

Findings of ^{123}I -Iomazenil SPECT During and After Stroke-Like Episodes in a Patient With MELAS

Yoshiharu Taguchi, MD,* Shutaro Takashima, MD,* Kyo Noguchi, MD,† and Kortaro Tanaka, MD*

Abstract: Reduced cortical benzodiazepine receptor binding potential in late images of ^{123}I -iomazenil SPECT indicates neuronal damage in the cortex. We present the case of a 31-year-old woman with mitochondrial myopathy, encephalopathy, lactic acidosis, and stroke-like episodes (MELAS) who had focal seizures in the right hand. FLAIR imaging in the ictal state revealed a high-intensity lesion in the left post-central gyrus, while ^{123}I -iomazenil SPECT showed decreased tracer uptake in this lesion. The lesion completely disappeared on FLAIR imaging performed 1 month after the focal seizures; in contrast, ^{123}I -iomazenil SPECT still revealed a significant decrease in tracer uptake in this lesion.

Key Words: ^{123}I -iomazenil, MELAS, stroke-like episode, neural damage

(*Clin Nucl Med* 2014;39: e334–e335)

Received for publication January 22, 2013; revision accepted April 9, 2013.

From the *Department of Neurology, Toyama University Hospital, Toyama, and

†The Department of Radiology, Toyama University, Toyama, Japan.

Conflicts of interest and sources of funding: none declared.

Reprints: Yoshiharu Taguchi, MD, Department of Neurology, Toyama

University Hospital, 2630 Sugitani, Toyama, 930-0194, Japan.

E-mail: ytagu@med.u-toyama.ac.jp.

Copyright © 2013 by Lippincott Williams & Wilkins

ISSN: 0363-9762/14/3906–e334

REFERENCES

1. Millet P, Graf C, Moulin M, et al. SPECT quantification of benzodiazepine receptor concentration using a dual-ligand approach. *J Nucl Med.* 2006;47:783–792.
2. Hatazawa I, Satoh T, Shimosegawa E, et al. Evaluation of cerebral infarction with iodine-123-iomazenil SPECT. *J Nucl Med.* 1995;36:2154–2161.
3. Hatazawa J, Shimosegawa E, Satoh T, et al. Central benzodiazepine receptor distribution after subcortical hemorrhage evaluated by means of [^{123}I]iomazenil and SPECT. *Stroke.* 1995;26:2267–2271.
4. Nakagawara J, Sperling B, Lassen NA. Incomplete brain infarction of reperfused cortex may be quantitated with iomazenil. *Stroke.* 1995;28:124–132.
5. Lewis DH, Longstreth WT Jr, Wilkus R, et al. Hyperemic receptive aphasia on neuroSPECT. *Clin Nucl Med.* 1993;18:409–412.
6. Wei CY, Hsiao HL, Chen SC, et al. Ictal and interictal 99mTC-HMPAO brain SPECT of a MELAS case presented with epilepsy-like visual hallucination. *Clin Nucl Med.* 2012;37:876–877.
7. Tanahashi C, Nakayama A, Yoshida M, et al. MELAS with the mitochondrial DNA 3243 point mutation: a neuropathological study. *Acta Neuropathol.* 2000;99:31–38.
8. Ito H, Mori K, Harada M, et al. Serial brain imaging analysis of stroke-like episodes in MELAS. *Brain Dev.* 2008;30:483–488.

