Positron emission tomography: systematic review. PET as a diagnostic test in head and neck cancer

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Authors' objectives
To assess the efficacy of positron emission tomography (PET) in the diagnosis of head and neck cancer.

Searching
MEDLINE, HEALTH and Current Contents were searched; PDQ was also searched for background information. Only peer-reviewed studies in the English language were included; 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 reported with respect to study design.

Specific interventions included in the review
PET imaging using the radiopharmaceutical 2-(F-18)-2-deoxy-D-glucose. The other index tests investigated were computed tomography (CT), magnetic resonance imaging (MRI), endoscopy and clinical examination. Specifically, the review referred to the detection of unknown primaries, primary disease, cervical metastases and recurrent disease. Head and neck cancer was defined as the common squamous-cell carcinomas of the oral cavity, nasal cavity and paranasal sinuses, pharynx and larynx.

Reference standard test against which the new test was compared
The reference standard used to identify cases was not clearly reported.

Participants included in the review
Patients with suspected head and neck cancer. Most of the studies included only patients known to have head or neck cancer.

Outcomes assessed in the review
The outcomes computed from the primary studies included the sensitivity, specificity, and the positive and negative predictive value of PET.

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 author 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?
A narrative review was undertaken.

How were differences between studies investigated?
Difference between the studies were discussed. A subgroup analysis based on the role of PET in the management of head and neck cancer was performed.

Results of the review
Nine studies that met the basic criteria for assessing diagnostic efficacy were found. Six studies (n=182) assessed the diagnostic accuracy efficacy of PET and alternatives.

Detection of unknown primaries: no PET studies that met evidence-based criteria for the diagnosis of unknown primaries were found.

Detection of primary disease: no PET studies that met evidence-based criteria for the diagnosis of primary disease were located.

Detection of cervical metastases: one study met all evidence-based criteria and was methodologically sound. A number of other studies partially met the criteria. The studies suggested that PET is somewhat limited in its ability to detect subclinical cervical node metastases. A high rate of false-positives for cervical nodes was associated with PET. The evidence suggests that PET does not perform substantially better than MRI, CT or ultrasound-guided fine-needle aspiration biopsy.

Detection of recurrent disease: one study found that blinded PET and blinded interpretation of CT had approximately equivalent sensitivity and specificity. An unblinded study found that PET was superior to MRI.

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

Authors’ conclusions
PET has potential uses in the diagnosis and management of head and neck cancer, but its role is unclear as the existing studies have methodological weaknesses.

CRD commentary
This review was of average quality. The search was limited to three 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 author’s conclusions are supported by the results presented.

Implications of the review for practice and research
Practice: The author did not state any implications for practice.

Research: Good quality, prospective controlled blinded studies are required to determine the efficacy of PET in the diagnosis and management of head and neck cancer.

Bibliographic details

Other publications of related interest

Indexing Status
Subject indexing assigned by CRD

MeSH
Diagnostic Techniques and Procedures; Ear Neoplasms; Esophageal Neoplasms; Facial Neoplasms; Head and Neck Neoplasms; Laryngeal Neoplasms; Mouth Neoplasms; Nose Neoplasms; Otorhinolaryngologic Neoplasms; Paranasal Sinus Neoplasms; Salivary Gland Neoplasms; Submandibular Gland Neoplasms; Thyroid Neoplasms; Tomography, Emission-Computed; Tonsillar Neoplasms; Tracheal Neoplasms

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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.