

# Bilateral Alien Hand Syndrome in Cerebrovascular Disease

## CT, MR, CT Angiography, and $^{99m}\text{Tc}$ -HMPAO-SPECT Findings

Justo Serrano-Vicente, MD, PhD, Carmen Duran-Barquero, MD, Lucia Garcia-Bernardo, MD,  
Maria Luz Dominguez-Grande, MD, Jose Rafael Infante-Torre, MD, PhD,  
and Juan Ignacio Rayo-Madrid, MD PhD

**Abstract:** We report a 65-year-old man with a right cerebral infarction that occurred 15 years ago and a residual left hemiparesis that began with progressive contralateral hemiparesis. During the hospitalization, the patient developed a bilateral alien hand syndrome. Urgent CT, MR, CT angiography, and brain perfusion SPECT were performed that revealed an old right cerebral infarction and a new ischemic lesion in left parietal lobe and adjacent brain territories.

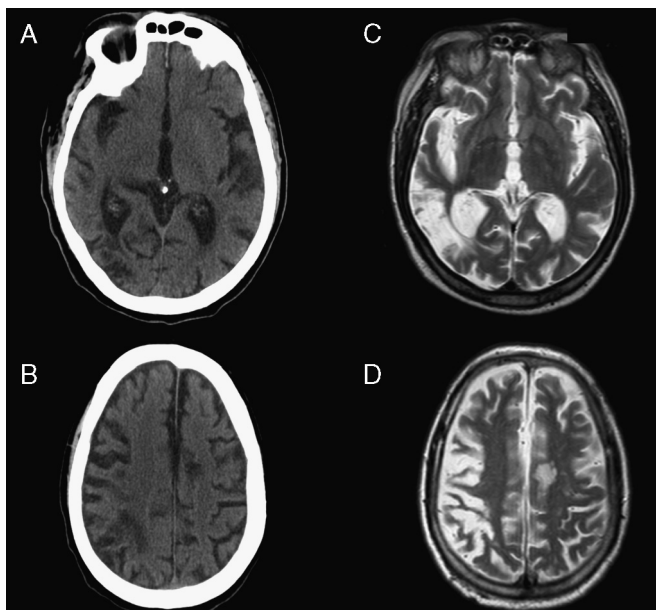
**Key Words:** alien hand syndrome, cerebrovascular disease, CT angiography, brain perfusion SPECT

(*Clin Nucl Med* 2015;40: e211–e214)

