Prevention

THE PROGNOSTIC VALUE OF CPET: ASSOCIATION WITH CORONARY ARTERY CALCIUM SCORE

Poster Contributions
Poster Hall, Hall C
Saturday, March 18, 2017, 3:45 p.m.-4:30 p.m.

Session Title: Innovations in Cardiovascular Risk Assessment and Reduction
Abstract Category: 32. Prevention: Clinical
Presentation Number: 1235-063

Authors: Matthew Hakimi, Tomohiko Kisaka, Kathy Sietsema, Yasuki Kihara, Karlman Wasserman, Matthew Budoff, Los Angeles Biomedical Research Institute, Torrance, CA, USA, Hiroshima University Hospital, Hiroshima, Japan

Background: It has been proposed that information derived from cardiopulmonary exercise testing (CPET) may provide additional prognostic information; but there are few studies evaluating for coronary artery disease (CAD). By measuring a broad range of variables, CPET can precisely determine aerobic capacity and independent and coupled functions of the cardiovascular, pulmonary and skeletal muscle systems. We tested the prognostic relevance of CPET by comparing its functional data to coronary artery calcium (CAC) score. CAC is highly predictive for cardiovascular events and provides unique anatomic information regarding coronary atherosclerotic burden.

Methods: Data from 83 asymptomatic individuals with CAD risk factors were retrospectively analyzed at LA Biomedical Research Institute and Hiroshima University Hospital. Subjects had an exercise stress test by CPET followed by CAC from 2009 to 2015. An algorithm was developed using specific CPET parameters (peak VO_2 < 75% of predicted, V_E/VCO_2 at anabolic threshold (AT) ≥ 34, and delta VO_2/delta WR slope ≤ 8.3) to physiologically separate individuals into control, ischemic and non-ischemic groups.

Results: Mean CACS in the control group with normal exercise capacity was 196 ± 363. The ischemic group, termed exercise induced myocardial ischemia (E-IMI), had CACS of 1074 ±1261, while the non-ischemic exercise cardiomyopathy (ECM) group had CAC of 297 ± 496. As compared with control and ECM, the mean scores were significantly higher in the E-IMI group ($p=0.0007$ and 0.0021, respectively). Multiple logistic regression found that the observed highest CAC was independently associated with the CPET identified ischemic group (E-IMI) after adjustment for risk factors: sex, age, BMI, diabetes mellitus, hypertension, hyperlipidemia, cigarette smoking, and family history.

Conclusions: CPET is useful in CAD risk stratification and in identifying patients who may benefit from intensified medical therapy or coronary angiography for possible revascularization. CPET identifies with high accuracy those with very high CAC, and those exhibiting ischemia had an average CAC score >1000, which has great prognostic significance as a very high risk cohort.