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## Abstract

Cerebellopontine angle meningiomas are slow-growing benign tumors of the brain with a largely indolent course until compressive and mass effects occur with adjacent neural structures. Clinical presentations are variable and dependent on the rate of growth and location and tend to progress over a longer period. Acute presentations are less common and require consideration of ubiquitous etiologies. A 62-year-old male with a history of hypertension, benign prostatic hyperplasia, dyslipidemia, and gout presented to the emergency department with a sudden onset of dizziness, loss of balance, and persistently elevated blood pressure. The examination was positive for left dysmetria, dysdiadochokinesia, and tandem gait positivity with the tendency to sway to the left. The patient was admitted with a major concern for acute cerebrovascular syndrome. Brain imaging revealed a large compressive cerebellopontine meningioma that was treated with craniotomy. Sudden onset neurological symptoms, including ataxia, include a broad workup for multiple etiologies, particularly cerebrovascular diseases. Given the growth patterns of meningiomas, acute symptoms tend to be rare; thus, evaluation with brain MRI with contrast is essential for its diagnosis, along with stratification for appropriate treatment options.



## Keywords

cerebellopontine angle tumor, meningioma, cerebrovascular accident, acute CVA, gait ataxia

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## Abstract

Cerebellopontine angle meningiomas are slow-growing benign tumors of the brain with a largely indolent course until compressive and mass effects occur with adjacent neural structures. Clinical presentations are variable and dependent on the rate of growth and location and tend to progress over a longer period. Acute presentations are less common and require consideration of ubiquitous etiologies. A 62-year-old male with a history of hypertension, benign prostatic hyperplasia, dyslipidemia, and gout presented to the emergency department with a sudden onset of dizziness, loss of balance, and persistently elevated blood pressure. The examination was positive for left dysmetria, dysdiadochokinesia, and tandem gait positivity with the tendency to sway to the left. The patient was admitted with a major concern for acute cerebrovascular syndrome. Brain imaging revealed a large compressive cerebellopontine meningioma that was treated with craniotomy. Sudden onset neurological symptoms, including ataxia, include a broad workup for multiple etiologies, particularly cerebrovascular diseases. Given the growth patterns of meningiomas, acute symptoms tend to be rare; thus, evaluation with brain MRI with contrast is essential for its diagnosis, along with stratification for appropriate treatment options.

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## Introduction

Meningioma is the most common type of primary brain tumor, accounting for greater than 30% of all brain tumors. The majority of meningiomas are situated within the supratentorial region or adjacent to it. In 5 to 10% of cases, meningiomas are located within the cerebellopontine angle (CPA).[1] Most CPA tumors are benign, with over 85% being vestibular schwannomas, lipomas, vascular malformations, and hemangiomas, although the most frequent non-acoustic CPA tumors are meningiomas. CPA meningiomas are prone to cause compressive effects on nearby structures, including the brainstem, cerebellum, and adjacent cranial nerves. The clinical picture is variable, with symptoms including tinnitus, ataxia, hearing loss, facial pain, facial weakness, trigeminal neuralgia, vertigo, headache, facial hypoesthesia, facial spasm, and diplopia.[2,3] Presenting symptoms tend to vary according to the size and location of the lesion.

Due to the slower nature of growth (2-4 mm/year) of meningiomas, the presentation of symptoms tends to occur when meningioma size approaches 3 cm.[4] However, the sudden onset of neurological symptoms prompts further evaluation and suspicion of different etiologies, especially acute cerebrovascular disorders. Cerebrovascular disorders in the posterior fossa present with acute symptoms that include dysarthria, vertigo, ataxia, dysphagia, facial paralysis, headaches, and cranial nerve abnormalities.[5] Here, we present a 62-year-old male patient with sudden onset ataxia admitted with suspicion of an acute cerebrovascular disorder, found to have a CPA meningioma.

