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ORIGINAL RESEARCH

121 Splenic Metabolic Activity Predicts Risk of Future Cardiovascular Events: Demonstration of a Cardiosplenic Axis in Humans

Hamed Emami, Parmanand Singh, Megan MacNabb, Esad Vucic, Zachary Lavender, James H.F. Rudd, Zahi A. Fayad, Joshua Lehrer-Graiwer, Magnus Korsgren, Amparo L. Figueroa, Jill Fredrickson, Barry Rubin, Udo Hoffmann, Quynh A. Truong, James K. Min, Amos Baruch, Khurram Nasir, Matthias Nahrendorf, Ahmed Tawakol

VINI: Pre-clinical data suggest the existence of a cardiosplenic axis, wherein activation of hematopoietic tissues (especially the spleen) results in liberation of proinflammatory leukocytes and accelerated atherosclerosis. This splenic activation may be implicated in recurrent cardiovascular events after an acute coronary syndrome (ACS).

VIDI: ¹⁸F-fluorodeoxyglucose positron emission tomography imaging was performed in 508 patients to assess uptake in spleen and arterial wall. There was increased metabolic activity in the spleen post-ACS, which was associated with proinflammatory leukocytes, increased C-reactive protein and arterial wall inflammation. This increased splenic activity also independently predicted the risk of subsequent cardiovascular events.

VICI: As a first demonstration of the cardiosplenic axis in humans, this important study not only uncovers a potential novel mechanism for adverse event in post-ACS patients, but also identifies possibly new targets for therapeutic interventions.

131 ■ EDITORIAL COMMENT Do We Need to Expand Our Field of View for Imaging of Atherosclerosis?

Robert J. Gropler

CME

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134 Value of CACS Compared With ETT and Myocardial Perfusion Imaging for Predicting Long-Term Cardiac Outcome in Asymptomatic and Symptomatic Patients at Low Risk for Coronary Disease: Clinical Implications in a Multimodality Imaging World

Su Min Chang, Faisal Nabi, Jiaqiong Xu, Craig M. Pratt, Angela C. Mahmarian, Maria E. Frias, John J. Mahmarian

VINI: Exercise treadmill test (ETT), stress myocardial perfusion tomography (SPECT), and coronary artery calcium score (CACS) results predict outcome in patients at risk for coronary artery disease. However, no data exist comparing their relative value in long-term risk stratification.

VIDI: In this prospective observational study of 988 asymptomatic or low-risk symptomatic patients without known coronary artery disease with 10-year follow-up, CACS significantly improved long-term risk stratification beyond Framingham Risk Score, ETT, and SPECT results and supports CACS as a first-line test in risk stratification.

VICI: Among the array of noninvasive tests available for low risk individuals, the use of CACS has been increasing in practice, both for risk assessment and for guiding decision about interventions, such as statin therapy. Whether the use of CACS as a first-line screening test will be cost-effective will need to be investigated in future studies.

145 ■ EDITORIAL COMMENT The Exercise Test Is Alive and Well When Coupled With Coronary Calcium Scoring

Leslee J. Shaw

148 How to Define End-Diastole and End-Systole? Impact of Timing on Strain Measurements

Razvan O. Mada, Peter Lysyansky, Ana M. Daraban, Jürgen Duchenne, Jens-Uwe Voigt

VINI: Current speckle tracking based strain measurements are highly automated but the impact of the software-derived assignment of end-systole (ES) and end-diastole (ED) on systolic strain measurement has not been systematically evaluated.

VIDI: In this proof-of-principle study, 60 patients (20 healthy volunteers, 20 patients with CAD and 20 patients with typical left bundle-branch block [LBBB]) underwent echocardiography using different techniques to determine the timing of ES and ED. Changing the definition of ED and ES by only 4 frames resulted in significantly different end-systole global longitudinal strain (ES-GLS) and end-systole segmental longitudinal strain (ES-SLS) values in all subjects compared to reference ED timing, with variation of up to 40% and 85%, respectively. ES-SLS in dyssynchronous hearts showed the highest sensitivity to timing definition. From all methods, spectral Doppler was the most reliable time marker in all subjects.

VICI: The impact of timing of ES and ED on strain measurements can be critical to the results. Therefore, in order to optimize accuracy, protocols and software used to quantitate strain should include alternatives and caveats for situations in which the commonly used automated electrocardiography peak R-wave amplitude does not accurately define ED, such as LBBB.

158 ■ EDITORIAL COMMENT It Is All About Timing!

Braage Høyem Amundsen

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