

Lead Author: Donna E. Maziak, MDCM, MSc, FRCSC, FACS
Associate Professor, University of Ottawa
Ontario Clinical Oncology Group
Ottawa, Ontario, Canada

Clinical Science Symposium
Monday, June 2, 1:15 – 2:45 PM (CDT)
W375e

PET/CT Imaging Better Identifies Stage of Lung Cancer, Potentially Sparing Many from Invasive Surgery That Would Not Improve Outcome

This study found that PET/CT (positron emission tomography/computed tomography) combined with cranial imaging more accurately identifies the stage of disease in non-small cell lung cancer (NSCLC) patients than conventional imaging. Conventional imaging for lung cancer staging involves a CT scan of the abdomen, a bone scan, and cranial imaging to look for metastasis. PET/CT is a combined imaging technology that allows detection of metabolic and biological activity and matches it with precise anatomic imaging.

Accurate disease staging is critical to determining whether a patient will experience improved survival from surgery to remove their cancer; surgery is not appropriate for more advanced lung cancer patients because it does not improve survival.

This study randomized patients with newly diagnosed lung cancer to undergo either PET/CT and cranial imaging (170 patients) or conventional imaging (167 patients). The investigators found that 14 percent of the patients in the PET/CT arm were upstaged (meaning patients' disease was more advanced than previously thought, making surgery inappropriate); seven percent in the conventional imaging group were upstaged. Based on these findings, the investigators have found that PET/CT and cranial imaging can replace conventional imaging in staging early-stage NSCLC.

Abstract #7502

A randomized controlled trial (RCT) of ¹⁸F-fluorodeoxyglucose (FDG) positron emission tomography (PET) versus conventional imaging (CI) in staging potentially resectable non-small cell lung cancer (NSCLC)

D. E. Maziak, G. E. Darling, R. I. Incelet, K. Gulenchyn, A. A. Driedger, Y. C. Ung, J. D. Miller, T. Koru-Sengul, W. K. Evans, M. N. Levine

Background: Patients with early stage NSCLC who undergo surgery have the highest survival amongst patients with NSCLC. Preoperative imaging tests are critical in defining which patients are surgical candidates. PET/CT imaging may identify patients with more advanced disease not evident by CI and thereby avoid inappropriate surgery. Previous RCTs of CI plus PET/CT versus CI alone in the staging of early stage NSCLC have produced conflicting results.

Methods: Eligible patients had histological or cytological proof of NSCLC, clinical stage I, II, or IIIA based on chest X-ray and CT thorax, and a tumor considered to be technically resectable. Consenting patients were randomized to CI (CT abdomen including liver and adrenals, bone scan and cranial imaging) or PET/CT plus cranial imaging. Patients were stratified by stage (I/II vs. IIIA) and enrolling center. The primary endpoint was the percentage of patients correctly upstaged who avoided stage inappropriate surgery. The planned sample size, based on an alpha = 0.05 two-tailed, beta = 0.10 and an absolute difference of 15%, was approximately 146 patients per study arm. Allowing 10% for losses to follow-up, a total of approximately 322 patients was required.

Results: 337 patients were randomized from 8 centers in Ontario between July 2004 and August 2007: 167 in the CI arm and 170 in the PET/CT arm. Seventeen patients (10 on CI and 7 on PET/CT) were excluded from the analysis for protocol violations. The mean age of participants was 66 years and 50% were male. Twenty-three (14%) of 163 patients in the PET/CT arm were correctly upstaged and avoided inappropriate surgery compared to 11 (7%) of 157 in the CI group, Fisher's exact p=0.046. The difference in proportions is 7% with 95% confidence interval, 0.03% to 14%.

Conclusions: Preoperative staging with PET/CT and cranial imaging identifies more precisely those patients with mediastinal and extrathoracic disease, thereby sparing some patients from stage inappropriate surgery when compared to conventional preoperative staging. Importantly, our trial shows that PET/CT can replace CI in staging early stage NSCLC.

Disclosures for research team: Nothing to disclose.