Health Technology Assessment 1999; Vol. 3: No. 16 (Executive summary)

Rapid review

Executive summary

Positron emission tomography: establishing priorities for health technology assessment

G Robert[1]
R Milne[2]

[1] Health Economics Research Group, Brunel University, UK (corresponding author)
[2] Wessex Institute for Health Research and Development, University of Southampton, UK

Health Technology Assessment
NHS R&D HTA Programme

Executive summary

Background

Positron emission tomography (PET) is an expensive diagnostic imaging technology. Despite the long history of PET development, the costs and effectiveness of its use in routine clinical practice remain unknown.

Against this background of uncertainty regarding the clinical role of PET, the UK Standing Group on Health Technology requested a review of its current and potential role which would enable research priorities in this area to be established.

Objectives

This 3-month project had two explicit objectives:

- to review the state of knowledge regarding the clinical applications of PET
- to determine the key health technology assessment (HTA) research questions relating to the use of PET in the UK.

Methods

A literature review to ascertain the state of knowledge regarding the clinical applications of PET and a three-round Delphi study to inform the key HTA research questions relating to the use of PET in the UK were undertaken.

The results of an earlier systematic review, published by the Veteran's Health Administration (VHA) in the USA in 1996, were used as the starting point for the literature review. The VHA review was updated and extended by means of MEDLINE and Cochrane Library database searches.

Participants in the Delphi study were selected by discussion with five individuals in the UK with an interest in, and awareness of, developments in PET. As a result of their suggestions, 43 individuals were initially invited to participate, of whom two did not feel appropriately qualified. Questionnaires were sent by facsimile to all invited participants, who were asked to return the completed forms by facsimile within a week. The content and structure of the Delphi study was informed by the results of the literature review. The responses and comments of the participants were a major source of information for this report.

Results

Clinical applications for PET have been advocated in three broad disease groups: oncology, cardiology and neuropsychiatric disorders.

There are currently four PET modalities that need to be considered when assessing its potential clinical role in the UK: full ring PET scanners operating in two or three dimensions (available at five sites); partial ring rotating PET scanners (one currently operating in the UK); coincidence imaging with modified gamma camera technology; and high-energy collimator imaging of 511 keV photons with modified gamma camera technology.

There is a paucity of available evidence relating to the cost-effectiveness of the various PET modalities in all of the clinical indications for which the technology is currently being advocated. In addition, many existing reports on the diagnostic accuracy of PET are limited because they are liable to bias and often relate only to very small patient numbers.

The results of the Delphi study indicated that the four most important research priorities for the NHS, in descending order of their importance, are:

- the relative cost-effectiveness of:
  – full ring PET
  – gamma camera PET using coincidence imaging
  – existing diagnostic strategies
  to determine staging prior to operative intervention for lung cancer
- partial ring PET compared with full ring PET in oncology
- the relative cost-effectiveness of:
  – full ring PET
  – gamma camera PET using coincidence imaging
  – existing diagnostic strategies
  to stage and monitor treatment response in breast cancer

- the relative cost-effectiveness of:
  – gamma camera PET using coincidence imaging
  – 511 keV collimated positron imaging
  for assessing myocardial viability when selecting patients for revascularisation surgery.

Vignettes describing each of the research priorities are provided in the main report.

Conclusions

The findings of this project, which was undertaken rapidly in order to inform HTA research prioritisation in the UK, provide a contemporary overview of the potential clinical role for PET in the NHS. Evidence is needed that using PET as a diagnostic technique will alter patient management. This underlies the cost-effectiveness research priorities established by this project.

Publication

Robert G, Milne R. Positron emission tomography: establishing priorities for health technology assessment. *Health Technol Assess* 1999;**3**(16).

NHS R&D HTA Programme

The overall aim of the NHS R&D Health Technology Assessment (HTA) programme is to ensure that high-quality research information on the costs, effectiveness and broader impact of health technologies is produced in the most efficient way for those who use, manage and work in the NHS. Research is undertaken in those areas where the evidence will lead to the greatest benefits to patients, either through improved patient outcomes or the most efficient use of NHS resources.

The Standing Group on Health Technology advises on national priorities for health technology assessment. Six advisory panels assist the Standing Group in identifying and prioritising projects. These priorities are then considered by the HTA Commissioning Board supported by the National Coordinating Centre for HTA (NCCHTA).

This report is one of a series covering acute care, diagnostics and imaging, methodology, pharmaceuticals, population screening, and primary and community care. It was identified as a priority by the Diagnostics and Imaging Panel and funded as project number 97/03/01.

The views expressed in this publication are those of the authors and not necessarily those of the Standing Group, the Commissioning Board, the Panel members or the Department of Health. The editors wish to emphasise that funding and publication of this research by the NHS should not be taken as implicit support for the recommendations for policy contained herein. In particular, policy options in the area of screening will be considered by the National Screening Committee. This Committee, chaired by the Chief Medical Officer, will take into account the views expressed here, further available evidence and other relevant considerations.

Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search, appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

The editors have tried to ensure the accuracy of this report but cannot accept responsibility for any errors or omissions. They would like to thank the referees for their constructive comments on the draft document.

Copies of this report can be obtained from:

The National Coordinating Centre for Health Technology Assessment,
Mailpoint 728, Boldrewood,
University of Southampton,
Southampton, SO16 7PX, UK.
Fax: +44 (0) 1703 595 639 Email: hta@soton.ac.uk
http://www.hta.nhsweb.nhs.uk ISSN 1366-5278