Doppler Echocardiography

Prognostic value of non-invasive coronary artery flow velocity assessment in elderly patients

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Funding Acknowledgements: Type of funding sources: None.

Background: There is a high prevalence of coronary artery disease (CAD) in the elderly population. However, symptoms of CAD are often non-specific. Dyspnoe, non-anginal pains are among the main symptoms in older patients. Exercise tests are of limited feasibility in these patients, due to neuro-muscular weakness, physical deconditioning, and orthopaedic limitations. Pharmacological tests often are contraindicated in a substantial percentage of elderly patients. Some recent studies indicate using local flow acceleration during routine echocardiography has prognostic potential for coronary artery assessments without stress testing. The aim of the study was to define the prognostic value of coronary artery ultrasound assessment in patients ≥75 years old.

Methods: This is a prospective cohort study. Patients ≥ 75 years old who underwent routine echocardiography with additional scans for coronary arteries over a period of 24 months were included in the study. The study group consisted of 80 patients aged 75-90 years (56 women; mean age 79 ± 4). Initial exams were performed for other reasons, primarily for arterial hypertension. Fifteen patients had known CAD. Death, non-fatal myocardial infarction (MI), and revascularization were defined as major adverse cardiac events (MACE). All patients were followed up with at a median of 32 months.

Results: There were 34 patients with high local velocities in the left coronary artery. Eight deaths, two non-fatal myocardial infarctions occurred, and 13 revascularizations were performed. With a ROC analysis, a coronary flow velocity >110 cm/s was the best predictor for risk of death (area under curve 0.84 [95% CI 0.74–0.92]; sensitivity 75%; specificity 88%). Only the maximal velocity in proximal left-sided coronary arteries was independently associated with death (HR 1.03, 95% CI 1.01; 1.05; $p < 0.002$), or death/MI (HR 1.03, 95% CI 1.01; 1.04; $p < 0.0001$). The cut-off value of 66 cm/s was a predictor of all MACE (area under curve 0.87 [95% CI 0.77–0.94]; sensitivity 80%; specificity 86%). Any causes of death or MI occurred more frequently in patients with velocities of >66 cm/s (27% vs. 2%; $p < 0.002$). The rates of MACE were 58.0% vs. 2%; $p < 0.0000001$, respectively.

Conclusion: The analysis of coronary flow in the left coronary artery during echocardiography can be used as a predictor of outcomes in elderly patients. Maximal velocities in proximal left-sided coronary arteries is independently associated with further death or myocardial infarction.