

Cerebral Infarction with Increased Uptake on ^{123}I -FP-CIT SPECT

Abstract

A 76-year-old woman underwent ^{123}I -FP-CIT brain SPECT due to postural reflex impairment. The transverse slices demonstrated increased uptake in the right middle cerebral artery territory. MR images obtained two weeks earlier showed cerebral infarction in the corresponding area. ^{123}I -FP-CIT has high binding affinity for dopamine transporters, especially in the nerve endings of nigrostriatal dopaminergic neurons.

Key Words: infarction; brain; ^{123}I -N- ω -fluoropropyl-2 β -carbomethoxy-3 β -(4-iodophenyl)nortropane (^{123}I -FP-CIT); dopamine transporter; single photon emission computed tomography (SPECT)

Figure Legend

FIGURE 1. A 76-year-old woman underwent ^{123}I -FP-CIT brain SPECT due to postural reflex impairment. The transverse slices (**A**) demonstrated increased uptake near the surface of the brain in the right middle cerebral artery territory (arrows). Diffusion-weighted (**B**) and fluid attenuated inversion recovery (FLAIR) (**C**) MR images obtained two weeks earlier showed cerebral infarction in the corresponding area.

^{123}I -FP-CIT has high binding affinity for dopamine transporters, especially in the nerve endings of nigrostriatal dopaminergic neurons. In general, there is no increased uptake outside the striatum. However, extrastriatal elevated uptake on dopamine transporter imaging has been reported in an intra-axial tumor,¹ brain metastases,^{2,3} meningiomas,^{4,5} a skull hemangioma,⁶ and an intramuscular hematoma.⁷ ^{123}I -FP-CIT is also known to show decreased uptake at the old striatal infarction.⁸

Reactive astrocytes de novo express dopamine-1 receptors and dopamine-2 receptors after experimental stroke in rats.⁹ Activated microglia and peripherally derived macrophages de novo express dopamine-2 receptors after experimental stroke in mice.¹⁰ In our case, a similar mechanism may have increased ^{123}I -FP-CIT uptake in the subacute infarct lesion.

References

1. Boronat-Ferrater M, Lorenzo-Bosquet C, León A, et al. Unexpected I-123 FP-CIT uptake in a brain tumor. *Clin Nucl Med* 2009;34:608-609
2. Cascini GL, Ciarmiello A, Labate A, et al. Unexpected detection of melanoma brain metastasis by PET with iodine-124 betaCIT. *Clin Nucl Med* 2009;34:698-699
3. Wu YC, Hsieh TC, Sun SS, et al. Findings of cerebral metastasis demonstrated on Tc-99m TRODAT-1 SPECT. *Clin Nucl Med* 2010;35:107-108
4. Cilia R, Allegra R, Pezzoli G. Meningioma with intense I(123) FP-CIT uptake. *Mov Disord* 2012;27:1744-1745
5. Song IU, Lee SH, Chung YA. The incidental suggestive meningioma presenting as high 18F FP-CIT uptake on PET/CT study. *Clin Nucl Med* 2014;39:e97-98
6. Chun KA, Kong E, Cho I. An Incidental Finding of Skull Hemangioma During 18F-FP CIT Brain PET/CT. *Clin Nucl Med* 2015;40:e488-489
7. Ceulemans G, Verdries D, Versijpt J, et al. Extrastriatal uptake on (123)I-ioflupane brain SPECT. *Eur J Nucl Med Mol Imaging* 2010;37:1048
8. Kim C, Kim DY, Hong IK. Vascular Parkinsonism by Infarctions at Different Locations on 18F-FP-CIT PET/CT. *Clin Nucl Med* 2019;44:e627-e628
9. Ruscher K, Kuric E, Wieloch T. Levodopa treatment improves functional recovery after experimental stroke. *Stroke* 2012;43:507-513

10. Huck JH, Freyer D, Böttcher C, et al. De novo expression of dopamine D2 receptors on microglia after stroke. *J Cereb Blood Flow Metab* 2015;35:1804-1811

