



“Cardiac Solution” Program Tip Sheet

MYOCARDIAL PERFUSION IMAGING (MPI) vs. STRESS ECHOCARDIOGRAPHY (SE)

Main Points about the Two Tests:

- **Both tests have equal diagnostic accuracy** for coronary artery disease, with MPI showing greater sensitivity and SE showing greater specificity.
- **MPI is based upon the expectation of relatively reduced blood flow** in a myocardial segment during exercise or pharmacologic coronary micro vessel dilation, while **SE is based upon development of wall motion abnormality** provoked by myocardial ischemia during treadmill exercise or similar stress.
- **In order to perform a SE, one would prefer to have a patient who could perform treadmill exercise well, along with a good acoustic imaging window, while MPI can be performed with either exercise or the pharmacologic option.** Exercise can also provide the additional information from the EKG, when the baseline EKG does not already have substantial abnormality (e.g. a 1 mm ST segment depression at baseline, left bundle branch block, ventricular pacing, PVCs, or pre-excitation).
- Even with MPI, an exercise modality is preferred over pharmacologic vasodilation due to the additional functional and EKG information inherent in exercise testing. However, **in some patients, such as those with a pre-existing wall motion abnormality, left bundle branch block, ventricular paced rhythms, frequent PVCs, or pre-excitation (WPW), the related cardiac contraction pattern during exercise could obscure the effects of ischemia, making a pharmacologic approach more helpful.**
- **The radiation exposure of SE is zero**, while MPI incurs a radiation dose of 7-24 mSv (the equivalent of about 117-400 PA & lateral chest X-rays), with an increase in lifetime radiation exposure and its associated cancer risk.

Radiation Exposure
MPI: 7 - 24 mSv
SE: 0 mSv
Annual Background: 3 mSv
<i>Radiation exposure should be limited when possible.</i>



Clinical Applications that Prefer MPI:

- I. Technique Related
 - A. Obesity with BMI over 40 or poor acoustic imaging window, even with use of contrast

- II. Functional Capacity Related
 - A. Physical infirmities precluding a reasonable ability to exercise for at least 4 METS or at least 3 full minutes of Bruce protocol
 - B. Patients who cannot walk up a single flight of stairs at even a slow pace or even perform ADLs based upon documented limitations

- III. Comorbidity Related
 - A. Prior cardiac surgery (CABG or valvular), CHF with left ventricular ejection fraction < 40%
 - B. Severe COPD with PFT documentation, severe shortness of breath on minimal exertion, or requirement of home oxygen during the day
 - C. Poorly controlled hypertension, with systolic BP > 180 or Diastolic BP > 120
 - D. Medical instability or serious acute illness, where maximal exercise is not recommended or appropriate (e.g. acute myocarditis or pericarditis, active infective endocarditis, acute aortic dissection, etc.)

- IV. EKG Related
 - A. Pacemaker or ICD
 - B. Left bundle branch block
 - C. Poorly controlled atrial fibrillation
 - D. Frequent PVCs
 - E. Ventricular Pre-excitation (WPW)