Complete Vertebral Artery Occlusion Presenting with New Onset Seizures: A Rare Presentation of Posterior Circulation Stroke

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Abstract

A 56 year old man presented to the emergency department with new onset tonic-clonic seizures. He was conscious and alert on arrival, and able to give an approximately two week history of occasional visual disturbance and dizziness. Cerebellar signs were evident on examination. Initial imaging was inconclusive, although suspicious for pathology. The clinical team were asked to bring the patient back to the radiology department for repeat Computed Tomography (CT) with angiography of the intracranial vessels. This revealed an almost complete occlusion of the left vertebral artery, and cerebellar infarction. An atypical presentation of cerebrovascular ischemia, this patient was transferred to the local stroke unit for further treatment.

Introduction

Cerebrovascular accident is a very common presentation to the emergency department, and is increasingly common amongst Western populations. Seizure is not usually considered as a presenting feature of ischemic cerebral events, and more commonly associated with the post-stroke period. We present this case for clinicians to consider ischemic in addition to hemorrhagic stroke as the underlying aetiology in a patient presenting with new onset seizures.

Case Presentation

A 56 year old man, was brought to the emergency department by ambulance, having suffered two witnessed tonic-clonic seizures whilst at work. On arrival into the department, he was alert, with observations within normal parameters, Glasgow Coma Score (GCS) of 15, and normoglycemia. Seizures had been terminated with intravenous benzodiazepines with the paramedic crew.

He described feeling generally unwell throughout the morning, associated with dizziness and blurred vision. There was no associated headache. On further questioning, he had been experiencing these symptoms episodically over the preceding fortnight. There were no concerning cardiac, respiratory, or gastrointestinal features in the history relating to his presentation.

Significant past medical history included hypertension and hypercholesterolemia, for which he was taking a statin, and ramipril. He had a moderate smoking history, and drank below the recommended weekly alcohol limit.

Examination findings of significance were a persistent nystagmus in all directions of gaze beyond what would be expected post-ictally, past pointing, and normal tone and power in the limbs and facial musculature.

Initial suspicions for the cause of seizure given the clinical findings and age of this patient were of a spontaneous intracerebral hemorrhage affecting the cerebellum. Computed Tomography (CT) scanning did not reveal any areas of hemorrhage. Initial unenhanced CT imaging however, did reveal a dense left vertebral artery, suspicious for thrombus, and the patient was therefore recalled for CT intracranial angiogram (Figures 1). Advanced imaging then revealed reduced contrast filling in the left vertebral artery, confirming suspicions of acute thrombus in this vessel.

Differential Diagnosis

An intracranial cause for the seizures was suggested by the persisting neurological signs following the cessation of seizure activity, and a rapidly improving post-ictal state. Whilst vascular risk factors...
were present, the age of the patient suggested a hemorrhagic event, although an absence of headache went against this. Cerebellar signs localized the lesion to the posterior circulation.

**Treatment**

Initial treatment was supportive, with oxygen and intravenous fluids promptly given. No pharmacological treatment for convulsions was administered as these had terminated prior to his arrival. Once stroke was confirmed on intracranial angiography, oral antiplatelets were given. Further therapy was carried out at the local Hyperacute Stroke Unit (HASU), which is based at a different site to the emergency department which this patient attended.

**Outcome and Follow-Up**

After transfer to a local HASU, this patient was discharged after a short period of treatment and is recovering well at home.

**Discussion**

We report a case of complete vertebral artery occlusion presenting as generalized tonic-clonic seizures in a patient with vascular risk factors, however no previous stroke or seizure history. Whilst under-recognized as a presenting feature of stroke, several cases are reported in the literature. These cases involve both anterior and posterior cerebral circulations.

Associations between cerebral ischemia and disorders of movement are well recognized. These associations encompass focal weakness, hyperkinesia, post-stroke seizure, and infrequently, seizure as a presenting feature. Furthermore, there are a number of neurological conditions which can mimic the typical phenotype of an ischemic stroke.

Seizure mimic in the context of stroke can include the sequelae of thalamic/subthalamic infarct, known as hemiballismus. This is characterized by uncontrollable violent, usually unilateral, movements of the limbs. Stroke mimic in the context of non-ischemic neurological disease is also well recognized. Hemiparesis and speech difficulty can either precede or follow severe attacks of migraine and true epileptic activity, the latter often termed ‘Todd’s paresis’. Differentiating these conditions from true seizure activity as a presenting feature of stroke relies upon accurate history taking, including a full past medical and drug history. This is crucial in determining the chronology of neurological deficit, and associated features, to guide clinicians in the correct diagnosis of the underlying condition.

True seizure activity has been reported as the presenting feature of both anterior and posterior circulation stroke. Otsuji et al. report three similar cases of posterior circulation infarction presenting with seizures, each treated with mechanical thrombectomy [1]. Post-seizure conscious level was impaired with each patient, as in our case, with thrombus demonstrated on subsequent angiography. Similarly, basilar artery occlusion has been associated with generalized seizure as the presenting feature, [2] whilst pontine infarction and abnormal posturing is also reported [3]. Multiple acute lacunar infarcts presented with seizure in a case report published by Marjan et al. [4] interestingly with no other appreciable neurological deficit on examination.

The mechanism of seizure in acute stroke is not well understood. Disruption of the blood supply to neurons is known to induce hypoxic changes, which in turn can result in the formation of an epileptic focus through metabolic and electrical changes in neuronal membranes and their environments [5]. Similarly, disruption of descending tracts can result in abnormal posturing [6-7], which can be mistaken for true seizure activity.

It is likely that in this case, the preceding symptoms of dizziness and blurred vision leading up to presentation were transient ischemic attacks affecting the cerebellum. We recognize that in this case, seizure activity was not witnessed by healthcare professionals, and it is possible that whilst true seizures may have occurred, abnormal posturing could have been mistaken for true convulsive activity. In either case, involvement of the vertebro-basilar system in acute ischemic stroke is associated with movement disorder in a number of published reports.

**Learning Points**

- Although common presentations of common conditions are most likely, it is important to consider atypical presentations of common conditions.
- Neurological signs persisting beyond the post-ictal period should raise suspicion of an underlying cause for seizures.
- New onset seizures in adult/elderly patients with vascular risk factors are red flag features for intracranial pathology.
- Good communication between teams is essential when specialist services are split across various hospitals in order to facilitate timely transfer of patients when clinically necessary.

**Patient’s Perspective**

“Please be aware, I then had another episode on the 30th of April, and was admitted to hospital, and released after 2 weeks, then had another stroke on the 6th June.

I have just been discharged and returned home on the 18th of June, watch this space!”

**References**


