Case Studies

Anterior Inferior Cerebellar Artery Strokes Based on Variant Vascular Anatomy of the Posterior Circulation: Clinical Deficits and Imaging Territories

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We report imaging findings of 3 patients with anterior inferior cerebellar artery (AICA) infarcts who presented with atypical clinical findings of cerebellar strokes. AICA strokes are rare, and diagnosis can be difficult because of the high variability of the posterior circulation vascular anatomy. We describe the embryology and variant anatomy of AICA so that clinicians can understand and recognize the patterns of these infarcts. **Key Words:** AICA—ischemia—cerebellum—posterior circulation—variant vascular anatomy.

Introduction

The anterior inferior cerebellar artery (AICA) arises from the lower half of the basilar artery and is closely associated with the abducens, facial, and vestibulocochlear nerves. AICA and the cranial nerves together comprise the middle neurovascular complex.[1]

AICA strokes are the rarest of the posterior circulation strokes, representing .1% of all strokes.[2-4] The AICA contributes the smallest supply to the cerebellum compared with the other cerebellar arteries. The classically described symptoms of AICA stroke include presence of ipsilateral cerebellar ataxia, Horner syndrome, and involvement of trigeminal, facial, and vestibulocochlear nerves with contralateral sensory disturbance. However, clinical case series of AICA strokes have demonstrated variable clinical presentations.[5-7] Lack of a common clinical picture unfortunately makes diagnosis difficult in the absence of imaging. Previously, a direct correlation had been found between variable anatomy of the posterior communicating artery and the prevalence of cerebral infarction[8] Similarly, the differing AICA stroke presentations can be explained by the variable anatomy of the posterior circulation.

Cases

Case 1

A 67-year-old man with diffuse large B-cell lymphoma, diabetes, hypertension, and hyperlipidemia who underwent autologous stem cell transplant 3 months ago was an inpatient for treatment of pneumonia. During hospitalization, the patient developed left facial numbness. Family members also noticed the patient developed a left-sided facial droop. Magnetic resonance imaging (MRI) revealed an acute infarct in the left middle cerebellar peduncle (Fig 1, A) and petrosal surface of the left cerebellum (Fig 1, B). A computed tomography (CT) angiogram of the head showed a moderate focal stenosis of the lower basilar artery (Fig 1, C,D). Occlusion of the left AICA is

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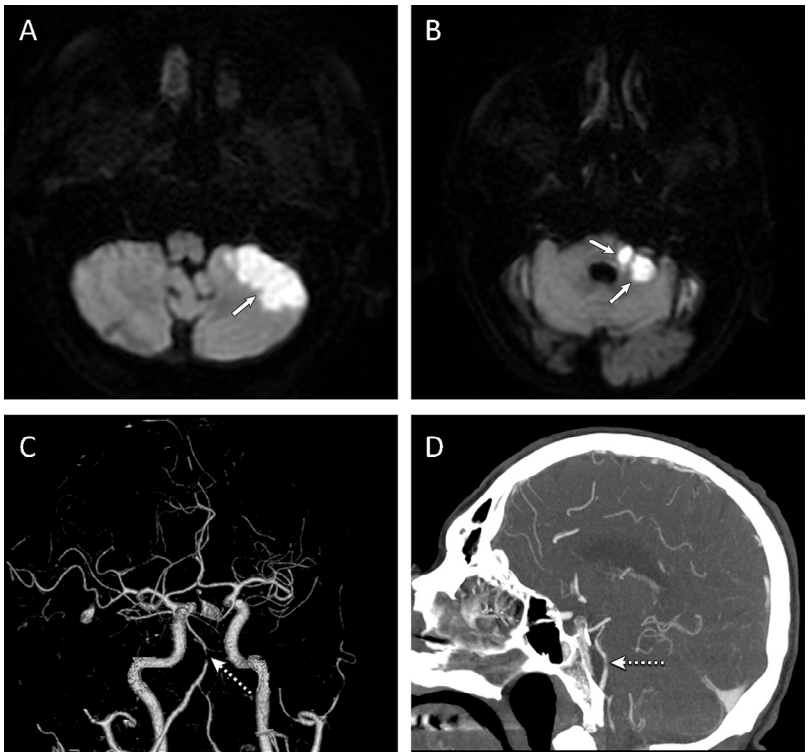

