MEDICAL POLICY – 6.01.502
Single Photon Emission Computed Tomography (SPECT) for Non-cardiac Indications

Effective Date: June 1, 2017
Last Revised: May 23, 2017
Replaces: N/A

RELATED MEDICAL POLICIES:
6.01.54 Dopamine Transporter Imaging with Single-photon Emission Computed Tomography

Select a hyperlink below to be directed to that section.

POLICY CRITERIA | CODING | RELATED INFORMATION
EVIDENCE REVIEW | REFERENCES | HISTORY

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Introduction

SPECT is a type of nuclear imaging test that uses a radioactive dye, also called a tracer, and a special camera to create a three-dimensional (3-D) image of the organs in the body. The images created by tracking the dye in the blood stream can show areas of increased/decreased blood flow and progressive changes in the body. SPECT is proposed to help diagnose or monitor certain tumors, bone disorders, and heart problems.

SPECT imaging of the brain for mental health disorders is used as a research tool in clinical trials. Research has not shown the utility of SPECT brain imaging for differential diagnosis or for assessing or predicting an individual’s risk of getting a mental health disorder.

Dopamine transporter imaging with single-photon emission computed tomography (DAT-SPECT) is addressed in another policy (see Related Medical Policies).

Note: The Introduction section is for your general knowledge and is not to be taken as policy coverage criteria. The rest of the policy uses specific words and concepts familiar to medical professionals. It is intended for providers. A provider can be a person, such as a doctor, nurse, psychologist, or dentist. A provider also can be a place where medical care is given, like a hospital, clinic, or lab. This policy informs them about when a service may be covered.
### Policy Coverage Criteria

**SPECT scan**

**Medical Necessity**

SPECT scans may be considered medically necessary for any of the following conditions or symptoms:

- Brain tumor recurrence versus radiation necrosis, infection
- Liver hemangioma versus tumor identification
- Localization of abscess, infection or inflammation
- Lymphoma evaluation
- Neuroendocrine tumors
- Parathyroid disease
- Renal function and renal scarring evaluation (Dimercaptosuccinic acid [DMSA] scan)
- Seizure foci localization for patients with intractable epilepsy
- Vertebral abnormalities evaluation (such as spondylosis, spondylolysis, spondylolisthesis, degenerative joint disease/arthritis of the facet joints, stress fractures)

**Investigational**

SPECT scans are considered investigational for any of the following conditions or symptoms:

- Attention deficit hyperactivity disorder (ADHD)
- Colorectal cancer (eg, with CEA-Scan, IMMU-4)
- Head trauma – evaluation of brain morphology
- Mental health disorders (diagnosis, prediction, response to medication)
- Movement disorder evaluation
- Pervasive development disorders (PDD)
- Prostate cancer (eg, with ProstaScint)
### Procedure

<table>
<thead>
<tr>
<th>Investigational</th>
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<td>• Unclassified dementia evaluation (eg, Alzheimer disease)</td>
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### Coding

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### Related Information

#### Definition of Terms

**Abscess:** A mass filled with pus (made up of dead white blood cells and dead tissue, bacteria, and blood serum) that collects anywhere in the body as a result of the body's response to an infection.

**Adenoma:** A noncancerous (benign) epithelial tumor that may affect various organs in the body. The adenoma often comes from or resembles glandular tissue, though some grow in nonglandular areas.

**Carcinoid tumors:** Carcinoid tumors are slow growing and usually start in the gastrointestinal tract (anywhere between the stomach and the rectum) or the lung. These tumors make and release (secrete) large amounts of hormones, including cortisol, histamine, insulin and serotonin. Carcinoid tumors are a type of neuroendocrine tumor.

**Liver hemangioma:** A noncancerous tumor (mass) that forms in or on the liver. It is made up of small blood vessels. Liver hemangiomas are more common in women than men.

**Lymphoma:** A cancer of the white blood cells (lymphocytes) of the body's immune system. It develops in the lymph nodes and lymphatic system.

**Movement disorders:** A group of diseases that includes abnormally slow movement (bradykinesia), rigidity, tremor at rest, and postural instability.
**Neuroendocrine tumors**: A diverse group of tumors that form from cells of the hormone and nervous systems. They may be found in the intestine and also occur in the thyroid, lung and other parts of the body.

**Pervasive developmental disorders (PDD)**: Refers to a group of disorders defined as delays in the development of socialization and communication skills often accompanied by cognitive and language delays.

