

<b>Subject: Brain SPECT, (78607)</b>		<b>Original Effective Date:</b> <b>10/25/2018</b>
<b>Policy Number: MCR: 661</b>	<b>Revision Date(s):</b>	
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**DESCRIPTION OF PROCEDURE/SERVICE/PHARMACEUTICAL**

Brain SPECT (Single-photon emission computed tomography) is a nuclear medicine procedure that can quantify blood flow (perfusion) to the brain and brain metabolic activity. Different radiopharmaceuticals that cross the blood brain barrier can be used for brain SPECT, depending on the diagnostic information being sought.

To distinguish Alzheimer disease (AD) from frontotemporal or other forms of dementia, SPECT is performed using the isotopes Technetium 99m HMPAO (hexamethyl propylene amine oxime) or Technetium 99m ECD (ethyl cysteinate dimer). These isotopes can also be used for a number of other indications including localizing epileptic foci, diagnosing encephalitis, assessing vascular spasm following subarachnoid hemorrhage, detecting and evaluating cerebrovascular disease, predicting the prognosis of patients with cerebrovascular accidents and corroborating the clinical impression of brain death. Although SPECT is less expensive and more readily accessible than PET, brain PET provides better resolution and more specific functional information than Technetium SPECT scans and PET is thus the preferred exam.

Parkinsonism is a progressive, neuro-degenerative syndrome, caused by neuronal loss in the substantia nigra and loss of dopaminergic terminals in the basal ganglia of the brain. The substantia nigra contains the dopamine transporter (DaT) protein that is responsible for the uptake of dopamine. Dopamine transporter scan (DaT SPECT) is performed with the isotope iodine-123 ioflupane and measures DaT sites in the brain, thus assessing nigrostriatal integrity

and evaluating for a dopaminergic deficit. Prototypical Parkinson Disease (PD) is characterized by tremor, bradykinesia and rigidity with a dopaminergic deficit. However, other conditions, including essential tremor (ET), drug induced Parkinsonism, normal pressure hydrocephalus, vascular Parkinsonism and psychogenic (functional) Parkinsonism, may mimic some of the clinical findings of classical PD, but without nigrostriatal degeneration (without a dopaminergic deficit).

#### APPROVAL SUPPORT

This policy addresses single photon emission computed tomography (SPECT) of the brain only.

- Post treatment evaluation to determine residual tumor versus radiation necrosis
- Pre-surgical evaluation for patients with refractory epilepsy

#### DaTscan Brain SPECT

- Patients with tremor that is not clearly differentiated into either essential tremor or
- Parkinsonian tremor and is not responsive to dopaminergic replacement therapy

#### ADDITIONAL INFORMATION

The above medical necessity recommendations are used to determine the best diagnostic study based on a patient's specific clinical circumstances. The recommendations were developed using evidence based studies and current accepted clinical practices. Medical necessity will be determined using a combination of these recommendations as well as the patient's individual clinical or social circumstances.

- Tests that will not change treatment plans should not be recommended.
- Same or similar tests recently completed need a specific reason for repeat imaging.

#### REFERENCES USED FOR DETERMINATIONS

1. Smirniotopoulos JG, Cornelius RS, Antuaco EJ, , et al, Expert Panel on Neurologic Imaging, American College of Radiology Appropriateness Criteria, Epilepsy,
2. Widjaja, E., & Raybaud, C. (2008). Advances in neuroimaging in patients with epilepsy. *Neurosurgical Focus*, 25(3), E3. Retrieved from <http://www.lucignani.it/download/Epi/Epi5.pdf>.
3. Colantonio L, Augustovski F, Pichon Riviere A. Usefulness of SPECT in epilepsy [summary]. Report ITB No.32. Buenos Aires, Argentina: Institute for Clinical Effectiveness and Health Policy (IECS); 2007.
4. Rozental JM. Positron emission tomography (PET) and single-photon emission computed tomography (SPECT) of brain tumors. *Neurol Clin*. 1991;9(20):287-305.
5. Holman BL, Abdel-Dayem H. The clinical role of SPECT in patients with brain tumors. *J Neuroimaging*. 1995;5 Suppl 1:S34-S39.
6. Grosset D, Grachev I, O'Brien J, et al. Integrated Analysis of 123I-FP-CIT (DaTscan; Ioflupane I123 Injection) SPECT Brain Imaging - Diagnostic Effectiveness in Patients with Movement Disorders and/or Dementia (S8.004). *Neurology*. 2014;82(10 Supplement):S8.004.

7. Tolosa E, Borghet TV, Moreno E. Accuracy of DaTSCAN (123I-Ioflupane) SPECT in diagnosis of patients with clinically uncertain parkinsonism: 2-year follow-up of an open-label study. *Mov Disord.* 2007; 22(16):2346-2351.
8. Karimi M, Perlmutter JS, Soher BJ, Doraiswamy PM, Charles HC. A review of 1H MR spectroscopy findings in Alzheimer's disease. *Neuroimaging Clin N Am.* 2005;15(4):847-852, xi.
9. Herholz K, Schopphoff H, Schmidt M, et al. Direct comparison of spatially normalized PET and SPECT scans in Alzheimer's disease. *J Nucl Med.* 2002;43(1):21-26.
10. Stuart H, Isaacson, Stanley Fisher, Fiona Gupta, Neal Hermanowicz, Daniel E. Kremens, Mark F. Lew, Kenneth Marek, Rajesh Pahwa, David S. Russell & John Seibyl (2017) Clinical utility of DaTscan™ imaging in the evaluation of patients with parkinsonism: a US perspective, *Expert Review of Neurotherapeutics*, 17:3, 219-225, DOI: 10.1080/14737175.2017.1256205
11. Juni, J.E., Waxman, A.D., Devous, M.D., Tikofsky, R.S., Ichise, M., Van Heertum, R.L., . . . Chen, C.C. (2009). Procedure Guideline for Brain Perfusion SPECT Using 99mTc Radiopharmaceuticals 3.0\*. *Journal of Nuclear Medicine Technology*, 37(3), 191-195. doi: 10.2967/jnmt.109.067850.
12. de la Fuente-Fernández R. Role of DaTSCAN and clinical diagnosis in Parkinson disease. *Neurology* 2012; 78:696.

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CPT	Description
78607	Brain SPECT