

Unilateral Diffusely Increased Muscle Uptake of F-18 FDG in a Patient With Hemiparesis Due to Stroke

Pushpender Gupta, MD,* Gopi Kota, MD,* Abass Alavi, MD,† and Akiva Mintz, MD, PhD*‡

Abstract: Although normal muscles accumulate less F-18 fluorodeoxyglucose (FDG) under normoglycemic conditions, FDG muscle uptake is frequently encountered on PET scans. However, diffusely elevated unilateral muscle uptake is not frequently seen. In this report, we demonstrate a case of unilateral muscle uptake in a patient with a remote history of stroke, possibly explained by increased spasticity, a shift toward fast twitch (type II) muscle fibers, and inflammatory changes that are all seen post–upper motor neuron injury. Thus, FDG PET may serve as a functional biomarker of the extent of upper motor neuron injury after stroke.

Key Words: PET/CT, hemiparesis, upper motor neuron injury, F-18 FDG uptake

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From the *Department of Radiology, Wake Forest University Baptist Medical Center, Winston-Salem, NC; †Division of Nuclear Medicine, Department of Radiology, Hospital of the University of Pennsylvania, Philadelphia, PA; and ‡Department of Neurosurgery, Wake Forest University Baptist Medical Center, Winston-Salem, NC.

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Reprints: Akiva Mintz, MD, PhD, Departments of Radiology and Neurosurgery, Wake Forest University Health Sciences, Medical Center Blvd., Winston-Salem, NC 27157. E-mail: amintz@wfbmc.edu.

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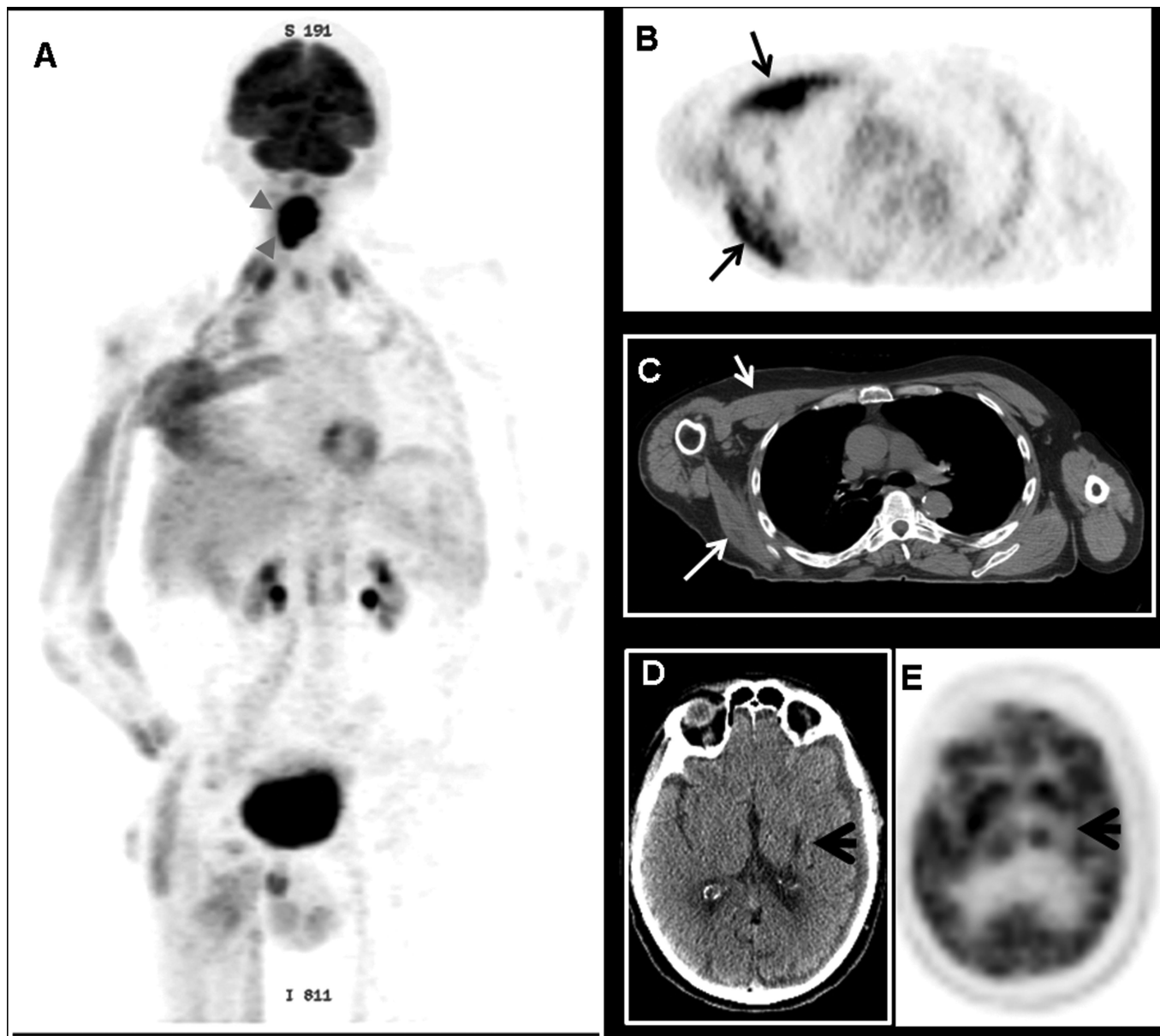


FIGURE 1. A 63-year-old man was referred to our department of nuclear medicine for staging evaluation of recurrent squamous cell carcinoma. The patient additionally had a remote history significant for stroke (20 years ago) that resulted in right-sided hemiparesis. Neurologic examination revealed motor strength of 1/5 in the right upper and lower extremities and 5/5 in the left upper and lower extremities with intact sensations throughout. In addition to the known malignancy in the base of the tongue region (A, arrowhead), the PET/CT scan revealed diffusely increased tracer uptake in muscles of the right chest wall, right shoulder, right upper extremity, and right lower extremity (A–C, arrows). The PET/CT images of the brain revealed a photopenic area involving the left lentiform nucleus along with decreased tracer uptake in left thalamus (D–E, arrows). Physiologic muscle uptake can be attributed to a number of factors that may occur around the time of injection, including increased insulin, surgical interventions, voluntary activities (talking, chewing, exercising), and involuntary muscle activity (labored breathing, coughing, stress-induced muscle spasm). Although normal muscle uptake is typically symmetric or limited to single muscle or functional group, our case illustrates the interesting findings on an FDG PET scan of relatively preserved muscle mass but diffusely increased unilateral muscle glucose metabolism in a patient with upper motor neuron injury nearly 20 years after a stroke. These findings of increased FDG muscle uptake in a hemiparetic patient indicate a potential role of using FDG PET for in vivo noninvasive assessment of muscle changes after a stroke and potential changes in uptake pattern in response to physical rehabilitation. Stroke is the leading cause of disability in the United States. Hafer-Macko et al have proposed that in addition to the primary brain injury, the disability in stroke patients may also be because of secondary biologic abnormalities of muscle atrophy, altered contractile protein expression with a shift toward fast twitch fibers, and skeletal muscle inflammation. Thus, FDG PET may serve as a functional biomarker of the quantity and extent of muscle changes after stroke and possibly to monitor effects of intervention.^{1–8}