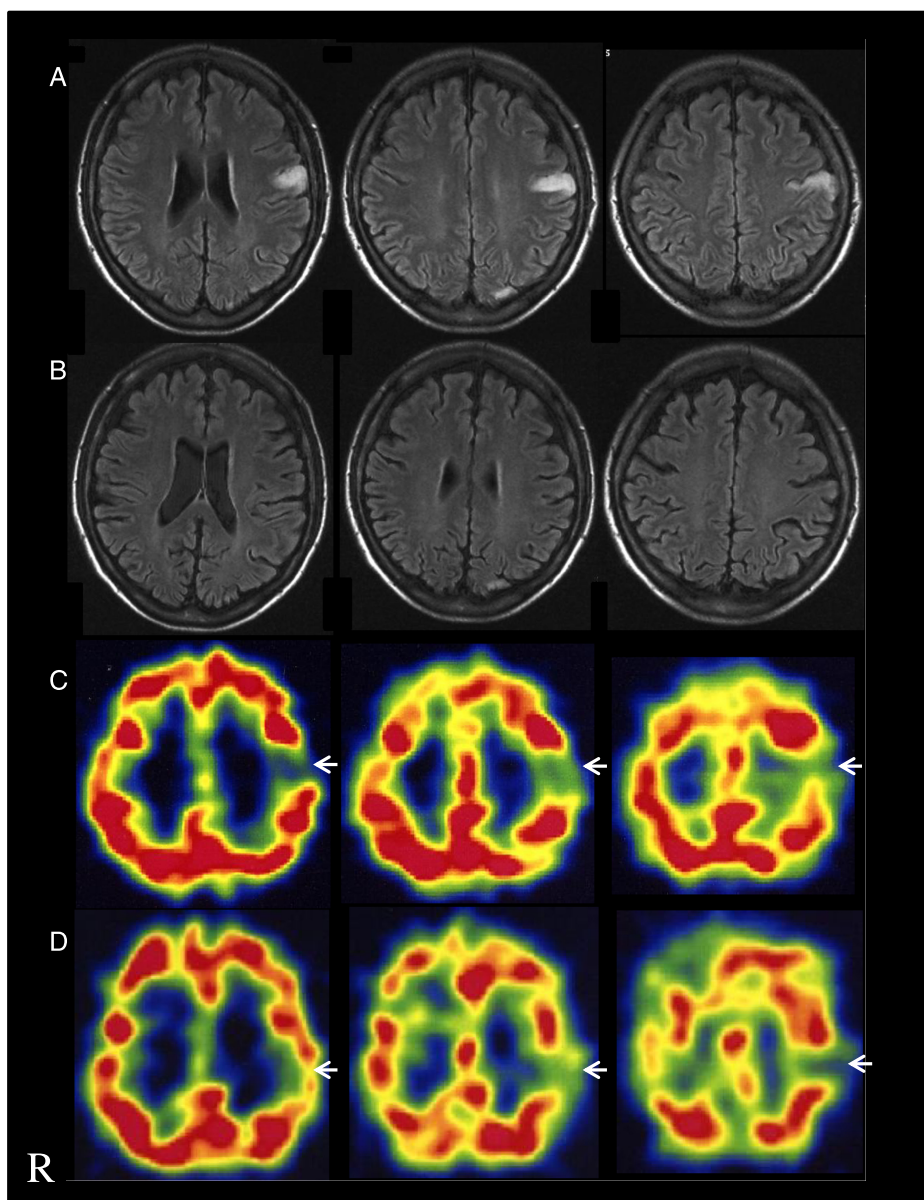


FIGURE 1. ^{123}I -iomazenil single-photon emission computed tomography (SPECT) shows the distribution of central benzodiazepine receptors in the human brain.^{1–4} Reduced cortical benzodiazepine receptor binding potential in late images of ^{123}I -iomazenil SPECT indicates neuronal damage or loss in the cerebral cortex.^{1–3} A 31-year-old woman with mitochondrial myopathy, encephalopathy, lactic acidosis, and stroke-like episodes (MELAS) presented with stroke-like episodes. She developed several convulsions and hypesthesia in the right hand and oral area, and was admitted to our department. After admission, focal seizures occurred intermittently in the right hand and oral area. Brain fluid-attenuated inversion recovery (FLAIR) MRI performed when the patient was in the ictal state revealed a high-intensity lesion in the left post-central gyrus (A). Despite anticonvulsant therapy, the convulsions in her right hand and oral area continued intermittently up to the second day. On the second day after admission, ^{123}I -iomazenil SPECT was performed 15 minutes (early images) and 180 minutes (late images) after injecting the tracer at a dose of 167 MBq (4.5 mCi). Tracer uptake in the lesion revealed by MRI was increased and reduced on early^{5,6} and late images (C). Her convulsions disappeared on the third day after treatment with anticonvulsant drugs. A follow-up brain FLAIR MRI performed 1 month after the stroke-like episodes showed that the lesion in the left post-central gyrus had completely disappeared (B). However, late images of ^{123}I -iomazenil SPECT performed at the same time revealed a significant decrease in tracer uptake in this lesion (D). The hypesthesia in her right hand continued, but the sensory disturbance caused by pinpricking improved. In the chronic phase, although the high-intensity area completely disappeared on FLAIR imaging, ^{123}I -iomazenil SPECT revealed a persistent decrease in tracer uptake. Neuronal damage in the stroke-like lesions, which can no longer be detected by MRI, may continue even during the chronic phase of MELAS.^{5–8} ^{123}I -iomazenil SPECT is, thus, considered to be very useful for assessing chronic neuronal damage after stroke-like episode in patients with MELAS.