

## ROLE OF POSITRON EMISSION TOMOGRAPHY IN STAGING OF LUNG CANCER

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Medical imaging technology is rapidly expanding and the role of each modality is being redefined constantly. Positron Emission Tomography (PET) using  $^{18}\text{F}$ -fluorodeoxyglucose (FDG) has emerged as an accurate imaging modality in patients with lung cancer. Potential clinical indications include the differential diagnosis of benign versus malignant disease, initial (i.e. preoperative) staging, evaluation of suspected recurrences and follow-up after therapy. PET has diffused into clinical practice based predominantly on the basis of technical performance and diagnostic accuracy studies. Therefore, we performed a randomised controlled trial in patients suspected of NSCLC, scheduled for surgery after conventional work-up (CWU), to test whether addition of PET to CWU reduces the number of futile thoracotomies in daily clinical practice. 188 patients (96 CWU, 92 CWU+PET) were enrolled; in the CWU group, 39 out of 96 patients (41%) underwent a futile thoracotomy versus 19 out of 92 (21%) in the CWU+PET group (relative reduction 51%, 95% confidence interval 32-80%;  $p=0.003$ ). Thus, addition of PET to conventional work-up may prevent unnecessary surgery in one out of five patients with suspected NSCLC. In parallel, we performed a prospective before-after study in a cohort of all 164 patients (university / community settings) referred for PET between August 1997 – July 1999. PET was restricted to cases where (non-invasive) tests failed to solve clinical problems. Impact on diagnostic understanding (DU) and management was assessed using questionnaires (intended treatment without PET, actual therapy choice after PET, post hoc clinical assessment). Diagnostic problems especially pertained to: unclear radiological findings ( $n=112$ ; 63%), mediastinal staging (36; 20%) and distant staging issues (16; 9%). PET findings were validated by reviewing medical records. PET had a positive influence on DU in 84%. Improved DU solely based on PET was reported in 26%. According to referring physicians PET resulted

in beneficial change of therapy in 50%. Cancelled surgery was the most frequent therapy change after PET (35%). FDG PET applied as 'add-on' technology in these clinical problems appears to be a clinically useful tool, directly improving therapy choice in one out of four patients. In conclusion, addition of PET to the standard work-up in routine clinical practice improves staging of patients with NSCLC. The potential of PET to replace other staging procedures is currently investigated in a trial that has completed patient accrual May 2001.

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