## Case

A 62-year-old male with a past medical history of essential hypertension, benign prostatic hyperplasia, dyslipidemia, and gout presented to the emergency department with complaints of balance issues and persistently elevated blood pressure. Prior to this, the patient's blood pressures were well-controlled on single agent losartan 100 mg daily. On initial examination, the patient was conscious and oriented to time, person, place, and situation. His speech was fluent, with normal repetition and comprehension. Neurological examination showed normal cranial nerves, no sensory deficits, no weakness or abnormal muscle tone or strength. There was the presence of left dysmetria along with dysdiadochokinesia. Romberg's test was negative. The tandem gait test was positive, with a tendency to sway to the left. He denied headaches, fevers, chills, chest pain, palpitations, shortness of breath, dysuria, abdominal pain, bloating, diarrhea, constipation, blurry vision, cough, and sore throat. Vital signs revealed a heart rate of 83 beats per minute, a normal respiratory rate of 12, a blood pressure of 195/97 mm Hg, an oxygen saturation of 97% on room air, and a temperature of 36.8 degrees Celsius. Laboratory workup, including a complete blood count, comprehensive metabolic panel, and troponin, were unremarkable. Electrocardiogram (EKG) showed normal sinus rhythm with minimal premature ventricular complexes. Blood pressure was unresponsive to intravenous labetalol and hydralazine, prompting further investigation. Due to the positive tandem gait test, the patient was sent to perform a computed tomography (CT) of the head along with a computed tomography angiogram (CTA) of the head and neck. CTA was unremarkable, although the CT head revealed a 4.3 cm right posterior fossa extra-axial mass with a mass effect on the right cerebellar hemisphere and fourth ventricle (**Figure 1**). Further investigation with magnetic resonance imaging (MRI) revealed a 4.3 cm extra-axial mass within the right cerebellopontine angle cistern, consistent with a meningioma (**Figure 2A, 2B**). On further investigation, a CT of the chest, abdomen, and pelvis was obtained to rule out other signs of masses or malignancy, which was unremarkable. Family history was unremarkable for malignancy. Inflammatory markers, including erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP), were unremarkable. The patient was started on a dexamethasone taper, which led to the improvement of his dizziness and tandem gait. The patient's blood pressure improved with the addition of amlodipine 10 mg and hydralazine 25 mg three times daily, in addition to his home losartan 100 mg, and he was discharged home.

Three months later, the patient was evaluated by neurosurgery for a planned craniotomy for the right CPA. New symptoms of dysmetria were present, along with tandem gait abnormalities. Successful surgery was performed with surgical pathology noting a transitional meningioma World Health Organization (WHO) grade 1. Postoperative MRI displayed no residual tumor, no associated hydrocephalus, and no other abnormal findings. The patient was discharged home with physical therapy after a course of inpatient coordination and balance learning exercises. His blood pressure medicines were adjusted on outpatient follow-up with discontinuance of hydralazine.

## Discussion

Meningiomas are the most common primary central nervous system tumors, accounting for approximately one-third of all primary and spinal tumors.[6] In the United States, the number of new cases is nearly 29,000 a year,

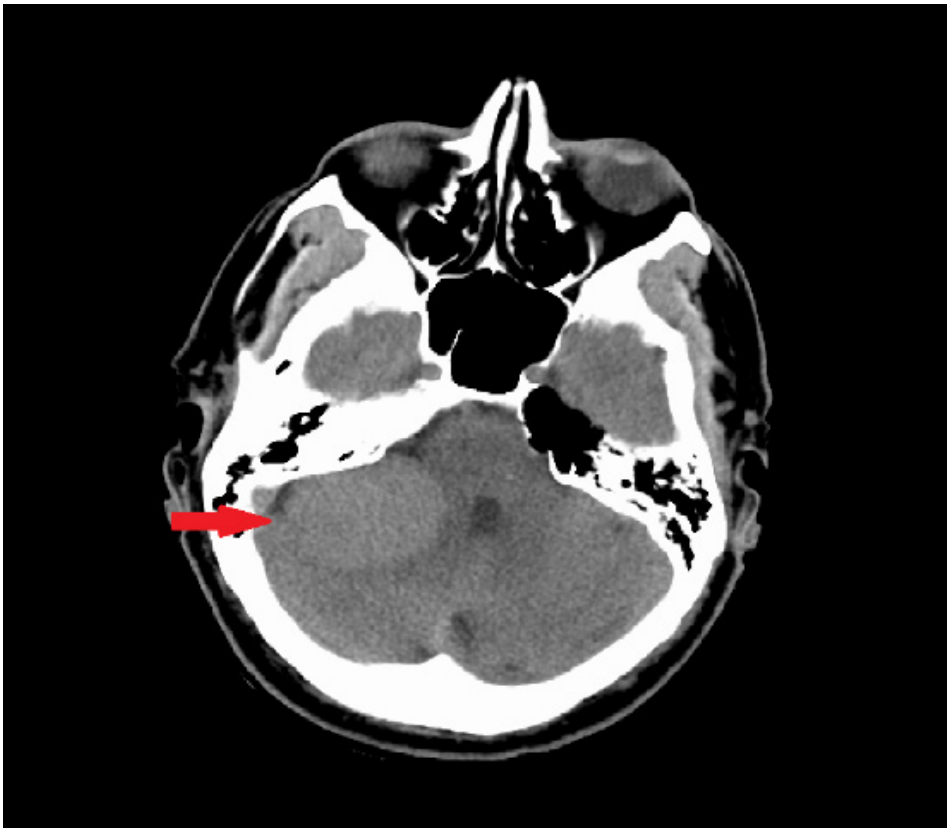

**Figure 1.** Axial CT Head without Contrast showing right posterior fossa extra-axial mass exerting mass effect on the right cerebellar hemisphere and fourth ventricle, which is displaced to the left. Red arrow pointing towards the cerebellopontine angle mass.

