Expanded Oncology PET/CT Coverage & Clinical Examples
CMS Final Changes

Nuclear Medicine
PET/CT Oncology
2009
GEMINI TF Clinical Examples for Expanded Coverage

- Only commercially available time-of-flight system with clinical examples from NOPR database
- Time-of-flight benefits in clinical imaging include
  - Excellent image quality
  - Small lesion detectability
  - Faster scan times
  - Lower doses
- Over 150 installations of GEMINI TF worldwide
## Summary of Final Changes

<table>
<thead>
<tr>
<th>Solid Tumor Type</th>
<th>Current Framework</th>
<th>Final Framework</th>
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<tbody>
<tr>
<td></td>
<td>Diagnosis</td>
<td>Staging</td>
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<tr>
<td>Brain</td>
<td>CED</td>
<td>CED</td>
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<tr>
<td>Breast (female and male)</td>
<td>N/C</td>
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<tr>
<td>Cervix</td>
<td>CED</td>
<td>Cover</td>
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<tr>
<td>Colorectal</td>
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<td>Esophagus</td>
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<td>Head &amp; Neck (not thyroid or CNS)</td>
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<tr>
<td>Lymphoma</td>
<td>Cover</td>
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<tr>
<td>Melanoma</td>
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<td>2</td>
</tr>
<tr>
<td>Myeloma</td>
<td>CED</td>
<td>CED</td>
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<tr>
<td>Non-small cell lung</td>
<td>Cover</td>
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<tr>
<td>Ovary</td>
<td>CED</td>
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<tr>
<td>Pancreas</td>
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<tr>
<td>Prostate</td>
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<td>Small cell lung</td>
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<td>Soft Tissue Sarcoma</td>
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<td>Thyroid</td>
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<tr>
<td>Testes</td>
<td>CED</td>
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<tr>
<td>All other solid tumors</td>
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</tr>
<tr>
<td>All other cancers not listed herein</td>
<td>CED</td>
<td>CED</td>
</tr>
</tbody>
</table>

*Formerly "diagnosis" and "staging", ** Formerly "restaging" and "monitoring response to treatment when a change in treatment is anticipated", N/C = noncover

1. **Cervix**: Covered for detection of pre-treatment metastases (i.e. staging) in newly diagnosed cervical cancer subsequent to conventional imaging that is negative for extra-pelvic metastases. All other uses are CED.
2. **Breast**: Noncovered for diagnosis and/or initial staging of axillary lymph nodes. Covered for initial staging of metastatic disease.
3. **Melanoma**: Noncovered for initial staging of regional lymph nodes. All other uses for initial staging are covered.
4. **Thyroid**: Covered for subsequent treatment strategy of recurrent or residual thyroid cancer of follicular cell origin previously treated by thyroidectomy and radiiodine ablation and have a serum thyroglobulin >10ng/ml and have a negative I-131 whole body scan. All other uses for subsequent treatment strategy are CED.

NEW - Initial Treatment Strategy of Ovarian Cancer

Case Summary:
The PET/CT study demonstrates the patient’s known primary ovarian cancer and other areas of abnormal activity in the abdomen and chest that are indicative of metastatic disease.

PET/CT can improve the accuracy of preoperative staging for ovarian cancer especially for detection of metastatic disease outside of the pelvis.

http://www.cancerpetregistry.org/news.html#covered
Clinical Data Courtesy of University Hospitals Case Medical Center
NEW - Initial Treatment Strategy of Pancreatic Cancer

Case Summary:
The PET/CT study demonstrates the patient’s known primary pancreatic cancer and abnormal focal uptake outside the pancreas indicative of metastatic disease. PET/CT can play a critical role in planning the initial treatment course for patients with pancreatic cancer. Curative treatment depends largely on resectability of the primary tumor. Evaluation for the presence of metastatic disease can reduce the number of unnecessary surgeries performed by identifying patients who would not benefit from this type of curative treatment.

