



Case report of a partially thrombosed ACoA aneurysm presenting with bilateral foot drop



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ABSTRACT

Background and importance: Foot drop is defined as a weakness in the ankle and foot dorsiflexors. A disruption of the neural pathway starting from the mesial frontal cortex and ending in the peroneal nerve can lead to foot drop. Unilateral foot drop due to lower motor neuron injury is well documented. However, bilateral foot drop due to a central cause is very rare.

Clinical presentation: A 29-year-old male presenting with bilateral lower extremity weakness in addition to rigidity. The patient is known to have bipolar disorder and an Anterior communicating artery aneurysm (ACoA) for which he has not followed up. A CTA showed a partially thrombosed 5 mm × 6 mm ACoA aneurysm. The patient underwent placement of flow diverter PED.

Conclusion: Central causes of acute bilateral foot drop are rare but should be considered in the differential diagnosis. Thrombo-embolism due to a partially thrombosed aneurysm is a well known phenomenon, all treatment options should be considered keeping in mind the risks associated with the different techniques due to the intra saccular thrombus.

1. Introduction

Drop foot is defined as a significant weakness of the foot and ankle dorsiflexors, including the tibialis anterior, extensor hallucis longus, and extensor digitorum longus. Footdrop results from a disruption in the neural pathway starting from the parasagittal cortical neurons to the spinal cord upper motor neurons and the peripheral lumbar spinal cord roots and ending with the peroneal nerve [1]. Unilateral foot drop is well documented, however, bilateral foot drop is rarely reported. Lower motor neuron injury, L4 and L5 radiculopathy due to disc herniation or foraminal stenosis, are the most common cause of unilateral foot drop [1]. Other common causes of foot drop are peroneal nerve damage and metabolic neuropathy. Central foot drop is more rare and reported causes include brain tumors, traumatic hemorrhagic contusions, brain abscesses, multiple sclerosis, and cerebral infarction [2]. There is only four reported cases of central bilateral foot drop and only one following endovascular treatment of an Anterior communicating artery aneurysm (ACoA). To our knowledge, this is the first report of a partially thrombosed ACoA presenting with bilateral foot drop due to dislodgement of emboli through both A2s.

2. Case report

The patient is a 29-year-old male presenting with bilateral lower extremity weakness in addition to rigidity. The patient is known to have a controlled bipolar disorder. 17 days prior to his admission, the patient was diagnosed incidentally with a 6 × 6 × 6.5 mm non-thrombosed ACoA using a computed tomography (CT) scan with contrast. He was recommended to follow up with a neurosurgeon, which he failed to perform. After 15 days of the finding the patient started noticing right lower extremity pain for which he received morphine for in the ER and discharged home. The second day following his ER visit he noticed a progressive lower extremity pain associated with spasticity. A CT scan was performed that showed ischemic changes and no brain hemorrhage. A magnetic resonance imaging (MRI) was performed that showed multiple acute infarcts in both anterior cerebral hemispheres. The magnetic resonance angiography (MRA) showed diminished flow in bilateral anterior cerebral arteries, more so on the left. More specifically, the right A1 segment appeared patent, however, the left A1 segment appeared to be occluded distally. Though no definite aneurysm was seen, presence of mildly hyperdense rounded focus in the region of

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Fig. 1. An axial non-contrast computed tomography showing ischemic changes in bilateral frontal lobes, in the ACA territory (circle). There is loss of grey white matter differentiation as well as hypodensity.

the anterior communicating artery on unenhanced CT scan suggested the possibility of a thrombosed ACoA. Following that a CT angiography showed a thrombosed 5 × 6 mm ACoA. Also, both A2 vessels were stenotic with a small amount of thrombus within the right A2 segment itself. The patient was counselled about the risks and benefits of the treatment, however, he decided to decline treatment. There was no indication that his decision making ability is impaired due to psychosis. He was able to participate in his own care decision since he had the ability to understand his illness, treatment options and consequences. He presented up the second day with a more pronounced bilateral lower extremity weakness with inability to walk. In addition, the family reported that the patient has been more fatigued and “not acting right.” His NIHSS scale was 7, and his physical exam was 0/5 dorsiflexion bilateral feet. Imaging was repeated and a non-contrast CT of the head showed bilateral frontal ischemic changes with the same hyperdense round focus in the anterior communicating artery region (Fig. 1). A brain MRI showed bilateral ACA territory infarct (Fig. 2A), and a CTA showed the partially thrombosed 5 mm x 6 mm ACoA (Fig. 2B). Full workup for stroke was performed which came out negative. Lower extremity doppler ultrasound as well as transthoracic echocardiography and transesophageal echocardiography were all normal. Hypercoagulative workup was normal. The patient underwent trans-radial catheterization which showed left-sided A1A2 partially thrombosed aneurysm (Fig. 3A, B). The filling part measures 3 × 2.8 mm. The patient

underwent placement of flow diverter PED (2.5 × 10 mm) (Fig. 3C). The procedure went well without any complications, and the patient was discharged to rehabilitation after two days.

3. Discussion

To our knowledge, this is the first report describing a bilateral foot drop secondary to a partially thrombosed ACoA. In this case we ruled out any other causes of thrombo-embolic stroke, hypercoagulative workup, cardiac echo, transesophageal echocardiography, were all normal. After ruling out all other causes we concluded that the partially thrombosed aneurysm was most likely the source of the emboli. Especially that on the first CT scan performed the aneurysms was not thrombosed. However, the imaging performed when the upper motor neuron signs (UMN) started showed a partially thrombosed aneurysm. Moreover, both A2s were stenotic and the right had a dislodged clot fragment. The decision was to use a flow diversion to avoid entry into the aneurysm sac and increase the risk of dislodging a thrombus, on the other hand the pipeline would seal the neck and prevent any embolic phenomenon. Clipping would also risk squeezing the thrombus out of the aneurysm and it would not be optimal to operate acutely with bi-hemispheric strokes.