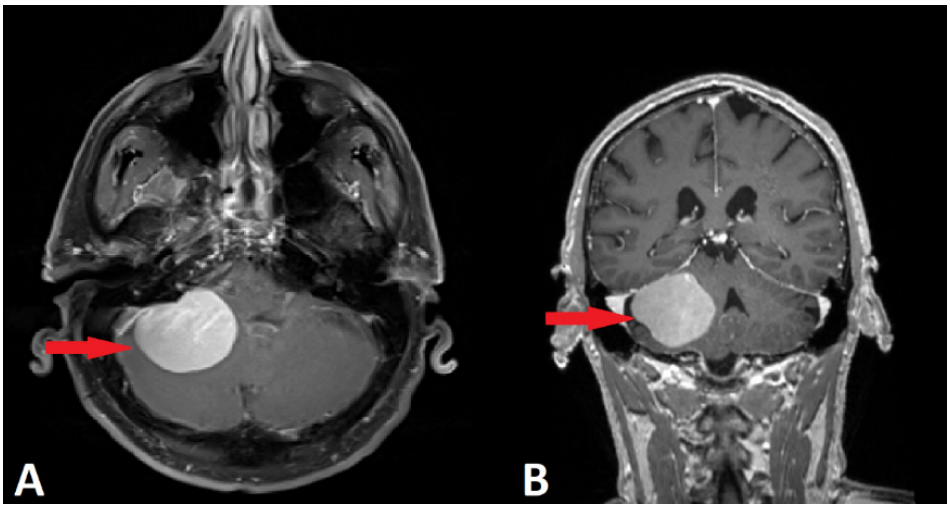


**Figure 2.** Axial and coronal head MRI scans with contrast **(A and B)** demonstrate a large bright extra-axial mass (red arrows) within the right cerebellopontine angle, consistent with a meningioma with a rounded contour and a dural attachment, displaying mass effect upon the right cerebellar hemisphere, with flattening of the lateral wall of the fourth ventricle and mild displacement to the left of midline.

with incidence increasing progressively with age. Classification is under the WHO scheme based on morphologic criteria that recognizes three grades divided into benign, malignant, and specific morphologic subtypes.[7] Clinical presentation of disease and symptoms are determined by the location of the mass and the time course over which the tumor develops. They are frequently slow-growing, asymptomatic, and discovered incidentally during neuroimaging studies. A systematic review and meta-analysis of incidental findings on brain MRIs found that meningiomas were the most common incidental tumor identified.[8] Findings characterized by brain tumors include visual changes such as optic atrophy, papilledema, unilateral visual loss, weakness of extraocular movements, loss of hearing and smell, mental status changes, and extremity weakness, including bilateral leg weakness and arm weakness. As the location of the meningioma is critical for the determination of clinical manifestations of the disease, a review was performed regarding the most common symptoms of cerebellopontine angle meningiomas. This includes unilateral hearing loss, vertigo, headaches, tinnitus, facial pain, and altered sensation.[9,10] Presentations involving impairment of gait are rare, as most cerebellopontine meningioma cases have associated vestibular findings. Our case presented with a sudden onset of ataxia without involvement of other neurological symptoms. The elevation of blood pressure and neurological findings led to high suspicion of cerebrovascular disease, although imaging revealed the presence of CPA meningioma as the underlying cause.

The literature has described cases in which meningiomas can directly lead to systemic hypertension that was not reported previously. Zhen et al. described cases of intracranial meningiomas being complicated by hypertension where, after surgical resection of tumors, the blood pressure of patients returned to normal.[11] In our patient, immediately after postsurgical resection of a CPA meningioma, immediate weaning of an antihypertensive was able to be performed, with discontinuance of hydralazine. The location of meningioma may play a role in the presence of systemic hypertension, although given the sparsity of literature, further investigation needs to be performed. This is opposed to the presence of intracranial hypertension, which has been described with cases of meningiomas compressing the venous sinus.[12-14]

## Conclusion

Various etiologies exist in the presentation of ataxia and acutely elevated blood pressure. Cerebrovascular etiologies, including

hypertensive encephalopathies and acute cerebrovascular accidents, are generally the more common causes. Rare entities such as cerebellopontine angle meningiomas may be found incidentally. Further evaluation with brain MRI is indicated for better characterization of location, extent of mass effect, and stratification of patients into appropriate treatment options. ■

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## Conflicts of Interest

The authors declare no relevant or material financial interests that relate to the research described in this paper

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