Conclusions: Myocardial T1 and T2 were found abnormal in the sub-epicardium of patients with acute myocarditis, but much less than the subendocardium of patients with chronic MI. A range of T1 and T2 alterations can be demonstrated with MOLLI. Further investigation will indicate whether the severity and EVF changes might help refine the predictive risk of LGE in various cardiac conditions. In myocarditis, T1 and T2 provide complementary information to T2 mapping, which helps both intra and extracellular compartments.

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Prognostic value of CMR criteria for LV functional improvement in patients with acute myocarditis

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Background: Standard diagnostic CMR criteria (“Lake Louise Criteria”) indicate acute myocarditis, if at least 2 out of the following 3 criteria are positive: (1) Myocardial edema/T2, (2) hyperemia/capillary leakage/early Gd enhancement ratio (EGE ratio) and (3) irreversible injury/late Gd enhancement (LGE). However, there is a lack of prognostic data using these criteria regarding LV functional improvement.

Methods: We studied 37 patients referred for acute myocarditis during admission and after a 12-month follow-up. CMR studies included T2-weighted and contrast-enhanced T1-weighted (EGE ratio and LGE) sequences. Global edema was defined as T2 SI ratio (normalized to skeletal muscle) of ≥2 and regional edema as a regional area of SI ≥2 and regional edema as a regional area of SI ≥5% was considered improvement.

Results: Out of a total of 37 patients, 29 met the CMR Lake Louise Criteria (LL+) and 8 did not (LL-). Baseline and 12-month EF were significantly lower in LL+ (53.2±9 vs. 62.2±5; p=0.007 and 58.9±4 vs. 62.9±5, p=0.0045 respectively). At follow up, ejection fraction increased in LL+ but not in LL- groups (delta EF:5.7±9.8 vs. 0.7±2). The presence of global and/or regional myocardial edema was strongly associated with an increase of EF ≥5% (see table).

<table>
<thead>
<tr>
<th>Lack of EF increase</th>
<th>EF increase</th>
<th>All patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Δ EF &lt; 5%) n=26</td>
<td>(Δ EF ≥ 5%) n=11</td>
<td></td>
</tr>
<tr>
<td>LL+</td>
<td>18 (69.2%)</td>
<td>11 (100%)</td>
</tr>
<tr>
<td>Edema +</td>
<td>15 (57.7%)</td>
<td>11 (100%)</td>
</tr>
<tr>
<td>EGE +</td>
<td>17 (65.3%)</td>
<td>11 (100%)</td>
</tr>
<tr>
<td>LGE+</td>
<td>17 (65.3%)</td>
<td>8 (72.7%)</td>
</tr>
</tbody>
</table>

In a multivariate analysis, the presence of global and/or regional edema on admission was the only independent predictor of an increase of EF (β=0.428, p=0.009)

Conclusion: In patients with clinically suspected acute myocarditis, the presence of positive CMR Criteria is associated with LV function recovery. Myocardial edema as defined by CMR was the strongest parameter, indicating that the observed increase of EF may be due to recovery of reversibly injured myocardium.

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Quantitative analysis of microvascular obstruction is bestly related to clinical prognosis than clinical markers at a 1 year follow-up: a contrast-enhanced MRI study

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Objectives: To evaluate the clinical prognostic value of a cardiac magnetic resonance (CMR) assessment soon after a first ST-segment elevation myocardial infarction (STEMI).

Background: Clinical factors such as gender, age, blood pressure, heart beat, heart and renal failure have already been described as related to poor clinical prognosis at follow-up. For now, the prognostic value and weight of CMR parameters is not well-defined.

Methods: We followed for 1 year up to 168 consecutive patients with a firstSTEMI treated with primary angioplasty. We performed CMR at day 5±2 and 3months to assess LV volumes. We used delayed enhancement imaging to assess the infarct size and the presence of MVO. We defined severe MVO as MVO extent being superior to its median value (2.82 gr).

Results: 13 major adverse cardiac events (MACE) including 2 cardiac deaths, 1 nonfatal myocardial infarctions, 8 readmissions for heart failure and 2 stroke were documented. In univariate analysis, the MACE was related to age, creatin kinase peak, heart failure, MVO and LV volumes. In a complete multivariate analysis, age (hazard ratio 1.075, p=0.003), end-diastolic LV volume (HR 0.74, p=0.017), end-systolic LV volume (HR 1.046, p=0.039), MVO presence (HR 8.867, p=0.041; Log rank=9.195, p=0.002) and severe MVO (HR 9.906, p=0.002; Log rank=18.090, p<0.001) were the only independent prognostic variables. Of note, clinical marker such as heart failure was strongly related to age and found as non significant in multivariate analysis.

Conclusions: A comprehensive CMR assessment is useful for stratifying risk soon after STEMI; baseline LV volumes and severe MVO are the stronger independent prognostic factors. This result supports the clinical interest of a quantitative assessment of MVO.

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Direct comparison of stress Thallium-201/Rest Technetium-99m dual isotope perfusion imaging with Cadmium-Zinc-Telluride detector versus standard dual detector camera

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Introduction: Recent advances in nuclear myocardial perfusion imaging (MPI) have provided opportunity for improved image information with an important reduction of exam time and radiation. This technology can be used to explore novel protocols (dual isotope high-speed MPI). Today, two devices exist: D-SPECT and Discovery NM 530c (DNM) camera. With D-SPECT, it was showed that rapid stress Tl-201/rest Tc-99m protocol for use with high-speed MPI has offered the superior qualities of Tl-201 for stress imaging and of the Tc-99m agents for rest imaging can be preserved. However, no study has evaluated the same dual-isotope protocol with the other system.

