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Case Report: Non traumatic Cerebellar Hemorrhage in a Young Man

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Abstract

Intracerebral hemorrhage (ICH) is a seldom-seen event, occurring in around 10% of cases within the cerebellum. These incidents are more common among older adults and are frequently linked to hypertension. However, instances have also been documented in younger individuals, particularly those with arteriovenous malformations and angiomas. The occurrence of spontaneous cerebellar hemorrhages, unrelated to trauma or known risk factors, is exceptionally rare and has a mortality rate ranging from 25% to 57%. This case involved a 29-year-old male who experienced a spontaneous cerebellar hemorrhage. Despite being a healthy young adult without common risk factors for cerebrovascular accidents (CVAs), even not smoking.

Key words: *cerebellar hemorrhage, non trauma*

Introduction:

Spontaneous cerebellar hemorrhage is characterized by an abrupt occurrence of bleeding in the cerebellum without prior warning, external cause, or identifiable risk factors. This type of hemorrhage, along with other forms of intracerebral hemorrhage (ICH), falls into the category of hemorrhagic stroke. Stroke refers to the interruption of blood supply to the brain, leading to inadequate oxygen delivery to brain tissues. As per the American Heart Association [1], stroke's prevalence is approximately 2.5% in the United States, impacting around 7 million individuals. More than 90% of these cases are attributed to modifiable risk factors.

Intracerebral hemorrhages can stem from trauma, underlying pathologies, or occur spontaneously. They can also be categorized by the specific brain region involved. Cerebellar hemorrhages, accounting for almost 10% of all ICH cases, primarily originate in the cerebellum. The first documented surgical intervention for cerebellar hemorrhage dates back to 1906, as Ott et al. reported [3]. Subsequent studies and research have contributed to a greater understanding of this condition.

Cerebellar infarctions, constituting nearly 3% of all strokes, result in around 20,000 new cases annually in the United States [4]. Global incidence of strokes in young adults has risen over the past three decades, with up to 30% of cases having undetermined causes [5]. In the United. States, non-traumatic cerebellar hemorrhage affects approximately 10,000 patients each year [6]. The majority of these cases involve older adults with identifiable chronic conditions. However, the occurrence of spontaneous cerebellar hemorrhage in healthy young adults lacking underlying medical conditions or risk factors remains exceptionally rare.

The posteroinferior aspect of the skull contains the brainstem and cerebellum. The cerebellum consists of two lateral hemispheres and a central vermis, playing a crucial role in coordinating movements and organizing visuospatial information. When the cerebellum is damaged, it leads to deficits on the same side as the affected region. There are three pairs of arteries supplying the cerebellum: the posterior inferior cerebellar artery (PICA) anterior inferior cerebellar artery (AICA), and superior cerebellar artery (SCA). These arteries are part of the vertebrobasilar system, providing the cerebellum with the necessary blood supply for complex functions.

Moreover, the cells in the cerebellar cortex are arranged in uniform layers, forming a unique pattern of nerve fibers going to and from the cerebellum. This is unlike the arrangement of nerve fibers in other parts of the brain. While the cerebellum is generally known for its role in posture, voluntary movement, goal-directed, and spontaneous movements, its precise function in processing spatial information remains unclear. Molinari and Leggio note that although cerebellar damage can affect spatial cognition, the resulting response patterns differ from damage to traditional spatial brain structures like the hippocampus and parietal cortex. (7, 8)

Damage to the cerebellum doesn't cause the predictable deficits seen in other brain structures. Cerebellar infarctions can lead to a broad range of impairments, varying from minor issues to lifethreatening situations. Although the case being presented occurred in Canada, it's relevant since many people from Caribbean islands have ties to the US and Canada, often traveling between these regions.

Case Report:

A 29-year-old man was brought to the emergency department due to a three-day history of severe headache, vomiting, and altered consciousness. He had no history of trauma, hypertension, or diabetes, and was not on anticoagulant or antiplatelet medications and not smoker. On examination, his Glasgow Coma Scale was 13/15 (E3V4M6), with pupils reacting to light bilaterally and normal blood pressure.

A CT scan of the head revealed a (52 * 28 * 31 mm) hematoma on the left side of the cerebellum, with focal mass effect on the 4th ventricle without hydrocephalus. (Figure 1)

Blood investigations revealed normal bleeding profile. Given the significant size of the hematoma and the resulting symptoms, an emergency craniectomy was performed. The patient was positioned prone and the head immobilized by using a Mayfield head holder. Through a midline suboccipital craniectomy, the dura was opened in a Y-shaped manner and trans cortically the hematoma was evacuated and hemostasis was achieved in the left cerebellar region. The dura was closed, and Dural bio glue was applied.

Following the procedure, the patient was transferred to the ICU and the process of weaning from general anesthesia was initiated. The next day, he was extubated, and his Glasgow Coma Scale improved to 15/15. He was then transferred to the neurosurgical ward. A follow-up CT scan on the 2nd postoperative day revealed complete removal of the hematoma.

After three days, the patient was discharged home (Figure 2). Ten days later, he returned for a follow-up appointment, during which the stitches were removed. The patient's progress was favorable, with the successful evacuation of the hematoma leading to his improved condition and eventual discharge.

