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Myocardial Flow Reserve Imaging to Direct Optimal Therapies for Ischemic Heart Disease

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Nuclear cardiology imaging with SPECT or PET is used widely in North America for the diagnosis and management of patients with coronary artery disease. Conventional myocardial perfusion imaging (MPI) can identify areas of reversible ischemia, as suitable targets for coronary artery revascularization by angioplasty or bypass surgery. However, the accuracy of this technique is limited in patients with early disease in the micro-vasculature or advanced disease in multiple coronary arteries, where there is no normal reference territory against which to assess the 'relative' perfusion defects. We have developed methods for the routine quantification of absolute myocardial blood flow (MBF mL/min/g) and coronary flow reserve (stress/rest MBF) using rubidium-82 dynamic PET imaging. The incremental diagnostic and prognostic value of absolute flow quantification over conventional MPI has been demonstrated in several recent studies. Clinical use of this added information for patient management to direct optimal therapy and the potential to improve cardiac outcomes remains to be proven, but may be informed by recent progress and clinical adoption of invasive fractional flow reserve (FFR)-directed revascularization. This talk will present recent progress in this field, towards non-invasive CFR image-guided therapy with cardiac PET and SPECT imaging.

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