerebral artery (MCA) aneurysm in an 18 year old man highlighting the role of imaging in the patient's management.

Case Report

H. I. is an 18 year old male student who presented to the neurology unit of Usmanu Danfodiyo University Teaching Hospital Sokoto with six months history of chronic headache and one month history of seizure. The headache was generalized and throbbing in nature. No history of vomiting. The seizure was also generalized tonic clonic in nature. He had two episodes prior to presentation. No history of weakness of one side of the body. He is not a known hypertensive, diabetic or sickle cell disease patient. No history of renal disease. There was family history of hypertension but no diabetes or sickle cell disease.

Physical examination revealed a young adult, calm, afebrile, not pale, anicteric. His blood pressure was 120/70mmHg. The systemic examinations were unremarkable. The results of laboratory examinations were essentially normal. A provisional diagnosis of suspected intracranial space occupying lesion was made and patient was referred to Radiology department for computed tomographic (CT) scan of the brain.

The non-contrast CT images showed a well outlined bilobed hyperdense (Hounsfield unit=57) mass lesion over the posterior part of frontal horn of the right lateral ventricle (fig.1) which showed brilliant enhancement in the post contrast series. There was associated dilatation of all the ventricles. The brain parenchyma was normal. A diagnosis of cerebral aneurysm was made with meningioma as a differential. Computed tomography angiography (CTA) was advised for further evaluation, but was not done due to financial constraint. However, six months later there was worsening of his symptoms with increase in frequency of seizure

attacks. A repeat CT showed decrease in density of the hyperdense lesion with an incomplete rim of peripheral calcification in non-contrast image (fig.2). The post contrast series showed a filling defect at the periphery of the lesion due to thrombus (fig.3). Computed tomographic angiography (CTA) revealed an outpouching with a narrow stalk attached to the first part of the right middle cerebral artery consistent with an aneurysm (fig.4 and 5). The aneurysm measures 2.3cm in its widest transverse diameter and the stalk length measures 0.5cm. A radiological diagnosis of thrombosed right middle cerebral artery aneurysm was made.

The interventional procedure of endovascular coiling of the aneurysm was recommended and patient was referred to a center with such facility as it is lacking in this center.

FIGURE 1: *Non contrast axial CT of the brain showing a fairly well outlined bilobed hyperdense lesion (arrow) over the posterior aspect of the right frontal horn of the lateral ventricle with associated ventriculomegaly.*

FIGURE 2: *Non contrast axial brain CT showing an oval isodense lesion over the posterior aspect of the frontal horn of the right lateral ventricle with rim of calcification (arrow). Compare with the lesion in figure 1 done six months earlier.*

