Title: Resting Electrocardiogram as a Predictor of Asymptomatic Myocardial Ischemia in Patients with Type 2 Diabetes

Specific Aims: To determine whether resting 12-lead ECG (rECG) abnormalities are associated with inducible ischemia in patients with type 2 diabetes and asymptomatic CAD.

Hypothesis: rECG abnormalities are predictive of inducible ischemia in patients with asymptomatic CAD.

Methods Used: ECGs and adenosine MIBI perfusion studies from patients (n=374) enrolled in the Detection of Ischemia in Asymptomatic Diabetics (DIAD) study were analyzed. DIAD is an ongoing prospective study attempting to define the predictors of inducible ischemia and cardiac events in patients with Type 2 diabetes who have no symptoms of CAD.

ECG analysis involved quantitative assessment of 11 out of the 12 leads of a rECG. The duration and amplitude of each QRS complex, ST segment and T wave were analyzed. rECG abnormalities were documented, including axis deviation [AD], conduction defects [CD], left ventricular hypertrophy [LVH], minor non-diagnostic q-waves and ST-T abnormalities. Statistical analysis examined the association of abnormalities on rECG with stress-induced myocardial perfusion abnormalities (MPI). Results were statistically analyzed with SAS software.

Results: Mean age was 60±6 years, T2DM duration was 8±7 years, 26% of patients were taking insulin; 56% were male and none had known or suspected CAD, LBBB, or diagnostic Q-waves. AD was present in 5%, CD in 9%, LVH in 3%, abnormal T-waves in 15%, minor q-waves in 4%, ST-depression in 4%, and ST-elevation in 5%. In total, rECG abnormalities were found in 40% of patients. As in the overall DIAD study, MPI abnormalities were found in 22% of subjects.

T-wave abnormalities (25% vs 12%; p = .004), minor ST-depression (9% vs 2%; p = .009), and ST-T-wave abnormalities (32% vs 18%; p = .008) were more prevalent in patients with vs without MPI abnormalities. AD, CD, LVH, and minor Q-waves were not found more frequently in subjects with MPI abnormalities.

Conclusions: rECG abnormalities are common in individuals with T2DM. T-wave abnormalities and ST-depression and are associated with MPI abnormalities. rECG may help to identify individuals with T2DM at increased risk for myocardial ischemia. These findings might assist primary care providers in selecting patients who would benefit from cardiac screening.