Imaging

SYSTEMATIC REVIEW OF THE DIAGNOSTIC UTILITY OF RUBIDIUM-82 POSITRON EMISSION TOMOGRAPHY PERFUSION IMAGING IN COMPARISON TO SINGLE PHOTON EMISSION TOMOGRAPHY

ACC Moderated Poster Contributions
McCormick Place South, Hall A
Saturday, March 24, 2012, 11:00 a.m.-Noon

Session Title: Protocol Update in Nuclear Imaging
Abstract Category: 23. Imaging: Nuclear
Presentation Number: 1106-348

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Standard Single Photon Emission Tomography (SPECT) for myocardial perfusion imaging (MPI) is used in assessment of patients with known or suspected coronary disease(CAD), but its diagnostic accuracy has been limited by tissue attenuation and the need for detector collimation. Positron Emission Tomography (PET) using rubidium-82 (Rb-82) has the advantage of attenuation correction as well as improved spatial resolution while not requiring an on-site cyclotron. Few studies have compared SPECT to PET MPI.

Methods: A systematic literature review was performed including studies where Rb-82 PET was used as a diagnostic test for CAD with invasive coronary angiogram (ICA) as a reference standard. A 2009 systematic review of SPECT with ICA as a reference, performed by the Ontario Ministry for Health, was updated using the same search strategy & these studies were compared.

Results: 14 PET (1,164 patients) & 98 SPECT (12,029 patients) studies met inclusion criteria. Pooled sensitivity and specificity were calculated for PET (90% (CI .88-.92), 88% (CI .85-.91)) and SPECT (83% (CI .83-.84), 69% (CI .68-.71)). SROC curves were computed with AUC of 0.95 and 0.87 for PET and SPECT respectively (P<0.001). Heterogeneity of CAD prevalence as well as methodology of SPECT was noted.

Conclusions: Although heterogeneity of CAD prevalence exists among published studies, overall Rb-82 PET has superior diagnostic accuracy in comparison to standard SPECT. Increasing availability of Rb-82 PET may present a diagnostic advantage.

Legend: (L) SROC of diagnostic accuracy of Rb-82 PET & (R) SROC diagnostic accuracy of SPECT. AUC 0.95 & 0.87 respectively (p<0.0001). SROC; Summary Receiver Operator Curve AUC; Area under the Curve