**Transient ischemic attack (TIA)**: A temporary lack of adequate blood and oxygen (ischemia) to the brain. The neurological signs and symptoms are similar to a brain attack (stroke), but go away within a short period of time. This may also be referred to as a mini-stroke.

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**Evidence Review**

**Abscess/Infection**

Labeled white blood cells are infused prior to SPECT imaging of the suspected clinical site of infection. This infusion helps with localization of tissue inflammation.¹

**Surgical Repair**

SPECT can be useful in distinguishing between tumor regrowth and radiation necrosis in patients with cerebral metastases.²

**Cerebrovascular Disease (CVA, stroke, brain attack, TIA)**

The use of SPECT has become outdated for the evaluation and management of cerebrovascular disease, including cerebrovascular accidents (CVA or stroke), subarachnoid hemorrhages, and transient ischemic attacks (TIA). Newer imaging techniques are more common such as computed tomography angiography (CTA) and magnetic resonance angiography (MRA).³⁻⁵
Epilepsy Seizure Foci

Interictal or intra-ictal SPECT may be applicable for patients being considered for surgery to treat intractable epilepsy, when seizure focus cannot be localized by EEG, video-EEG, or MRI.6,7

Kidney (renal)

Using Technetium-99m labeled dimercaptosuccinic acid (DSMA) for diagnostic imaging may be useful to evaluate the kidneys function and identify of scarring.8,9

Liver Hemangioma versus Primary Hepatoma or Metastases

Technetium-labeled red blood cells are infused prior to SPECT imaging of the liver.10

Lymphoma

SPECT scans may be useful to distinguish tumor from radiation necrosis in the chest and abdomen. An initial study can be compared with a follow-up study after the completion of treatment. SPECT is not appropriate for initial staging of lymphoma.11

Mental Health Disorders

SPECT imaging of the brain for mental health disorders is used as a research tool in clinical trials. The National Institute of Mental Health (NIMH) made the following statement in their brochure titled “Neuroimaging and Mental Illness: A window into the brain”: No scientific studies to date have shown that a brain scan by itself can be used for diagnosing a mental illness or to learn about a person's risk for disease. Brain scans alone cannot be used to diagnose a mental disorder, such as autism, anxiety, depression, schizophrenia, or bipolar disorder. Other types of tests are needed for a mental illness to be properly diagnosed.12,13
Mild Cognitive Impairment (MCI) Conversion to Alzheimer’s Disease (AD)

The utility of SPECT to predict conversion from mild cognitive impairment (MCI) to Alzheimer’s disease (AD) is limited.\textsuperscript{14,15}

Neuroendocrine Tumors

SPECT for the diagnosis and staging of neuroendocrine tumors may be done using a monoclonal antibody (OctreoScan™) or I-131 meta-iodobenzyl-guanidine (MIBG).\textsuperscript{16,17}

Parathyroid Disease

Guidelines on parathyroid scintigraphy from the Society of Nuclear Medicine\textsuperscript{19} state that there is a developing consensus that SPECT and SPECT/CT are most useful for improving the precision of anatomic localization. The Parathyroid Task Group of the EANM\textsuperscript{20} state that the use of SPECT/CT has a major role for obtaining anatomical details on ectopic foci. However, its use as a routine procedure before target surgery is still investigational. Preliminary data suggest that SPECT/CT has lower sensitivity in the neck area compared to pinhole imaging.\textsuperscript{18-20}

Pervasive Development Disorders (PDD)

Pervasive developmental disorder (PDD) can be difficult to diagnose due to the variety and severity of the presentation of symptoms. The American Academy of Neurology Practice Guideline states the following: "There is no evidence to support a role for functional neuroimaging studies in the clinical diagnosis of autism at the present time."\textsuperscript{21}

Vertebral Abnormalities

SPECT scans may be useful in evaluating chronic back or neck pain that is atypical, that may be caused by spondyloysis or stress fractures that are undiagnosed by conventional imaging studies.\textsuperscript{22,23}


### History

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<th>Date</th>
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<tr>
<td>09/01/16</td>
<td>New policy, approved August 9, 2016. Add to Medicine section. SPECT may be considered medically necessary when criteria are met for select non-cardiac indications. SPECT is not medically necessary for cerebrovascular indications. SPECT is investigational when criteria are not met.</td>
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<td>06/01/17</td>
<td>Annual review, approved May 23, 2017. Policy reorganized for clarity; no change in policy statements.</td>
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U.S. Department of Health and Human Services
200 Independence Avenue SW, Room 509F, HHH Building
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