

Technetium-99m Labeled Tropane Derivative: Uptake in a Pituitary Macroadenoma

Abstract

We present a case of suspected idiopathic Parkinson's disease in whom extrastriatal accumulation of Technetium-99m labeled tropane derivatives in a pituitary macroadenoma interfered with image quality and interpretation. Subsequent F-18 fluoro-dihydroxyphenylalanine positron emission tomography/computed tomography was useful to demonstrate the absence of presynaptic dopaminergic dysfunction.

Keywords: Fluoro-dihydroxyphenylalanine, Parkinson disease, pituitary macroadenoma, single-photon emission computed tomography/computed tomography, technetium-99m labeled tropane derivatives

A 55-year-old male presented with difficulty in walking, tremors of bilateral upper limbs, scanning speech, and urinary incontinence, for the past 2 years. He was a known case of pituitary macroadenoma (PM) and was referred to our department for dopamine transporter single-photon emission computed tomography (DAT SPECT) with the clinical suspicion of Parkinson's disease. Technetium-99m labeled tropane derivative (Tc-99m TRODAT) (20 mCi) was injected intravenously and SPECT/CT was done 4 h later. Evaluation of the cine image [Figure 1a] revealed intense focal tracer accumulation which corresponded to PM on the fused axial SPECT/CT images [Figure 1b], and on magnetic resonance imaging [Figure 1c]. As a result of this intense uptake in the macroadenoma, tracer binding in the basal ganglia was suboptimal and while the left basal ganglia showed normal binding, the right side was interpreted as normal only after a careful review of the transaxial images [Figure 1d]. To further confirm the absence of presynaptic dopaminergic dysfunction, we performed a F-18 fluoro-dihydroxyphenylalanine (FDOPA) positron emission tomography/computed tomography (PET/CT) which revealed normal tracer uptake in both basal ganglia [Figure 1e]. No accumulation of FDOPA was noted in

the PM [Figure 1f]. The symptoms of the patient were subsequently attributed to the presence of cerebellar atrophy.

Tc-99m TRODAT ([2-[2-[3-(4-chlorophenyl)-8-methyl-8-azabicyclo[3,2,1]oct-2-yl] methyl](2-mercaptoethyl)-amino] ethyl] amino] ethanethiolato (3-)-N2, N2', S2, S2']oxo-[1R-(exo-exo)]) binds to the DAT and is used for the evaluation of presynaptic dopaminergic function in Parkinsonism.^[1-4] The extrastriatal uptake of TRODAT has been reported in PM, primary brain tumors, brain metastases, meningioma, osteoid tumor of clivus, intracranial tuberculoma, and subdural hematoma.^[5-13] The possibility of extrastriatal accumulation of TRODAT interfering with image interpretation as in our case should be kept in mind, while planning TRODAT SPECT and alternative modalities like FDOPA PET with superior image quality and resolution should be resorted to at the outset. F-18 FDOPA is an analog of DOPA and serves as substrate for aromatic amino acid decarboxylase that converts dopa to dopamine. It can be used as an alternative for Tc-99m TRODAT,^[14] especially when the symptom duration of Parkinson's is not too short.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and

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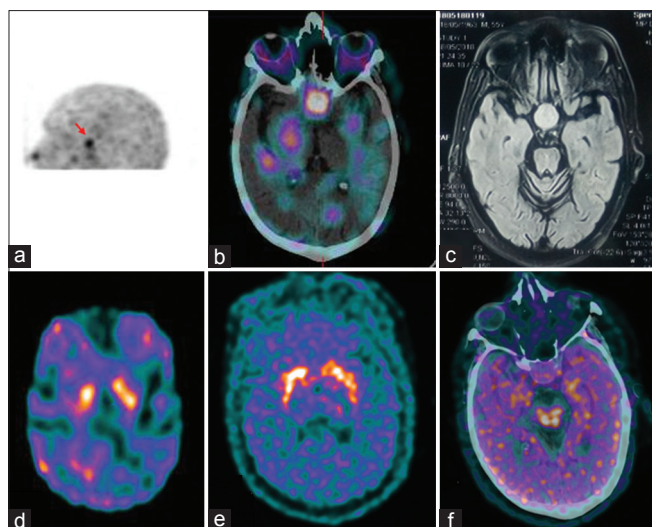


Figure 1: (a) Cine single-photon emission computed tomography image showing focal tracer accumulation, (b) corresponding to the pituitary macroadenoma on single-photon emission computed tomography/computed tomography, (c) pituitary macroadenoma as seen on magnetic resonance imaging, (d) labeled tropane derivatives single-photon emission computed tomography transaxial image showing normal uptake in the left basal ganglia and equivocal right basal ganglia uptake, (e) F-18 fluoro-dihydroxyphenylalanine positron emission tomography transaxial image showing normal uptake in both basal ganglia and, (f) F-18 fluoro-dihydroxyphenylalanine positron emission tomography image at sella level showing no uptake in the pituitary macroadenoma

other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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