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Predicting Cardiac Function Worsening Using Myocardial Perfusion SPECT and Coronary Artery Calcium Scoring

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PURPOSE

To investigate the value of coronary artery calcium (CAC) scoring along with myocardial perfusion imaging with single-photon emission computed tomography (SPECT) in prediction of cardiac function worsening.

METHOD AND MATERIALS

In a historical cohort study, 453 patients (mean age 57.3 ± 11.3) who had pharmacological or Bruce protocol myocardial perfusion SPECT undergoing a CAC measurement performed between 2010 and 2015 were followed for cardiac function worsening. The criteria of heart function worsening were defined as EF decrease equal or more than 5 percent (cases with latest EF ≥ 50 were excluded) or new wall motion hypokinesia for echocardiography related assessment and/or cardiac catheterization requiring intervention (percutaneous coronary intervention or Coronary artery bypass surgery). Multiple linear regression analysis was used for analysis, and independent variables were extracted based on cardiac imaging reports including LAD, LCX, RCA and LM calcification scoring, SPECT report impression and left ventricular ejection fraction (LVEF). Dependent variable was cardiac function worsening based on $\geq 5\%$ drop in EF or new wall motion hypokinesia in at least 2 echocardiographies after SPECT study and/or cardiac catheterization requiring intervention.

RESULTS

Results of multiple linear regression showed that coronary artery calcification scores, LVEF and SPECT impression, collectively can predict cardiac worsening in the future, $F(6,446)=7.514$, $p<0.001$, $R^2=0.092$. Further evaluation of variables individually revealed that LAD calcification score (standardized coefficients $\beta=0.20$, $p<0.001$), SPECT impression (standardized coefficients $\beta=0.161$, $p<0.001$) and LVEF (standardized coefficients $\beta=-1.22$, $p<0.01$) significantly predicted outcome.

CONCLUSION

Findings suggest value of myocardial perfusion SPECT along with coronary artery calcium (CAC) for prediction of future cardiac worsening.

CLINICAL RELEVANCE/APPLICATION

Cardiac SPECT along with coronart artery cacuim score as biomarkers have the potential to improve guidelines for ischemic heart disease.