Usually, patients presenting with foot drop are initially investigated for common causes such as peripheral neuropathy or radiculopathy. As such, patients with a central cause of foot drop tend to have a delay in the diagnosis or undergo unnecessary spine surgeries. However, a presentation of bilateral foot drop associated with UMN signs should redirect our attention to an upper motor neuron or central etiology rather than peripheral neuropathy or radiculopathy. The somatotopic organization of the motor neurons for the lower extremity are located on the medial homunculus of the primary motor cortex at the mesial surface and top of the lateral surface of the precentral gyrus that sends its tracts down through the internal capsule to the ventral grey matter of the spinal cord. An interruption of this circuit due to ischemia or compression may lead to foot drop [3].

Isolated bilateral foot drop is very rare and may occur due to various conditions such as; anorexia nervosa, hypothyroid myopathy, Crohn's disease, and post-electroconvulsive therapy. Moreover central causes of bilateral foot drop have been reported few times in the literature. Isik et al. reported bilateral foot drop following cerebral contusions [4], Waldron et al. reported bilateral foot drop due to lumbar spine subdural hematoma following SAH, Wilbers et al. reported intracerebral schistosomiasis presenting with a bilateral drop foot, and Teufack et al. reported bilateral foot drop following endovascular treatment of an ACoA [5].

4. Conclusion

Central causes of acute bilateral foot drop are rare but should be

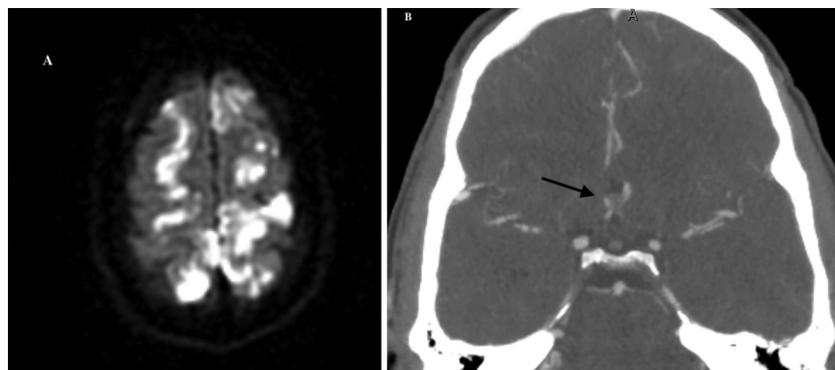


Fig. 2. (A) Diffusion-weighted imaging showing bi-hemispheric stroke. (B) Cerebral computed tomography in axial view showing a partially thrombosed Anterior communicating artery aneurysm (arrow).

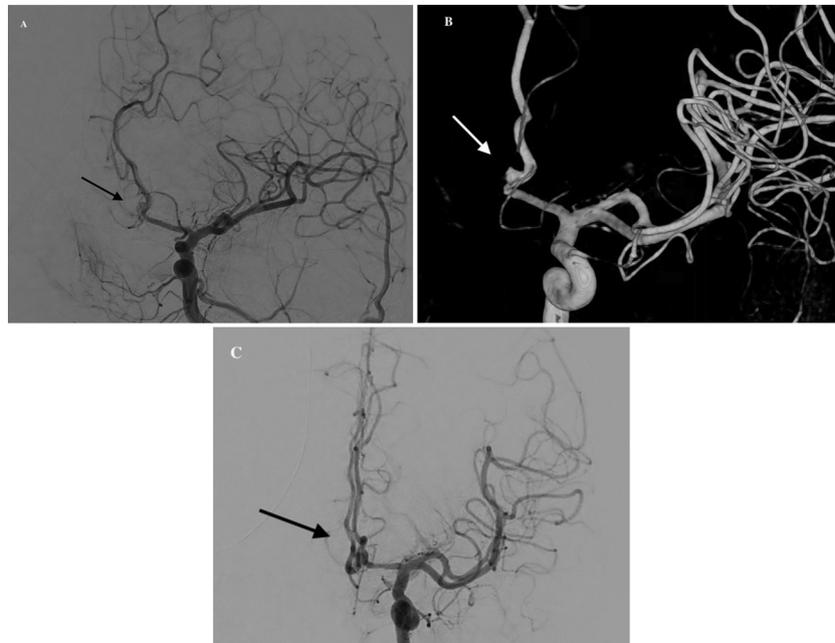


Fig. 3. Pre and Post ACoA treatment with flow diversion. Frontal view (A) and 3D reconstruction (B) of DSA showing a partially thrombosed ACoA (arrow). (C) Frontal view of DSA following flow diversion of a partially thrombosed ACoA (arrow).

considered in the differential diagnosis. Subtle upper motor neuron signs would help direct the work up. Thrombo- embolism due to a partially thrombosed aneurysm is a well-known phenomenon, all treatment options should be considered keeping in mind the risks associated with the different techniques due to the intra saccular thrombus.

Disclosure

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Consent

Patient consent was taken prior to the inscription of this case report.

Declaration of Competing Interest

None.

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