Positron emission tomography: systematic review. PET as a diagnostic test in solitary pulmonary nodules

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Authors' objectives
To assess the efficacy of positron emission tomography (PET) in the diagnosis of solitary pulmonary nodules (SPN).

Searching
MEDLINE, HEALTH, Current Contents and PDQ were searched for peer-reviewed studies in the English language; abstracts were excluded. The searches were restricted to the years 1991 to 1995. Significant articles appearing before that period were identified by selected searches of the years 1986 to 1991, and from the reference lists of retrieved articles. It was noted in the text that peer-reviewed literature published and indexed up to September 10th 1996 was also included.

Study selection
Study designs of evaluations included in the review
The inclusion criteria were not clearly stated with respect to study design.

Specific interventions included in the review
PET imaging and transthoracic needle aspiration biopsy (TTNA).

Reference standard test against which the new test was compared
The reference standard was not clearly reported, but it appears to have been biopsy.

Participants included in the review
Patients with malignant and benign lung lesions (e.g. indeterminate focal pulmonary lesions).

Outcomes assessed in the review
Sensitivity, specificity and accuracy were assessed.

How were decisions on the relevance of primary studies made?
The author did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The validity of the retrieved studies was assessed using a series of grading schemes that assessed the methodological quality of the primary studies. The studies were graded from A to D based on sample size, spectrum composition, reference standard, and the technical quality of PET. An external reviewer judged the studies for quality, although the initial process was unclear.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. Data were extracted on: study role, study details, the number of participants (cases and controls, when included), and the sensitivity and specificity.

Methods of synthesis
How were the studies combined?
The studies were combined by a narrative review.
How were differences between studies investigated?
Differences between the studies were investigated narratively.

Results of the review
Data from 4 studies (n=231) were presented.

The sensitivity of PET in defining unknown SPN was 93 to 100% (4 studies) and the specificity was 78 to 88% (4 studies). The sensitivity and specificity of TTNA were 81 and 100%, respectively.

Cost information
A discussion of the costs of PET provision was included in the report.

Authors' conclusions
Limitations in the reporting and study design preclude drawing firm conclusions from these series. No evidence published to date definitively supports the routine use of PET in these patients.

CRD commentary
This review was of average quality. The search was limited to four databases and only English language studies were eligible for inclusion. It is therefore possible that important studies may have been missed. Details of the review process (e.g. inclusion criteria, how the studies were assessed for relevance and how the data were extracted) were lacking. The author performed a quality assessment of the included studies and good details of the included and excluded studies were presented. The synthesis of the results was poor. The results presented in this abstract were taken from the table of included study details. The author's conclusions are supported by the results presented.

Implications of the review for practice and research
Practice: The author made no recommendations for practice.

Research: The author stated that larger studies with stronger study designs are needed to refine the characteristics of PET as a diagnostic test for SPNs. A PET registry could provide a range of data on the demographic and clinical characteristics of patients on whom PET studies are performed, and on their clinical outcomes in a variety of settings. Estimates of a cut-off point to define disease and of subsequent diagnostic accuracy need to be established. Studies to assess the role and impact of PET in the diagnostic work-up of SPNs (e.g. to avoid unnecessary surgery, to replace needle biopsy, or to replace conventional imaging) are required.

Bibliographic details
Adams E. Positron emission tomography: systematic review. PET as a diagnostic test in solitary pulmonary nodules. Boston, MA, USA: Veterans Affairs Medical Center, Health Services Research and Development Service, Management Decision and Research Center, Technology Assessment Program PET Report; A7. 1996

Other publications of related interest

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**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.