Cerebellar Hemorrhage

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KEYWORDS

• Cerebellar hemorrhagic stroke • Posterior circulation hemorrhage
• Cerebellar hematoma • Vertigo • Ataxia

KEY POINTS

- The spectrum of clinical presentation of cerebellar hemorrhage depends on the size of the hematoma. Smaller hemorrhages can mimic cerebellar infarction whereas larger ones can present with catastrophic neurologic deterioration.
- The most common cause is hypertension; other causes include coagulopathy, arteriovenous malformation, aneurysm, neoplasm, and hemorrhagic transformation of ischemic infarction.
- Obstructive hydrocephalus, brainstem compression, and cerebellar herniation are life-threatening complications arising from tissue swelling and mass effect.
- Close monitoring is essential in the acute phase for timely recognition and treatment of these complications.
- Prompt surgical evacuation is indicated in patients with neurologic deterioration attributed to mass effect and brainstem compression or hydrocephalus.

INTRODUCTION

Cerebellar hemorrhage accounts for approximately 9% to 10 % of all intracranial hemorrhages (ICH).[1–3] Hypertension and small vessel disease being the most common cause, it is frequently seen in middle-aged to older patients (usually beyond the fifth decade).[3–6] The posterior fossa is a small space with virtually no additional room for expansion. Any mass lesion in the cerebellum thus threatens to compress neighboring structures, most importantly the brainstem and the fourth ventricle. Moreover, the hematoma can extend into the ventricular system via the fourth ventricle, worsening the hydrocephalus. The clinical spectrum of cerebellar hemorrhage is determined by its size and perilesional edema. Preexisting atrophy also plays a role by providing additional space for expansion. Indications for imaging beyond a noncontrast computed tomography (CT) scan, surgical management, and optimal timing of surgery are currently uncertain and controversial.

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Most hemorrhages related to hypertension occur in the area of the dentate nucleus.[1,3] The hemorrhage can further extend into the cerebellar peduncles, to the contralateral side, or to the fourth ventricle. In addition to the cerebellar parenchyma, blood can be present in the subarachnoid space tracking along the cerebellar folia. Rarely, hemorrhage is present predominantly along the superior folia, following neurosurgical manipulation in the supratentorial space; this phenomenon is termed remote cerebellar hemorrhage (see later discussion).

CLINICAL FINDINGS

Patient History

Patients with smaller cerebellar hemorrhage can present with symptoms of cerebellar stroke such as vertigo, ataxia, nausea, vomiting, and headache (**Table 1**). Often the symptoms are sudden in onset, and may happen during strenuous exertion or a stressful situation. If the hemorrhage is large, patients may present with a change in the level of consciousness or may become comatose. Careful attention to the following details in the history is essential.

- History of chronic hypertension
- Presence of coagulopathy or thrombocytopenia
- Use of antiplatelet medications or anticoagulants
- Recent head trauma
- Known arteriovenous malformation (AVM) or posterior circulation aneurysm
- History of systemic or central nervous system (CNS) malignancy
- Use of recreational drugs (eg, cocaine or amphetamines)

Physical Examination

A detailed neurologic examination should be performed with special attention to the level of consciousness, gaze and ocular movements, cranial nerve deficits, autonomic changes (heart rate, blood pressure, Horner syndrome), and long tract findings (hemimotor or hemisensory deficits). Clinical signs are summarized in **Table 1**.

Deterioration following cerebellar hemorrhage can occur at any time between a few hours and 5 days after the onset of symptoms, but is more frequent in the first 2 to

Table 1
Signs and symptoms of cerebellar hemorrhage

Symptoms	Signs
Dizziness	Limb and/or gait ataxia
Nausea	Nystagmus[a]
Vomiting	Intention tremor
Limb and/or gait incoordination	Dysmetria
Headache	Rebound phenomenon[b]
Slurred speech	Dysarthria (scanning speech)
Intractable hiccups[c]	Hypotonia
	Pendular reflexes[d]

[a] Direction changing or vertical, not inhibited by visual fixation, and without any associated tinnitus suggests central rather than peripheral cause.
[b] When muscles are contracted against resistance and the resistance is then suddenly removed, the antagonists fail to check the movement and the limb continues to move in the direction of the muscle contraction.
[c] Seen sometimes with pressure on the brainstem because of involvement of the medulla.
[d] Oscillating motion of the extremity after a reflex is elicited.