

2010 Imaging Criteria

Positron Emission Tomography (PET), Whole Body (Pediatric)^(1, 2, 3, 4)

ICD-9-CM: 92.18

CPT: 78811, 78812, 78813, 78814, 78815, 78816

I/O Setting: Outpatient

INDICATION(S)

- 100 Non-Hodgkin's/Hodgkin's lymphoma
200 Sarcoma

- 100 Non-Hodgkin's/Hodgkin's lymphoma **[One]**^(5, 6)
- 110 Baseline scan as part of staging
 - 120 Baseline scan positive **[One]**⁽⁷⁾
 - 121 Periodic assessment during chemotherapy^(8, 9, 10)
 - 122 Restaging after chemotherapy completed^(10, 11)
 - 123 Periodic assessment during remission with no new Sx/findings⁽¹²⁾
 - 130 New/worsening Sx/findings with known lymphoma **[One]**⁽¹³⁾
 - 131 Enlarged lymph nodes
 - 132 CT/MRI suspicious for recurrence/metastasis
 - 133 CT/MRI nondiagnostic for recurrence/metastasis
- 200 Sarcoma **[One]**⁽¹⁴⁾
- 210 Baseline scan as part of staging⁽¹⁵⁾
 - 220 Baseline scan positive **[One]**⁽⁷⁾
 - 221 Periodic assessment during chemotherapy^(8, 9)
 - 222 Restaging after chemotherapy completed^(11, 15)
 - 223 Periodic assessment during remission with no new Sx/findings⁽¹²⁾
 - 230 New/worsening Sx/findings with known sarcoma **[One]**
 - 231 CT/MRI suspicious for recurrence/metastasis
 - 232 CT/MRI nondiagnostic for recurrence/metastasis

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Notes

(1)

These criteria include the following procedure:
PET/CT Fusion

(2)

While CT or MRI provides anatomic information that is helpful in the evaluation of cancer, the utility of these studies is often limited by scarring or benign postoperative changes that can be difficult to differentiate from tumor (Delbeke and Martin, *Radiol Clin North Am* 2001; 39(5): 883-917). PET scans image metabolic function and usually can distinguish between benign and malignant changes by utilizing a radiolabeled tracer, most commonly ¹⁸F-fluorodeoxyglucose (FDG), which is incorporated into tumor cells more avidly because of higher metabolic rates (Rohren et al., *Radiology* 2004; 231(2): 305-332).

(3)

Virtually all newly installed PET systems in the U.S. are PET/CT systems, rather than dedicated stand-alone PET units. Studies indicate that PET/CT is superior to PET alone, CT alone, or PET and CT compared side-by-side in the detection, localization, staging or restaging of various primary or metastatic cancers (Roman et al., *Clin Nucl Med* 2005; 30(7): 470-477; Antoch et al., *J Clin Oncol* 2004; 22(21): 4357-4368; Keidar et al., *J Nucl Med* 2004; 45(10): 1640-1646). PET/CT is increasingly used to diagnose suspected cancer, for initial staging, for restaging after completion of therapy, and for suspected recurrence (Blodgett et al., *Radiology* 2007; 242(2): 360-385). Therefore, PET/CT may be utilized for any oncological indication where PET scanning is considered appropriate.

(4)

The diagnostic utility of FDG-PET has led to important changes in the clinical management of lymphomas and, to a lesser extent, sarcomas, in the pediatric population (Jadvar et al., *Semin Nucl Med* 2007; 37(5): 316-331). The use of PET/CT in other pediatric malignancies has yet to be rigorously studied (Federman and Feig, *J Nucl Med* 2007; 48(12): 1920-1922).

(5)

Non-Hodgkin's and Hodgkin's lymphoma account for up to 15% of pediatric malignancies (Jadvar et al., *Semin Nucl Med* 2007; 37(5): 316-331). FDG-PET is useful for staging and follow-up of pediatric patients with lymphoma (Hernandez-Pampaloni et al., *Pediatr Radiol* 2006; 36(6): 524-531).

(6)

Non-Hodgkin's lymphoma and Hodgkin's disease may be symptomatic (e.g., fever, weight loss, night sweats) or may be suspected by virtue of enlarged lymph nodes. Imaging is required to document the extent of lymphatic involvement because management is affected by the results (Kumar et al., *Radiol Clin North Am* 2004; 42(6): 1083-1100, viii). Conventional CT and gallium scan have traditionally been used to guide therapy, assess tumor response, and assess possible recurrence; however, PET has replaced gallium scan for the staging and evaluation of lymphoma and is useful in guiding therapy and determining recurrent disease (Podoloff et al., *J Natl Compr Canc Netw* 2007; 5 Suppl 1: S1-S22; quiz S23-22).

(7)

A repeat scan is usually not necessary unless the initial scan was positive.

(8)

In clinically stable or improving patients, reassessment by PET is generally not necessary more frequently than after every two cycles of chemotherapy. However, oncologists are increasingly ordering PET after the first cycle of chemotherapy if there is clinical suspicion of early therapy failure or to assess early response to therapy.

(9)

PET provides a noninvasive assessment of tumor response to therapy and may provide sufficient information to stop ineffective treatment (Kato et al., *Am J Surg* 2002; 184(3): 279-283; Moadel et al., *Gastroenterol Clin North Am* 2002; 31(3): 841-861; Chisin and Macapinlac, *Radiol Clin North Am* 2000; 38(5): 999-1012).

(10)

Therapy for certain types of pediatric lymphoma may leave a fibrotic mass, which is visible on CT or MRI. FDG PET/CT is useful in differentiating fibrotic scarring from residual active disease (Tatsumi et al., *J Nucl Med* 2007; 48(12): 1923-1931).

(11)

PET has proven more reliable in identifying responders after treatment, while CT is not always able to differentiate tumor from inflammatory reactions, edema, and scar tissue (Kato et al., *Am J Surg* 2002; 184(3): 279-283; Moadel et al., *Gastroenterol Clin North Am* 2002; 31(3): 841-861).

(12)

The frequency of assessment is a matter of clinical judgment but is not generally needed more frequently than every 3 months.

(13)

New or worsening symptoms and findings include night sweats, weight loss, ESR > 30 mm/hr, or temperature > 100.4 F (38.0 C) ≥ 1 week of unknown etiology. Patients with suspected recurrence or metastatic disease undergo CT or MRI as the initial study.

(14)

Rhabdomyosarcoma is the most common soft-tissue malignancy in the pediatric population (Loeb et al., Surg Clin North Am 2008; 88(3): 615-627). Osteosarcoma, typically a lesion of the long bones, and Ewing's sarcoma are the 2 primary bone malignancies of childhood. PET is useful in staging and therapy planning in pediatric sarcomas (Volker et al., J Clin Oncol 2007; 25(34): 5435-5441).

(15)

PET/CT is significantly more accurate than PET alone in the staging and restaging of Ewing sarcoma (Gerth et al., J Nucl Med 2007; 48(12): 1932-1939).