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Diagnostic performance of positron emission tomography in the detection of coronary artery disease: a meta-analysis.

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Abstract

RATIONALE AND OBJECTIVES: Although myocardial perfusion positron emission tomography (PET), using either cyclotron-produced ammonia or generator-produced rubidium 82, has reported excellent diagnostic capabilities in the detection of coronary artery disease (CAD) in individual studies, the technique is not widely used in practice. This may be driven by cost and availability or by unawareness of performance. The purpose of our study was to conduct an evidence-based evaluation of PET in the diagnosis of CAD.

MATERIALS AND METHODS: We examined studies from January 1977 to July 2007 using MEDLINE and EMBASE. A study was included if it (1) used PET as a diagnostic test for CAD and (2) used catheter x-ray angiography as the reference standard (> or =50% diameter stenosis). Analysis was performed on a subject and coronary territory level.

RESULTS: Nineteen studies (1442 patients) met the inclusion criteria. On a patient level, PET demonstrated a sensitivity of 0.92 (95% confidence interval [CI]: 0.90-0.94) and specificity of 0.85 (CI: 0.79-0.90), with a positive likelihood ratio (LR+) of 6.2 (CI: 3.3-11.8) and negative likelihood ratio (LR-) of 0.11 (CI: 0.08-0.14). On a coronary territory level (n = 1130), PET showed a sensitivity of 0.81 (CI: 0.77-0.84) and specificity of 0.87 (CI: 0.84-0.90), with an LR+ of 5.9 (CI: 4.5-7.9) and an LR- of 0.19 (CI: 0.09-0.38).

CONCLUSION: PET demonstrates excellent diagnostic properties in the diagnosis of CAD, especially at the patient level. The capabilities appear superior to those reported in meta-analyses for perfusion imaging with Tl-201 and sestamibi, or anatomical imaging with coronary MDCT angiography or MRA. Given that previous studies have found PET to be cost-effective and the current findings of excellent sensitivity and specificity, the modality should be more widely considered as an initial test in the diagnosis of CAD.

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Publication Types, MeSH Terms

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