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Figure 1: (Axial, Sagittal and coronal Pre-op CT scan)

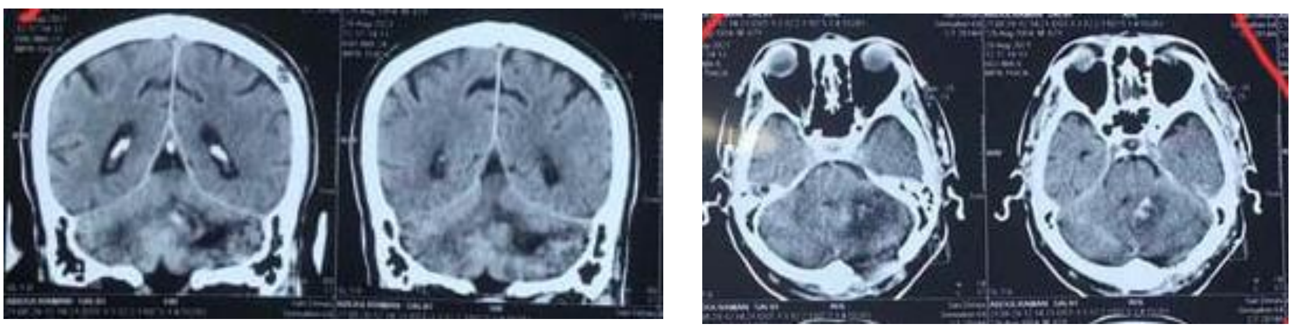

Figure 2: (Axial and coronal post-op)

Discussion:

The majority of cerebellar hemorrhages typically occur in older adults who have hypertension, accounting for around 60-70% of cases. The remaining cases are primarily attributed to factors such as arteriovenous malformations (AVMs), bleeding diathesis, and tumors [9]. Other potential causes encompass trauma, coagulation disorders, ischemic stroke leading to hemorrhagic transformation, cerebral amyloid angiopathy, septic embolism, encephalitis, vasculitis, sympathomimetic drugs like cocaine and amphetamines, and aneurysms in the posterior cerebral circulation.

In instances where a tumor is the source of bleeding, glioblastoma consistently emerges as the underlying cause [2].Cerebellar hemorrhages due to AVMs tend to manifest in younger individuals, while those resulting from hypertension-related vascular issues are more prevalent among older individuals [10]. The symptoms presented can vary significantly based on the hemorrhage's location and size [3).

Smaller hemorrhages may not impact the patient's mental state, whereas larger ones can result in a stupor or unresponsiveness. Frequently reported symptoms of cerebellar hemorrhages include a sudden onset headache, nausea and vomiting, problems with balance and coordination (truncal ataxia), dizziness (vertigo), difficulty speaking (dysarthria), stiffness in the neck (nuchal rigidity), and changes in mental status or consciousness [2]. It's worth noting that the patient being studied in this context did not mention experiencing headaches.

Cerebellar hemorrhage management is outlined in the intracerebral hemorrhage (ICH) guidelines [11], yet clinical experience significantly influences how these guidelines are applied. Particularly in situations involving brainstem compression or sizable hematomas causing mass effects and acute hydrocephalus, as noted by Little and colleagues [12], clinical judgment becomes crucial. In cases where patients are not viable candidates for surgery, the prognosis can be bleak. Despite this, there's insufficient evidence backing the surgical management of ICH patients to yield an overall decrease in mortality. The CLEAR III and MISTIE III trials reveal that removing extensive hematomas doesn't necessarily correlate with enhanced functional outcomes [6].

The majority of cerebellar hemorrhages are linked to identifiable causes or predisposing risk factors. Only a small portion of cases can be considered truly spontaneous, lacking any history of trauma, identifiable cause, or predisposing risk factors. For instance, Dayes et al. documented cases of three young male adults aged 30, 38, and 27, revealing a medulloblastoma, hemophilia A, and malignant melanoma respectively, all of which were identified as risk factors [9]. Among the three cases, two involved tumors and one was associated with a bleeding disorder, indicating identifiable risk factors.

In another study, Mitchell & Angrist examined 12 cases of cerebellar hemorrhage-related deaths [13]. In each case, there were identifiable risk factors, including conditions like malignant nephrosclerosis, cerebral arteriosclerosis, and myelogenous leukemia. Among these, hypertension-related cardiovascular disease was the most prevalent risk factor.Hyland and Levy identified 32 instances of cerebellar hemorrhage, and while an underlying lesion was absent in most cases, there were four instances where an underlying lesion wasn't demonstrated. The authors speculate that these lesions might have been so small that they essentially bled out and were compressed [14].

Conclusion:

Spontaneous cerebellar hemorrhage in young, healthy adults is an extremely uncommon occurrence that warrants additional investigation and study. While the exact cause might never be fully understood, swift identification and treatment of cerebellar hemorrhage can be pivotal in determining life or death outcomes. Although guidelines for managing intracerebral hemorrhage (ICH) exist, they aren't well-defined for cases of cerebellar hemorrhage. Given the unique nature of each case, flexibility in adhering strictly to these guidelines is expected. Prior to sending this article for publication, a written consent was signed by the patient by which he agreed to use his information and images.

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