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A new turn in SPECT myocardial perfusion imaging: data-driven cardiac gating is now possible with the new generation CZT SPECT Discovery NM 530c.

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Aim We previously developed a data-driven (DD) respiratory-motion (RM) correction method for conventional SPECT gamma-cameras (REGAT) and adapted it to the new CZT camera (Discovery NM 530c). We recently reported that RM correction with REGAT applied to CZT myocardial perfusion SPECT imaging (MPI) is clinically feasible and impacts substantially myocardial perfusion defects. In this evaluation, we study whether REGAT applied to MPI (Discovery NM 530c) is capable of generating a data-driven (DD) cardiac gating signal allowing the generation of valid global left ventricular (LV) function parameters (EDV: end diastolic volume; ESV: end systolic volume; EF: ejection fraction).

Materials and methods Were included 7 patients addressed for stress/rest MPI. All patients had prone stress MPI (2 MBq/Kg 99mTc-Tetrofosmin) and rest MPI 3-hours later (6 MBq/Kg). All acquisitions were made on Discovery NM 530c. Each acquisition was processed with REGAT to generate a dynamic SPECT acquisition study. The latter was processed to generate a DD cardiac gating signal and generate a mean DD cardiac SPECT study (GSPECT-DD). In parallel, a mean ECG cardiac GSPECT study was generated using the ECG trigger signal provided by traditional ECG monitor (GSPECT-M). The 2 generated cardiac GSPECT studies were reconstructed on Xeleris workstation and processed with Emory Cardiac Toolbox (ECT). LV EDV, ESV and EF were compared between cardiac GSPECT-DD and GSPECT-M.

Results Stress LV EVD, ESV, and EF were 91±24ml, 29±13ml, and 68±10% vs 95±23ml, 29±12ml, and 70±11% with GSPECT-DD vs GSPECT-M respectively (P<NS). Rest LV EDV, ESV, and EF were 97±21ml, 32±10ml, and 67±6% vs 101±22ml, 31±10ml, and 69±6% with GSPECT-DD vs GSPECT-M respectively (P<NS).

Conclusion Data-driven cardiac gating of MPI with Discovery NM 530c is clinically possible. It provides LV global systolic function parameters similar to those provided by the traditionally used ECG monitor gating.

The author hereby declares no conflict of interest

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Assessment of left ventricular filling pressures: a prospective speckle tracking echocardiography compared to invasive hemodynamic study

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Background Assessment of left ventricular filling pressures (LVFP) is a key part of echocardiographic evaluation but actual validated parameters aren’t relevant in some routine cases. Use of diastolic strain rates (DSr) may improve the diagnostic of elevated LVFP in specific cardiomyopathies. Our primary objective was to evaluate the diagnostic performance for elevated LVFP of different DSr indexes in a heterogeneous cardiological population.

Material and Methods We led a prospective mono-centric two-dimensional speckle tracking echocardiography study compared to invasive hemodynamic (left catheterization with measurement of pre-atrial pressure (preA)). Elevation of LVFP was defined as preA>15mmHg. Global DSr indexes tested were: isovolumetric relaxation DSr (IvrDSr), early DSr (EarlyDSr) and late DSr (LateDSr). Additional DSr indexes were calculated by means of these parameters: EarlyLateDSr and IvrlateEarlyLateDSr. DSr values were multiplied by 10 factor and ratios of E wave to the obtained result gave different composite E/10DSr indexes.

Results Fifty height patients were included. Patients with preA>15mmHg (n=23) were compared with patients with preA<15mmHg (n=35). Mean left ventricular ejection fraction (LVEF) was 55,7±13,3%, mean preA was 13,6±2,2mmHg. 52% of patients had coronaropathy, 43% had regional dysfunction and 31% had significant valvulopathy. Correlations to LVFP were: E/10EarlyLateDSr (R=0,50), E/10LateDSr (R=0,46), E/10EarlyLateDSr (R=0,42).

Conclusion E/10DSr composite indexes, especially E/10LateDSr and E/10IvrEarlyLateDSr are relevant LVFP indexes, which may be applied to a large spectrum of cardiomyopathies.

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