Methods: A total of 38 consecutive patients underwent simultaneous dualradionuclide (stress thallium-201/rest technetium-99m) perfusion imaging with a DNM camera and standard dual detector camera (S-SPECT) during the month of May 2011.

Results: All patients successfully underwent stress/rest MPI with both cameras. In 38 patients (50%) pharmacological stress was induced with dipyridamole. DNM SPECT SSS and SRS correlated linearly with conventional S-SPECT respective scores (r=0.84, p<0.0001 for SSS, and r=0.94, p<0.0001 for SRS). On Bland-Altman analysis there was good agreement between the two imaging methods with a shift for both SSS and SRS (mean...
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Assessment of respiratory variation on inferior vena cava by three-dimensional echocardiography

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Background: Accuracy of measurement of inferior vena cava (IVC) respiratory variations has clinical implications in the management of cardiac disorders because it affects the estimation of right-atrial (RA) pressure. We assumed that 3D can add more valuable information in IVC assessment.

Aims: To develop a methodology of 3D exploration of VCI and evaluate it in comparison with 2D.

Methods: 20 patients with good echo-visualisation underwent 2D and 3D (Philips IE 33). In 2D, the IVC maximal (2DDmax) and minimal (2DDmin) diameters were measured according to the ASE guidelines.

In 3D, VCI was displayed according to its longitudinal axis, from the junction with the RA. Cross-section of the VCI was realised immediately after the hepatic vein junction. The large (D1) and small (D2) diameters and the surface (S) of this cross-section were measured when the VCI has the maximal size during normal respiration (maximal VCI dimensions). After deep inspiration, the same measures were done (minimal VCI dimensions). The IVC collapsibility index was calculated in 2D and 3D.

Results: 2DDmax and 2DDmin was 21.3±3.1 mm and 11.4±1.7 mm. 3D shows that VCI in cross section has an oval geometric shape. D1max and D1min was 27.6±1.9 mm and 22.3±1.5 mm. D2max and D2min was 15.6±1.2 mm and 11.1±1.1 m. S max and min was 3.2±0.6 cm² and 2.0±0.4 cm². 2D is less than D1 (p<0.001). Because VCI moves during respiration (outside of the initial 2D section), the physician can not conclude about the real diameter decrease and as a consequence 2D overestimated its respiratory variations. 3D allows true measurements by using the planes permanently adjusted in the space to anatomical landmarks. Because reflecting both long and short diameters, the surface of the cross-section of the VCI must be the more informative measurement.

Conclusions: This study developed a 3D methodology of reliable assessment of the VCI. We propose for evaluation of respiratory variation of IVC an index of collapsibility of the surface of its cross-section.

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Microvascular obstruction assessed by 3-Tesla magnetic resonance imaging in acute myocardial infarction is correlated with plasma troponin I levels

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Background: Infarct size is a powerful prognostic factor and is usually assessed indirectly using dosage of plasma levels of cardiac enzymes, particularly troponin. Microvascular obstruction (MVO) at the acute phase of myocardial infarction (MI) is associated with myocardial reperfusion injury, resulting in greater infarct size, left ventricular (LV) impairment and higher mortality. We aimed to evaluate whether a correlation exists between plasma levels of cardiac troponin I (cTnI) at the acute phase of MI and the extent of no-reflow as assessed by 3-T cardiac magnetic resonance imaging (MRI).

Secondly, we aimed to define a cut-off value for cTnI predictive of no-reflow.

Methods: We included 51 consecutive patients with no previous history of cardiovascular disease, and presenting for a first MI with ST elevation within the first 12 hours. Infarct size and extent of no-reflow were evaluated by 3-T MRI at day 5 using early and late hyperenhancement imaging at 3 and 15 minutes after injection of gadolinium. Extent of no-reflow at 15 minutes (MVO) was measured and correlated with repeat doses of cTnI on admission and at 6, 12, 24, 48 and 72 hours. At 6 months follow up, MVO was associated with LV remodeling resulting in higher LV volumes and lower LV ejection fraction (LVEF).

Conclusions: There is a relationship between plasma levels of cardiac troponin I (cTnI) at the acute phase of AMI and the extent of MVO as assessed by 3-T cardiac magnetic resonance imaging (MRI). A cut-off value of 89 ng/ml for cTnI at 12 hours seems to best predict presence of early MVO with a sensitivity of 63% and a specificity of 88%. At 6 months follow up, MVO was associated with LV remodeling resulting in higher LV volumes and lower LV ejection fraction (LVEF).

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Effects of spinal anaesthesia on left ventricular function assessed by two-dimensional echocardiography

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Background: Spinal anaesthesia (SA) is one of the most frequently realized techniques of regional anaesthesia to allow lower limbs surgery. Hypotension is an adverse effect commonly observed, especially in elderly patients. Indeed the sympathetic block induced by SA decreases left ventricular (LV) preload and afterload, the cardiac effect of SA is still controversial.

The aim of this study was to compare the effect of SA and general anesthesia (GA) on left ventricular systolic function assessed by 2D strain by transthoracic echocardiography (TTE).

Methods and results: During 6 months, 22 patients over 60 years old referred for elective lower limb surgery underwent TTE immediately before and 15 minutes after SA (n=10) or GA (n=12). Hypotension was more frequent in the GA group than in the SA group (83% vs. 16%, P=0.008). The use of fluid expansion and vasopressors was higher in the GA group (P=0.03).

GA and SA induced both a significant increase of global longitudinal strain rate (−0.2±0.3%/s vs. −0.2±0.3%/s respectively; P[GA vs. SA]=ns). LV ejection fraction and LV telediastolic volume were not modified by both anesthesia. Systolic peak velocities at the mitral annulus by tissue Doppler imaging were not significantly different in the two groups (P=ns). The TS/TI ratio was not significantly different between the two groups (P=ns).

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