GEMINI TF PET/CT
- 55 y.o. Male
- 10.4 mCi / 385 MBq, 18F-FDG inj.
- 115 min. uptake
- 27 min PET Acquisition
- 74 kg /163 lb Patient Weight
- 120 kV, 66 mAs

Clinical Data Courtesy of Saint Louis University Medical Center
NEW - Initial Treatment Strategy of Small Cell Lung Cancer

Case Summary:
The PET/CT study demonstrates the patient’s known lung tumor with no evidence of metastatic disease.

PET/CT is a useful tool in differentiating patients with limited disease small cell lung cancer from those with extensive disease. PET/CT can also impact the accuracy of target definition for those patients in which radiation therapy is a course for treatment.

http://www.cancerpetregistry.org/news.htm#covered
Clinical Data Courtesy of University Hospitals Case Medical Center
New - Initial Treatment Strategy of Soft Tissue Sarcoma

Case Summary:
The patient was found to have a large mass in the lung later found to be a sarcoma. The PET/CT study was performed to evaluate the extent of disease prior to treatment. The PET/CT study demonstrates a large mass in the thorax involving not only the right lung, but also the liver.

PET/CT, when combined with conventional imaging, improves diagnostic accuracy in the initial treatment evaluation for patients with sarcoma.

http://www.cancerpetregistry.org/news.htm#covered
Clinical Data Courtesy of University Hospitals Case Medical Center
NEW - Initial Treatment Strategy of Thyroid Cancer

Case Summary:
This patient is s/p thyroidectomy and 150 mCi 131I NaI ablation for thyroid cancer. Blood tests were positive for elevated thyroglobulin, but her whole body NM scan was negative. The PET/CT study demonstrates multiple foci of abnormal uptake in the thyroid bed consistent with residual thyroid cancer.

PET/CT is a valuable tool in the evaluation of residual thyroid cancer following resection/ablation of the thyroid as it improves identification of patients eligible for potentially curative surgery.

References: “Impact of FDG PET on Patients with Differentiated Thyroid Cancer Who Present with Elevated Thyroglobulin and Negative 131I Scan”, Schluter, et al; JNM; 42:71-76
Clinical Data Courtesy of Penn State Milton S. Hershey Medical Center
NEW - Initial Treatment Strategy of Testicular Cancer

Case Summary:
This patient is s/p resection of the primary tumor. The PET/CT study demonstrates activity in the left inguinal lymph node region which is linear and likely inflammatory rather than metastatic disease. No other areas of abnormal uptake indicative of malignancy.

PET/CT is useful for evaluation of residual disease post-surgery, prior to planning the course for further treatment.

References: “Relationship Between Cancer Type and Impact of PET and PET/CT on Intended Management: Findings of National Oncologic PET Registry”, Hilner, et al, JNM 49:(12); 1928-1935.
Clinical Data Courtesy of Penn State Milton S. Hershey Medical Center
NEW - Initial Treatment Strategy of Brain Cancer

Case Summary:
The PET/CT study demonstrates the presence of abnormal uptake in the right basal ganglia and anterior aspect of the right frontal lobe of the brain.

PET imaging can be used in the evaluation of certain brain tumors, and can assist in planning the course of therapy.

References: "Clinical Applications of PET in Brain Tumors", Chen. JNM; 48:9, 1468-1481
http://www.cancerpetregistry.org/news.htm#covered
Clinical Data Courtesy of University Hospitals Case Medical Center
NEW - Initial Treatment Strategy of Solid Tumor Bladder Cancer

Case Summary:
This patient was recently diagnosed with bladder cancer. The PET/CT study was performed to evaluate the extent of disease prior to treatment. The study demonstrates metastatic lymph node involvement in the pelvis, abdomen and chest.

PET/CT is useful in the initial treatment of bladder cancer for evaluation of extent of disease prior to planning a treatment course.

