

CLINICAL VIGNETTE

A Case of Alien Hand Syndrome

Jessica Poon and Sherwin Hsu, MD

A 79-year-old male presented with several hours of sensory deficits and uncontrollable movements of the left upper extremity. His past medical history included heart failure with reduced ejection fraction, ventricular tachycardia requiring placement of an implanted cardiac defibrillator, and a remote history of ischemic stroke in the left parietal lobe with residual dysarthria. The sensory changes included numbness and tingling to the left hand. He first noted the uncontrollable arm movements while lying in bed when he felt something move across his chest which he thought might be an animal. Upon looking down, he was alarmed to see that his left hand was moving on its own accord. The patient tried to inhibit these movements by holding down the arm with his right hand and by sitting on it, but the left upper extremity movements persisted.

His vitals were unremarkable on presentation. His electrolytes were within normal limits and his creatinine at baseline. The patient was alert and oriented to person, place, and time. He had stable chronic dysarthria from his prior stroke. The motor exam showed 5/5 strength in the upper and lower extremities bilaterally, but the patient had new deficits in coordination in the left upper extremity, including dysmetria in the finger-to-nose test and an inability to interlace his fingers. Additionally, the patient exhibited parietal drift and decreased sensation to pinprick on the left upper extremity. Non-contrast head CT demonstrated hypoattenuation in the right posterior parietal lobe which was consistent with an infarct likely from an embolic source. The patient's constellation of physical exam and imaging findings was consistent with alien hand syndrome (AHS) likely secondary to biparietal lobe stroke.

Discussion

Alien hand syndrome is the rare phenomenon of uncontrollable and unintentional movements, most often reported in the upper extremities. It was first described by Goldstein in 1908.¹ Since then, the syndrome has been primarily described in case reports and is often attributed to injury of the frontal lobes or the corpus callosum.² This condition can cause significant distress to the patient, in addition to imposing many limitations on their activities of daily life. The mechanism of these injuries is broad and includes trauma, hemorrhage, malignancy, corticobasal degeneration, seizures, and ischemic stroke.² As many of these cases involve the frontal lobe, patients may also exhibit additional motor aberrations and frontal behavior patterns.¹

Based on aggregate data from several case reports, alien hand syndrome has been further sub-categorized based on the affected region of the brain and can be sorted by the typical behaviors present in each. Frontal AHS results from damage to the dominant hemisphere, specifically in the supplementary motor area, anterior cingulate gyrus, or the medial prefrontal cortex.²⁻⁵ It commonly presents with grasping behaviors, thought to be due to loss of motor inhibition via the corpus callosum.^{2,6} Callosal AHS, attributed to an anterior corpus callosum injury, results in "intermanual conflict," in which the motions of the affected limb are in direct opposition to the unaffected limb.^{2,3,5}

However, the abnormal contralateral left upper extremity movements seen in our patient are distinct from the previously described "classical" forms of AHS and are more consistent with posterior AHS. Unlike frontal or callosal AHS, posterior AHS presents as simple motor disturbances of a limb, such as levitation, and can include a variety of sensory deficits.^{1-3,5} Posterior AHS results from injury to the parietal lobe, occipital lobe, or the thalamus. Parietal lobe damage, which can occur in corticobasal degeneration, Alzheimer's disease, and stroke, can lead to involuntary levitating motions of the contralateral hand.^{5,7} Movements in posterior AHS are less complex compared to the frontal or callosal subtypes and are most consistent with our patient's presentation of motor dysfunction.

There are a number of proposed mechanisms for this type of AHS. One proposes injury to the multimodal association areas in the interior parietal lobes produces stimulation of abnormal motor function.^{7,8} Another possible mechanism involves the abnormal sensory component of posterior AHS. Abnormal sensation of the affected limb can result in a decrease of motor activity inhibition, which results in involuntary movement.^{7,8} Such a case was described by Carillho et al. 2001, in which a patient with parietal injury presented with intermittent loss of proprioception in the contralateral arm, resulting in "purposeless hand movements" during these periods.⁵

Unlike other cases of posterior AHS, our patient had biparietal lobe injury secondary to ischemic stroke, both remote and acute. Left upper extremity weakness and AHS due to biparietal infarction caused by acute cardioembolic stroke has been reported by Panikkath et al.⁷ Embolic etiologies for stroke were assessed in our patient by interrogating his cardiac defibrillator and by transthoracic echocardiogram. The interrogation was unrevealing, but the echocardiogram demonstrated a left ventri-

cular thrombus at the apex, which was the likely cause of our patient's stroke.

In conclusion, alien hand syndrome describes involuntary movements, usually of an upper extremity, in conjunction with a sensation of foreignness in the affected limb. Posterior AHS, a distinct entity from frontal and callosal AHS, presents with both motor and sensory changes rather than the isolated motor changes seen in the two more common subtypes. In our case, the patient's alien hand sensation resolved in 30 minutes and the foreign sensation in his left upper extremity gradually receded throughout his hospital stay. On the day of discharge, it was present only in his fingers. The patient was started on anticoagulation for his ventricular thrombus and was discharged home in stable condition.

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