Figure 1. *Case 1 presents a 67-year-old male patient with acute left facial numbness and facial droop. Diffusion-weighted magnetic resonance images show increased signal in the left (A) petrosal surface of the cerebellum and flocullus (B) middle cerebellar peduncle, with low signal on the corresponding Apparent Diffusion Coefficient (ADC) map (not shown) consistent with an acute infarct. A computed tomography angiogram showed focal stenosis of the midportion of the basilar artery (dashed arrow) as seen on the (C) 3-dimensional image and (D) sagittal maximum intensity projections.*

presumably related to atherosclerotic plaque embolizing from the basilar artery.

Case 2

A 65-year-old female patient presented with acute onset of right facial numbness, vertigo, and medical history of diabetes, hypertension, and hyperlipidemia. The emergency room (ER) staff diagnosed the patient with Bell palsy and did not obtain imaging on her initial visit. The diagnosis of acute infarct was specifically dismissed in the initial visit, given the lack of cerebellar dysfunction. A week later, the patient presented to the ER with persistent vertigo and right facial numbness. On examination, she had sustained nystagmus on leftward and upward gaze and a few beats of nystagmus on rightward gaze. Romberg was unsteady while standing with eyes open and she demonstrated mild dysmetria and very unsteady gait. Hearing was grossly intact with finger rub. A non–contrast-enhanced CT revealed a round hypodensity in the right middle cerebellar peduncle (Fig 2, A), with evidence of prior lacunar infarcts in the left putamen and bilateral frontal centrum semiovale. MRI showed diffusion-weighted signal abnormality (Fig 2, B) and Fluid-Attenuated Inversion Recovery (FLAIR) hyperintense signal (Fig 2, C) in the right middle cerebellar peduncle, consistent with an acute infarct.

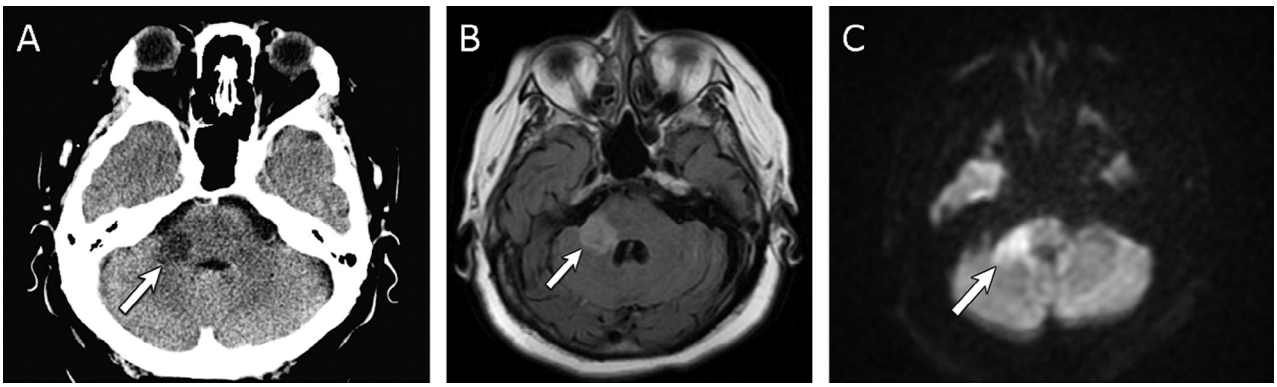

Figure 2. *Case 2 presents a 65-year-old female patient with right facial numbness and vertigo. (A) Unenhanced computed tomography of the brain shows hypodensity in the right middle cerebellar peduncle. (B) MRI FLAIR axial image of the brain demonstrates an expansile FLAIR hyperintensity in the right middle cerebral peduncle with (C) mildly increased diffusion-weighted signal with low ADC (not shown), compatible with an acute infarct.*