Clinical Data Courtesy of Penn State Milton S. Hershey Medical Center
NEW - Initial Treatment Strategy of Solid Tumor
Gastric Cancer

Case Summary:
This patient was recently diagnosed with gastric cancer. The PET/CT is performed for evaluation of the extent of disease prior to treatment. The PET/CT study demonstrates a large mass of abnormal uptake corresponding to the patient’s known primary and a small focal area of abnormal uptake in the liver indicative of metastatic disease.

PET/CT is useful in the initial treatment of gastric cancer for evaluation of extent of disease prior to planning a treatment course.

http://www.cancerpetregistry.org/news.htm#covered
Clinical Data Courtesy of University Hospitals Case Medical Center
NEW - Subsequent Treatment Strategy of Cervical Cancer

Restaging Post-Therapy

GEMINI TF PET/CT
- 45 y.o., Female
- 13.5 min. PET Acquisition
- 67 kg / 147 lb Patient Weight
- 120 kV, 40 mAs

Case Summary:
This patient has a history of cervical cancer. PET/CT was performed for staging of the disease prior to treatment, and also following treatment for monitoring.

PET/CT can be useful in measuring treatment response. PET/CT can also provide valuable prognostic information in the selection of patients for further treatment to improve long term outcomes.

http://www.cancerpetregistry.org/news.htm#covered
Clinical Data Courtesy of University Hospitals Case Medical Center
NEW - Subsequent Treatment Strategy of Colorectal Cancer

Case Summary:
This patient has a history of colorectal cancer. PET/CT was performed for staging of the disease prior to starting treatment, and again following treatment to monitor therapy response. The PET/CT demonstrates some interval response to treatment although metastatic burden is still present in the liver.

PET/CT can improve the ability to evaluate residual disease following therapy over CT alone. PET/CT is also useful in the selection of patients for further treatment evaluation based upon initial therapy response.

http://www.cancerpetregistry.org/news.htm#covered
Clinical Data Courtesy of University Hospital Case Medical Center
NEW - Subsequent Treatment Strategy of Esophageal Cancer

Case Summary:
This patient has a history of esophageal cancer. PET/CT was performed for initial staging of the disease, and for re-staging following initial treatment. The PET/CT comparison demonstrates marked interval response to therapy.

PET/CT is more accurate than CT alone in assessing response to therapy. A positive therapy response is a good indicator for improved long term outcome in patients who undergo further treatment which is surgical resection of the primary tumor.

http://www.cancerpetregistry.org/news.htm#covered
Clinical Data Courtesy of University Hospitals Case Medical Center
NEW - Subsequent Treatment Strategy of Head & Neck Cancer

Case Summary:
This patient has a history of locoregional head and neck cancer. PET/CT was performed prior to treatment and again following therapy. The study comparison demonstrates interval improvement in the post-therapeutic scan. PET/CT improves the accuracy in evaluating therapy response over CT alone. In patients where PET/CT reveals no residual lymphadenopathy, evidence has shown that planned neck dissection may no longer be necessary.

http://www.cancerpetregistry.org/news.htm#covered
Clinical Data Courtesy of University Hospitals Case Medical Center
NEW - Subsequent Treatment Strategy of Lymphoma

Case Summary:
This patient has a history of lymphoma. PET/CT was performed for staging the disease prior to treatment, and again post-treatment for monitoring therapy response. The comparison studies demonstrate marked interval improvement in response to therapy.

PET/CT improves accuracy in the evaluation of therapy response over CT imaging alone by better distinguishing posttreatment fibrosis from residual tumor.

http://www.cancerpetregistry.org/news.html#covered
Clinical Data Courtesy of University Hospitals Case Medical Center
NEW - Subsequent Treatment Strategy of Non-small cell lung cancer

Case Summary:
This patient has a history of metastatic lung cancer. PET/CT was performed for initial staging of the disease and again for restaging after treatment. The comparison studies demonstrate interval resolution of abnormal FDG uptake in the right supraclavicular and mediastinal lymphadenopathy correlating to a positive response to interval treatment.

PET/CT is a useful tool in the evaluation of therapy response.

http://www.cancerpetregistry.org/news.html#covered
Clinical Data Courtesy of University Hospitals Case Medical Center