PET Recommendation Report 10

PET Imaging in Brain Cancer

N Laperriere and C Walker-Dilks

Report Date: January 19, 2009

PET Recommendation Report 10 is comprised of 2 sections and is available on the CCO Web site (https://www.cancercare.on.ca) PEBC PET Recommendation Reports page at:
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Section 1: Recommendations
Section 2: Evidentiary Base

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PET Imaging in Brain 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 gliomas?
• What benefit to clinical management does PET or PET/CT contribute to the assessment of treatment response for gliomas?
• What benefit to clinical management does PET or PET/CT contribute when recurrence of gliomas 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 gliomas?
• 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 gliomas.

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 the determination of diagnosis or grading in gliomas.

Five studies (Chen et al [2], Cher et al [3], Liu et al [4], Potzi et al [5], Stockhammer et al [6]) assessed diagnostic accuracy and prognostic influence of PET scanning on survival, but none have demonstrated any additional diagnostic accuracy or prognostic influence over and above that provided by magnetic resonance imaging (MRI) and histology in a multivariate model.

**Qualifying Statement**

None.

Assessment of Treatment Response

A recommendation cannot be made for or against the use of PET for the assessment of treatment response in gliomas due to insufficient evidence.

None of the studies discuss this question.

**Qualifying Statement**

- Anecdotal evidence exists that PET/CT may differentiate radiation necrosis from tumour recurrence, but there is no gold standard for the diagnosis of radiation necrosis in glioblastoma multiforme.

Recurrence/Restaging

A recommendation cannot be made for or against the use of PET or PET/CT in the assessment of patients with recurrent gliomas due to insufficient evidence.

Two studies evaluating the use of PET included patients with recurrent gliomas (Chen et al [2], Potzi et al [5]). In both studies, fluorodeoxyglucose (FDG) PET was not the focus of the study but a comparison test for the tracer of interest, F-DOPA-PET in Chen et al (2) and Methionine-PET in Potzi et al (5). The evidence was insufficient to generate a recommendation on the use of FDG PET.

**Qualifying Statements**

- PET or PET/CT has not been examined in a prospective cohort of gliomas to assess the treatment effect on PET imaging before and after treatment and correlate this with survival.
- Radiation necrosis is a major factor in assessing recurrent gliomas.

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REFERENCES