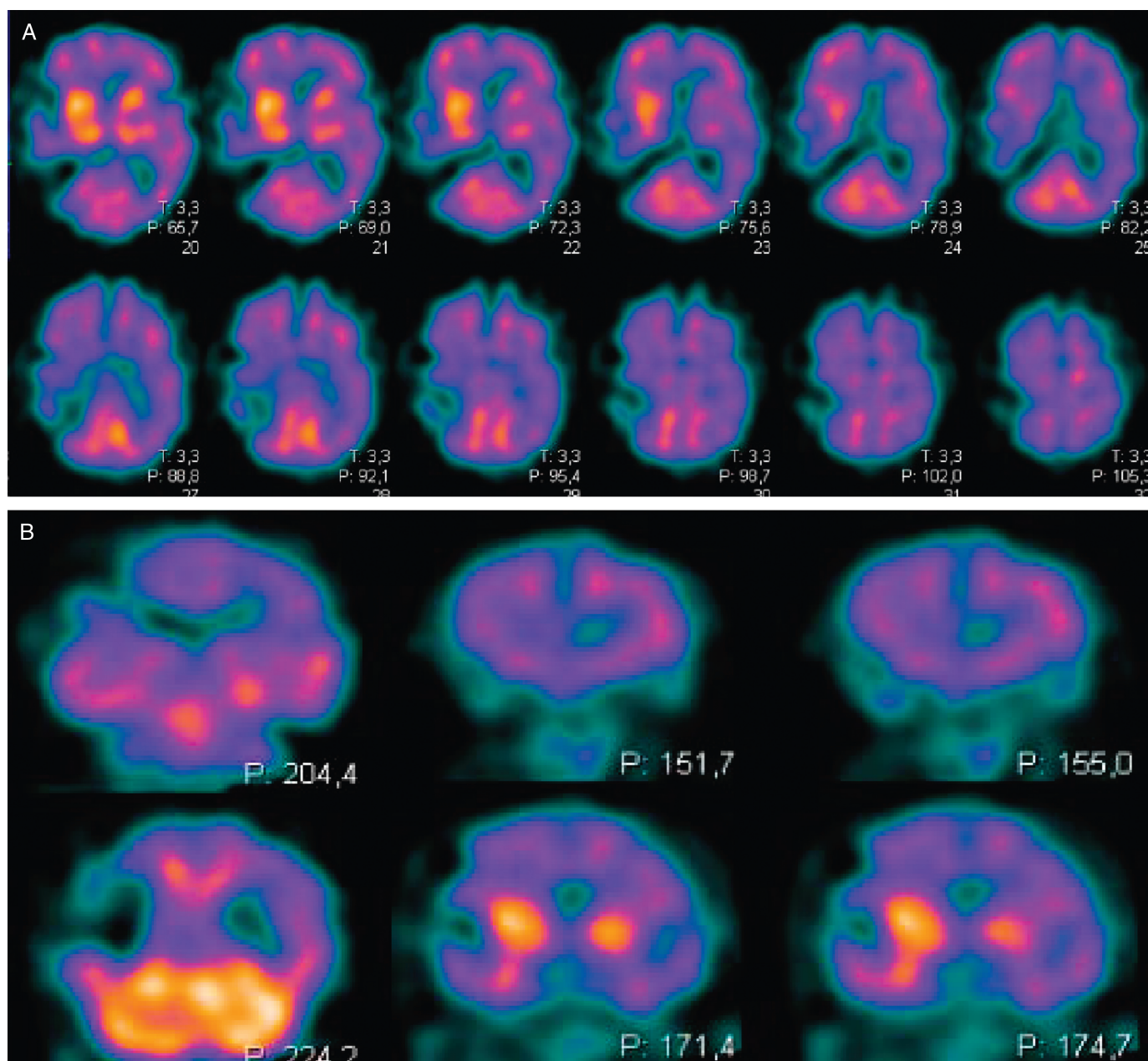
Received for publication April 9, 2014; revision accepted October 24, 2014.  
From the Nuclear Medicine Department, Infanta Cristina Hospital, Badajoz, Spain.  
Conflicts of interest and sources of funding: none declared.  
Reprints: Vicente Justo Serrano, MD, PhD, Avd Elvas SN, Nuclear Medicine Department, Infanta Cristina Hospital, Badajoz 06080, Spain. E-mail: justosv@unex.es.  
Copyright © 2014 Wolters Kluwer Health, Inc. All rights reserved.  
ISSN: 0363-9762/15/4003–e211

### REFERENCES

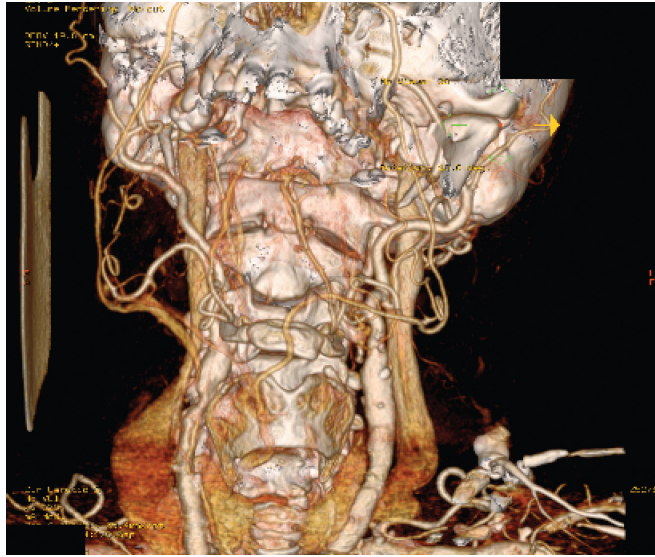
1. Brion S, Jedynak CP. Roubles du transfert interhemispherique. *Rev Neurol*. 1972; 126:257–266.
2. Doody R S, Jankovic J. The alien hand and related signs. *J Neurol Neurosurg Psychiatry*. 1992;55:806–810.
3. Yuan JL, Wang SK, Guo XJ, et al. Acute infarct of the corpus callosum presenting as alien hand syndrome: evidence of diffusion weighted imaging and magnetic resonance angiography. *BMC Neurol*. 2011;11:142.
4. Huang Y, Jia J. Corpus callosum hematoma secondary to cerebral venous malformation presenting as alien hand syndrome. *Neurocase*. 2013;19:377–381.
5. Bakheit AM, Brennan A, Gan P, et al. Anarchic hand syndrome following resection of a frontal lobe tumor. *Neurocase*. 2013;19:36–40.
6. Heiss WD. Ischemic penumbra: evidence from functional imaging in man. *J Cereb Blood Flow Metab*. 2000;20:1276–1293.
7. Alvarez AM, Serena A, Nogueiras JM, et al. Incidental finding of bilateral subdural hematoma on brain perfusion SPECT. *Rev Esp Med Nucl Im Mol*. 2012;31:110.
8. Carrilho PE, Caramelli P, Cardoso F, et al. Involuntary hand levitation associated with parietal damage: another alien hand syndrome. *Arq Neuropsiquiatr*. 2001; 59:521–525.
9. Delrieu J, Payoux P, Toulza O, et al. Sensory alien hand syndrome in corticobasal degeneration: a cerebral blood flow study. *Mov Disord*. 2010;25:1288–1291.



