

Case Report

Corpus callosum stroke with seizure as primary symptom

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ABSTRACT

The corpus callosum is a large commissural fiber connecting the two hemispheres. The anterior communicating artery, pericallosal artery, and posterior pericallosal artery supply it. Stroke in this area is indeed rare, with an incidence rate of 0.9% to 2.8% per year. There were no documented seizure cases as a manifestation of corpus callosum stroke. We report a case of a 42-year-old right-handed male with a history of hypertension and heart failure who presented with focal motor seizure with intact awareness, alien hand syndrome, and hemianesthesia. His cranial magnetic resonance imaging (MRI) showed a corpus callosum stroke and focal delta slowing on electroencephalography (EEG). This study showed that the corpus callosum is a possible epileptogenic focus.

Keywords: Corpus callosum stroke, Post-stroke seizure, Cerebrovascular disease, Young adult, Heart failure

INTRODUCTION

The corpus callosum is a large commissural fiber bundle connecting both hemispheres' cortical and subcortical regions.¹ The clinical manifestation of acute corpus callosum infarction is complex and lacks specificity because it often merges with other location infarction. In a study by Giroud in France, out of the 282 cases of stroke documented, only eight were callosal stroke, having an incidence of 2.8% per year, with pure callosal stroke at 1.4% per year.² While the study done by Shen Li in China documented 1629 cases of stroke in 4 years, only 59 patients had callosal stroke, having an incidence rate of only 0.9% per year.³ The clinical presentations of patients in both studies were ideomotor apraxia, construction apraxia, left agraphia, alien hand syndrome, impaired left limb functions, and hemianesthesia, but none had a seizure as a presentation.

Bladin et al found the incidence of seizures to be 10.6% among 265 patients with intracerebral hemorrhage versus 8.6% among 1632 with ischemic stroke.⁴ Seizures may be a more common accompaniment of hemorrhagic rather

than ischemic stroke. In another prospective series, seizures occurred in 4.4% of 1000 patients, including 15.4% with lobar or extensive intracerebral hemorrhage, 8.5% with subarachnoid hemorrhage, 3.7% with hemispheric transient ischemic attacks, and 6.5% with cortical infarction.⁵

The corpus callosum agenesis was previously associated with seizures.⁶ However, there have been no studies up to date showing seizures as the primary symptom of corpus callosum infarction.

CASE REPORT

This is a case of a 42-year-old right-handed male with known hypertension and dilated cardiomyopathy with a reduced ejection fraction of 20% NYHA II presenting with focal motor seizure.

History started two months before admission; while the patient was doing his usual work as a technician, he suddenly presented with flexion of the right arm, with associated versive gaze and head version to the right.

There was no associated loss of consciousness, urinary or fecal incontinence. The patient experienced seizures every month with the same semiology, but no consult or medication was taken. A few hours before admission, the patient noted a recurrence of seizure but with a longer duration, lasting for 3 minutes hence consulted at our institution and was advised admission. Pertinent physical and neurological examination revealed right hemianesthesia, ataxia of the right extremity, and alien hand syndrome.

The patient was then initially managed as a case of focal motor seizure with intact awareness, probably structural in origin. The patient was started on levetiracetam 500 mg every 12 hours. Cranial magnetic resonance imaging (MRI) showed curvilinear FLAIR hyperintensities at the rostrum, genu, and body of corpus callosum on T2 weighted imaging and DWI sequence with signal drop out at the ADC sequence. The 21-channel electroencephalography (EEG) showed intermittent focal delta slowing at the left frontal region.

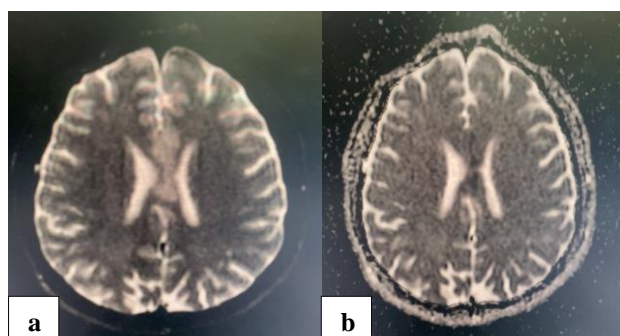


Figure 1: Axial cut MRI DWI sequence showing hyperintensities and ADC sequence showing signal drop out at the body of the corpus callosum.

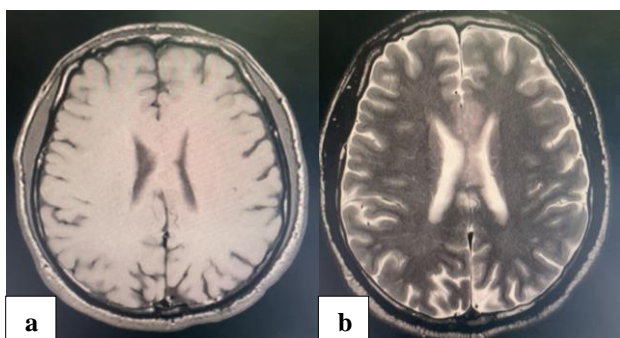


Figure 2: Axial cut MRI T1 was normal and T2 sequence showing isointensities at the body of the corpus callosum.

The patient stayed in the hospital for 21 days. There was no seizure recurrence, yet the alien hand syndrome, hemianesthesia, and ataxia persisted. Other medications given were aspirin 80 mg/tab once a day, atorvastatin 40 mg/tab once a day, carvedilol 12.5 mg/tab twice a day, spironolactone 25 mg/tab once a day, empagliflozin 10

mg/tab once a day and sacubitril + valsartan 100 mg/tab once a day.

DISCUSSION

Neurons from the cortex can become hypersynchronous and discharge in the form of seizures.⁷ Some basic mechanisms for the neurons include the projection of neurons to distant areas of the brain with projections fibers; interneurons, association fibers, and local-circuit cells which influence the activity of nearby neurons; and communication fibers spread excitation from one hemisphere to the other. Seizure has various etiologies, which can be metabolic or neurological in cause. Seizures of vascular origin include arteriovenous malformation, aneurysms, cortical strokes, and bilateral thalamic infarcts. However, no associated seizure episodes have been associated with strokes in the corpus callosum alone.

The corpus callosum consists of white matter tracts and is a significant terminal connecting the left and right cerebral hemispheres.⁸ It was said to have heavily myelinated nerve fibers that form projections to the contralateral and ipsilateral neurons in the same anatomical layer and also to different parts of the brain.⁹ One of the functions of the corpus callosum is to process and act as a conduit for both cerebral hemispheres in terms of motor, sensory, and high-level cognitive signals.

Corpus callosum and pericallosal region pathology would usually be demyelinating lesions such as multiple sclerosis in the corpus callosum and pericallosal region. The corpus callosum alone can then be a focus of epileptogenicity and not just cortical strokes, although further studies would be needed to document this.

CONCLUSION

In conclusion, aside from alien hand syndrome, language disorder, and cognitive abnormality, a seizure can also be a clinical manifestation of corpus callosum stroke. This study would like to start the possibility of further case series regarding patients like this.

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