Prognostic Value of Stress Electrocardiogram Portion in Myocardial Perfusion Imaging

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Research Questions/ Hypothesis

1. It's unclear to us, whether an abnormal stress electrocardiographic (ECG) portion with a normal nuclear myocardial perfusion imaging (MPI), is merely a false positive value or if carries an important prognostic value for an underlying Coronary artery disease (CAD) in our patients.

2. Retrospective evaluation of the stress ECG response to MPI and focusing on patients with a discrepancy between the two components of the test and the long term prognostic value.

3. Retrospective comparison between the discrepancy of MPI and transient ischemic dilation (TID) with cardiac catherization findings, stress ECG findings, morbidity, mortality, re-hospitalization rate and in addition to evaluating the long-term prognostic value.

Introduction

- In this study was are evaluating the importance of abnormal ECG portion as it related to MPI and TID. In a prospective observational study performed by Roubin et al, concluded that when the results of MPI and ECG are disagreeing that only the MPI results should be considered as negative as the MPI adverse event rate was <1% regardless of the ECG response.[1] MPI has an estimated sensitivity of 80-90% with high diagnostic accuracy for coronary artery disease.[2]

- The downside to MPI, in particular single-photon emission computed tomography (SPECT) is that it only allows detection of relative perfusion defects. Myocardial ischemia may be underestimated in vascular territories next to areas with more severe coronary disease resulting in false positives.[1] Despite this, Nakanishi et al, in their study demonstrated the safety of MPI, with only 0.16% high-risk CAD in patients with normal MPI.[3]

- Lima et al and Berman et al found that the incorporation of transient ischemic left ventricle dilatation to MPI significantly improved the detection of high-risk coronary artery disease.[4,5,6] TID is not dependent on perfusion defects such as SPECT and is not dependent on comparison of a region of an abnormal stress response to a normal zone. Patients with a high TID and otherwise normal MPI or minimal perfusion defects more commonly had severe or extensive coronary artery disease incorporating multivessel critical stenosis in the proximal left anterior descending artery as defined by invasive coronary angiography.[7-12]

- Abnormal MPI despite subsequent negative coronary angiography is associated with a long-term higher risk of adverse cardiovascular events as compared with patients without ischemia on MPI.[13-15] This finding is thought to be secondary to angiographically silent microvascular ischemia.[14,16]

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Materials and Methods

- A retrospective studying involving a chart review of a total of 300 consecutive patients who underwent myocardial single-photon emission computed tomography (SPECT) at the Arnot Ogden Medical Center. Outcomes including related admissions and mortality will be compared as specified below. The project is currently in the data collection phase. The project has SRB project approval A-20-020. We will retrospectively analyze and compare:

1. Abnormal stress ECG findings to normal and abnormal MPI studies to occurrence of cardiac-related admissions and cardiac related mortality

   ECG+,SPECT-
   ECG+, SPECT +
   ECG-, SPECT –
   ECG -, SPECT +
   Compare up to five year outcomes defined as cardiac death as documented per patient chart, non-fatal myocardial infarction as documented by appropriate cardiac enzyme and electrocardiographic changes, revascularization, or admission due to new-onset heart failure.

2. Abnormal MPI studies and TDI to ECG to occurrence of cardiac-related admissions, revascularization, and cardiac related mortality.

   SPECT+,TDI+, ECG
   SPECT+, TDI-, ECG
   SPECT-, TDI+, ECG
   Compare up to five year outcomes defined as cardiac death as documented per patient chart, non-fatal myocardial infarction as documented by appropriate cardiac enzyme and electrocardiographic changes, revascularization, or admission due to new-onset heart failure.

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