**FIGURE 1.** Alien hand syndrome (AHS) was first described in 1972, referred to apparently purposeful, upper-extremity movements that the patient reports as beyond his control.<sup>1</sup> It usually consists of an autonomous motor activity, with a feeling of foreignness of the involved limb.<sup>2</sup> We report a 65-year-old patient who had a cerebrovascular stroke in the right temporoparietal region 15 years ago, with a residual left hemiparesis, who came to our hospital with progressive right hemiparesis. An urgent brain CT was performed, which showed findings related to an old brain infarct at the right temporoparietal region (A) and a small hypodense lesion in left frontal lobe (B). After admission, the patient progressively developed a left AHS, and 5 days later, another AHS appeared in the right limb. A brain MR was requested showing an old lesion at the right temporoparietal regions (C), as well as a hyperintense T2 lesion in parasagittal left frontal lobe, compatible with a subacute ischemic lesion (D).



**FIGURE 2.** The same day, a brain perfusion SPECT after the administration (with) of 740 MBq of  $^{99m}\text{Tc}$ -HMPAO was performed. Two sets of selected transaxial (A) and coronal slices (B) are presented showing severe right temporoparietal hypoperfusion that affected moderately to the occipital and frontal adjacent territories. Besides, another moderate hypoperfusion was found in the left frontal lobe affecting the medial precentral gyrus and the ipsilateral adjacent temporoparietal territories. Subcortical faint hypoperfusion was observed in left caudate, putamen, striatum, hemithalamus, and insular cortex. These findings correlated with an old infarct in right parietal lobe and a subacute new stroke in left frontal lobe and subcortical ipsilateral centers. Brain SPECT showed more territories affected by the ischemic event than CT and MR did.



**FIGURE 3.** A head and neck brain CT angiography was performed showing diffuse occlusive atheromatosis in both internal carotid arteries (ICAs). The left ICA showed increased volume suggesting a recent occlusion of it. The AHS was progressively diminishing in the left side remaining in a stable residual hemiparesis. The patient left the hospital with the diagnosis of old right ICA occlusion and subacute left ICA occlusion. Alien hand syndrome is usually considered as a type of interhemispheric disconnection syndrome resulting from several different types of lesions involving supplementary motor area, corpus callosum, parietal and frontal cortex, or thalamus. However, the neural mechanisms of AHS have remained controversial.<sup>3-6</sup> Bilateral AHS is a rare circumstance that we have not found published in the medical literature. Brain perfusion SPECT is a well-known diagnostic technique in cerebrovascular pathology,<sup>6,7</sup> and some publications related to unilateral AHS have been published.<sup>8,9</sup> Additional abnormalities shown by brain SPECT could help to understand the physiopathology of this strange syndrome. Perhaps, the great number of injured territories: sensitive, motor, and association cortex in both hemispheres could explain the bilateral movements. Besides, the subcortical structures affected such as striatum, thalamus, nigrostriatal system, and related neuronal circuits also could explain the involuntary hand movement characteristics of AHS.