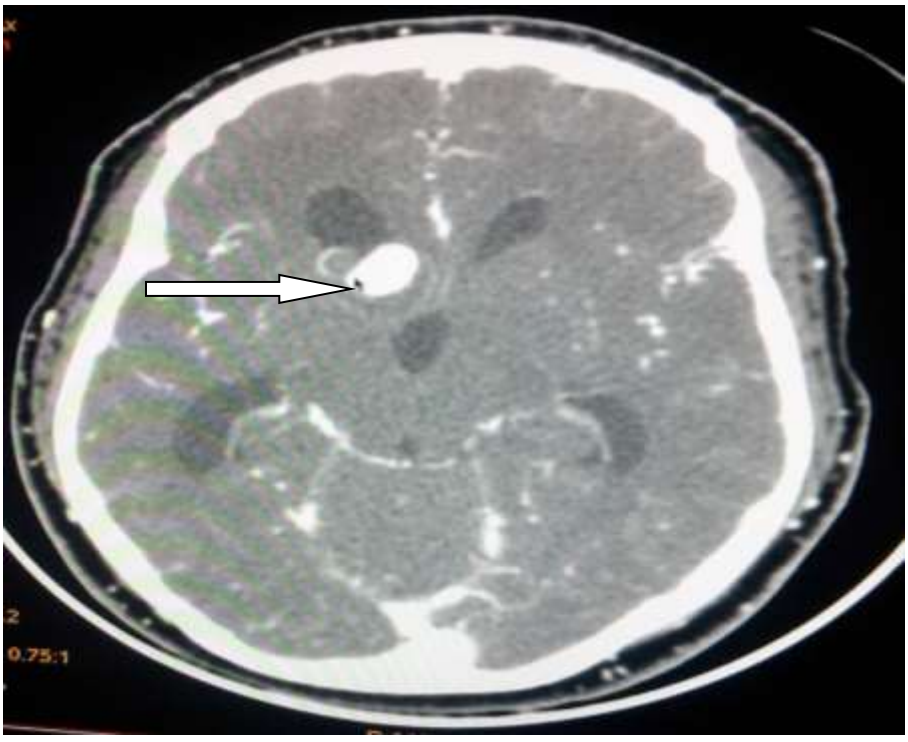

FIGURE 3: *Contrast enhanced axial brain CT at the same level with figure 2 showing brilliant enhancement of the mass over the posterior aspect of the frontal horn of the right lateral ventricle with peripheral filling defect (arrow) due to thrombus.*

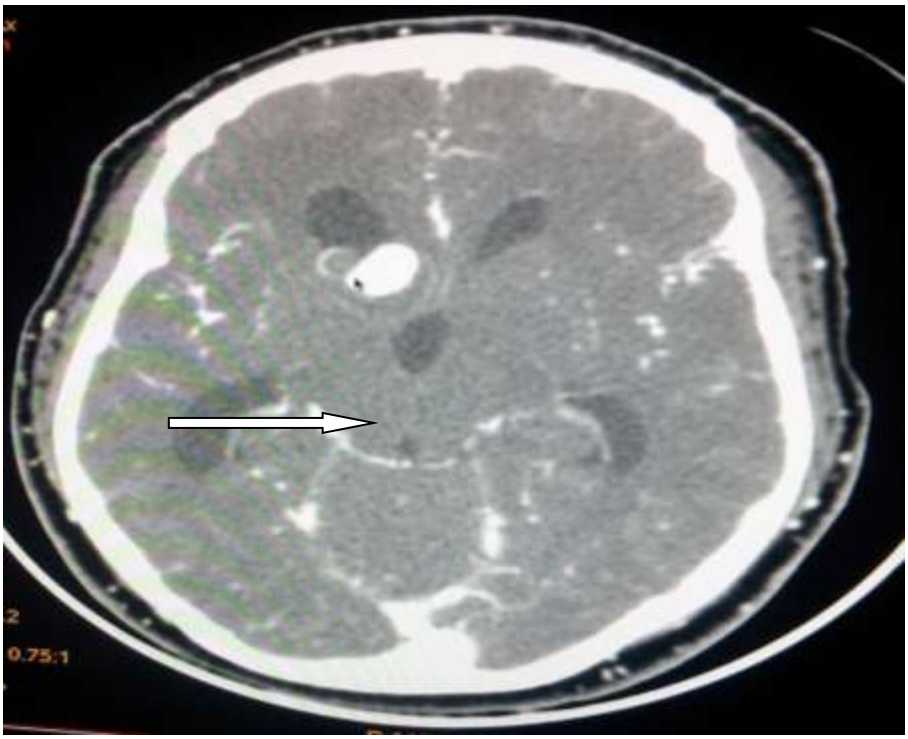

FIGURE 4: *Maximum intensity projection (MIP) image of CTA showing a right middle cerebral artery aneurysm with a stalk (arrow)*

FIGURE 5: *3D CTA image at the circle of Willis showing right middle cerebral artery aneurysm with a stalk (arrow).*

Discussion

Intracranial aneurysms affect approximately 5% of the population and about 85% of these aneurysms arise from the carotid circulation, including internal carotid artery and its terminal branches: anterior cerebral, anterior communicating, posterior communicating and middle cerebral arteries [1]. Middle cerebral artery (MCA) aneurysms represent 14% to 20% of intracranial aneurysms. Among the MCA aneurysms, aneurysms of proximal (M1) segment are second in frequency to bifurcation aneurysms3, 5. This patient had M1 segment aneurysm.

