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PET Recommendation Report 5

PET Imaging in Pancreatic Cancer

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Report Date: January 19, 2009

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Section 1: Recommendations
Section 2: Evidentiary Base

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Recommendation Report – PET #5: Section 1

PET Imaging in Pancreatic Cancer: Recommendations

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QUESTIONS

- What benefit to clinical management does positron emission tomography (PET) or positron emission tomography/computed tomography (PET/CT) contribute to the diagnosis or staging of pancreatic cancer?
- What benefit to clinical management does PET or PET/CT contribute to the assessment of treatment response for pancreatic cancer?
- What benefit to clinical management does PET or PET/CT contribute when recurrence of pancreatic cancer is suspected but not proven?
- What benefit to clinical management does PET or PET/CT contribute to restaging at the time of documented recurrence for pancreatic cancer?
- What is the role of PET when a solitary metastasis is identified at the time of recurrence and a metastectomy is being contemplated?

TARGET POPULATION

Patients with pancreatic cancer.

INTENDED PURPOSE

- This recommendation report is primarily intended to guide the Ontario PET Steering Committee in their decision making concerning indications for the use of PET imaging.
- This recommendation report may also be useful in informing clinical decision making regarding the appropriate role of PET imaging and in guiding priorities for future PET imaging research.

RECOMMENDATIONS AND KEY EVIDENCE

These recommendations are based on an evidentiary foundation consisting of one recent high-quality systematic review from the U.S. Agency for Health Research and Quality (AHRQ) (1) that included primary study literature for the period from 2003 to March 2008.

Diagnosis/Staging

PET is not recommended for primary diagnosis of pancreatic cancer.
Eleven prospective studies were identified that evaluated the role of PET or PET/CT in the diagnosis of a suspicious pancreatic mass. Sensitivity ranged from 69% to 97%, and specificity ranged from 61% to 97% (Giorgi et al [2], Nishiyama et al [3], Rasmussen et al [4], van Kouwen et al [5], Bang et al [6], Heinrich et al [7], Lemke et al [8], Lytras et al [9], Maemura et al [10], Sperti et al [11], Casneuf et al [12]). Meta-analysis of four prospective studies evaluating the diagnostic performance of PET for the purpose of primary diagnosis (Giorgi et al [2], Nishiyama et al [3], Rasumussen et al [4], van Kouwen et al [5]) yielded a pooled positive likelihood ratio (+LR) of 4.28 (95% CI 2.07 to 8.86) and negative likelihood ratio (-LR) of 0.21 (CI 0.12 to 0.40). These LRs had moderate heterogeneity, presenting some difficulties in determining overall accuracy. Meta-analysis of seven prospective studies evaluating the diagnostic performance of PET with the purpose of primary diagnosis and staging (Bang et al [6], Casneuf et al [12], Lemke et al [8], Lytras et al [9], Maemura et al [10], Ruf et al [13], Sperti et al [11]) yielded a +LR of 2.77 (CI 1.62 to 4.73) and –LR of 0.19 (CI 0.10 to 0.34). There was considerable heterogeneity, limiting determination of the overall accuracy of PET. Meta-analysis of three studies on PET/CT (Casneuf et al [12], Heinrich et al [7], Lemke et al [8]) yielded a homogenous +LR of 2.69 (CI 1.84 to 3.94) and –LR of 0.16 (CI 0.10 to 0.26). These pooled LRs suggest that PET and PET/CT offer small benefit in ruling in and ruling out pancreatic cancer when investigating a suspicious pancreatic mass; therefore, they may be useful in establishing a diagnosis when standard investigations are not confirmatory. Five studies compared PET or PET/CT with CT in the diagnosis of a suspicious pancreatic mass. In two that compared PET, PET/CT, and CT (Lemke et al [8], Casneuf et al [12]), PET/CT had the better diagnostic performance.

Qualifying Statements

- The gold standard as well as the clinical goal is biopsy. When biopsy is inconclusive or not possible and the diagnosis remains in doubt, the above evidence supports the use of PET/CT where a positive result would lead to surgical resection for purposes of both diagnosis and treatment.
- Neuroendocrine tumours of the pancreas are known to be unreliably fluorodeoxyglucose (FDG) avid.

PET is recommended for staging if a patient is a candidate for potentially curative surgical resection as determined by conventional staging.
In four studies (Bang et al [6], Heinrich et al [7], Nishiyama et al [14], Sperti et al [11]), staging and treatment strategy changed after PET or PET/CT scan in 12% to 69% of cases. In one study (Heinrich et al [7]) with 46 patients with pancreatic carcinoma, standard staging followed by PET/CT improved the detection of distant metastases compared with standard staging alone (88% vs 56%, p=0.06 McNemar test). In Nishiyama et al [14], 16 of 42 patients were found to have distant metastases by radiologic evaluation or cytological verification. With the combination of PET and CT, all metastatic sites were detected. Based on the above studies, staging and hence surgical management are impacted in a substantial proportion of patients who are candidates for surgery.

Qualifying Statement

- The clinical importance of change in treatment strategy as an outcome, despite a lack of strong evidence, is noted.

Assessment of Treatment Response

A recommendation cannot be made for or against the use of PET to guide clinical management based on assessment of treatment response due to insufficient evidence.
One study (Bang et al [6]) showed that PET was superior to CT in the detection of treatment response after chemoradiation. Of 102 patients evaluated for a suspicious pancreatic mass, 15 with confirmed pancreatic cancer received chemoradiation. CT did not detect any responders while PET detected 5/15 therapy responders. The response after chemoradiation correlated with longer time to progression (TTP) compared with nonresponders (399 vs 233 days). A second study (Maemura et al [10]) showed that in 23 patients who received chemoradiation, an SUV <7.0 was correlated with improved survival. The above results are based on two small nonrandomized studies and therefore are not strong enough to make a recommendation for using PET in evaluating treatment response outside of a clinical trial.

Qualifying Statement

- A recommendation for PET cannot be made in the setting of incomplete resection due to lack of evidence.

Recurrence/Restaging

PET is not recommended for clinical management of suspected recurrence, nor for restaging at the time of recurrence, due to insufficient evidence and lack of effective therapeutic options.
One study (Ruf et al [15]) compared PET with CT in 31 patients who had suspected recurrence based on symptoms or increased CA 19-9 levels. While PET had higher sensitivity than CT for the detection of recurrence overall (96% versus [vs] 39%), and for nonhepatic intra- and extra-abdominal metastases, CT had a superior sensitivity for the detection of liver metastases (92% vs 42%). However, patient outcomes based on these results were not reported. In a subset of 12 patients in Casneuf et al (12) who were being screened for recurrent pancreatic cancer, the sensitivity, specificity, and accuracy were not different between PET, PET/CT, and CT. In neither study was a reported change in management identified based on scanning modality.

Qualifying Statement

- Pancreatic cancer has high overall mortality, and recurrence is uniformly fatal. At this time, there are insufficient treatment options that improve the outlook in patients who recur after surgical resection that would allow PET to contribute to management. PET imaging in recurrent disease should be restricted to clinical trials.

Solitary Metastasis Identified at Time of Recurrence

A recommendation cannot be made for or against the use of PET for staging if a solitary metastasis is identified at recurrence as there are no trials that identify the utility of PET scanning in this setting.
No studies exist that examine PET in this setting.

Qualifying Statement

None.

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