Unruptured aneurysms can be divided into two major classifications: saccular and fusiform. Saccular aneurysms are rounded, focal dilatations of the arterial lumen usually arising from bifurcations. They can be caused by congenital vascular abnormalities, trauma, infection, tumour or drug abuse and can be associated with high-flow states (such as those caused by arterio-venous malformation), polycystic kidney disease, fibromuscular dysplasia, connective tissue disease and coarctation of the aorta1. Fusiform aneurysms are arterial ectasias thought to be formed from a severe type of atherosclerosis [1,6]. The index case is a saccular aneurysm of the middle cerebral artery.

Intracranial aneurysms can present with subarachnoid haemorrhage (SAH), with other acute symptoms such as cranial nerve palsies or sudden onset headache in the absence of SAH, seizures and focal neurological deficits or with chronic symptoms such as headache or cranial nerve palsy or other focal neurological deficits [7]. This patient presented with chronic headache and seizures but no focal neurological deficit.

Giant aneurysms which are larger than 2.5cm in diameter are unusual representing 5-13% of all intracranial aneurysms. These giant aneurysms usually present as masses rather than haemorrhage [3, 6]. In addition, spontaneous thrombosis of an intracranial aneurysm is well known and is usually seen in giant aneurysms. Reports have demonstrated the relationship of aneurysmal volume and aneurysmal orifice to intraneurysmal thrombus formations by biophysical and haemodynamic studies [3, 8]. A larger ratio of volume to orifice causes slower flow and longer retention time, resulting in intraneurysmal thrombosis. This is the reason why giant intracranial aneurysms have a high incidence of thrombus formation compared to smaller size aneurysms [3, 7]. However in this case, the thrombosed aneurysm was just 2.3cm in diameter which is defined as a 'large' aneurysm rather than 'giant' aneurysm. Radiologically, thrombosis appears as filling defect within a dilated part of an artery in contrast images [3] (fig.3).

Aneurysms can be diagnosed by CT, magnetic resonance imaging (MRI), and angiography. Angiography is the accepted standard for identification of intracranial aneurysms [9, 10]. Noninvasive approaches to angiography such as computed tomographic angiography (CTA), and magnetic resonance angiography (MRA) have developed a role in detecting aneurysms [1, 10, 11]. Traditional catheter angiography is still the gold standard for definitive diagnosis and preoperative delineation of aneurysms due to its high sensitivity in detecting both small and large aneurysms1. However the accuracy of CTA has been found to approach that of catheter angiography1, 9. Despite advances in imaging technology, the sensitivity of both CTA and MRA is detecting aneurysms decreases significantly when the aneurysm is less than 5mm in diameter1, 9. The index case had a large MCA aneurysm diagnosed by CT and CTA.

The treatment of intracranial aneurysm can be divided into two broad categories: surgical repair and endovascular treatment. Surgical repair consist of performing a selective craniotomy to reveal the aneurysm and placing a clip at its neck to occlude flow into the aneurysm. If the aneurysm is deemed unclippable, trapping the aneurysm can be necessary. The endovascular treatment of aneurysm involves catheterization of the artery and deployment of detachable balloons to occlude the artery supplying the aneurysm or more favorably, use coils to close off an aneurysm while preserving the parent vessel. Although endovascular treatment is safer than surgical clipping, clipping can be more durable [1, 5].

Conclusion

Spontaneous thrombosis of aneurysms is known to occur frequently with giant aneurysms and in paediatric age group. We reported a thrombosed non giant aneurysm of the right middle cerebral artery in an 18 year old man with review of imaging.

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