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Tri-dimensional Fusion Image Helps Refining the Coronary Diseases Diagnoses

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Introduction: The purpose of this study was to obtain in a non-invasive manner a tri-dimensional (3D) fusion image of the myocardial perfusion by integrating a single-photon emission computed tomography (SPECT) with a multidetector 64-slice-computed tomography coronary angiography (64-CTCA).

Methodology: A 3D fusion image was performed in 45 patients with myocardial perfusion defect. As a first step, the myocardial perfusion defect was detected through Thallium 201 SPECT stress-rest, via images made by Infinia Hawkeye 4g and computed by a Xeleris workstation (GE Healthcare Technologies, Milwakee,Wis). As a second step, a 64-CTCA (Light Speed VCT, GE) was performed on the same patients (Advantage Workstation, GE Healthcare Technologies). As a third step, 3D fusion images (Advantage Workstation, GE Healthcare Technologies) were obtained by integrating SPECT and 64-CTCA. The results of these images were compared to coronary angiographic segments which: were undamaged, had a stenosis (> 50%), had atherosclerotic plaque or had a stent.

Results: 540 coronary angiographic segments were examined in 45 patients;494 were evaluated while 46 segments were excluded from further analysis caused by a lack of visibility and/or poor quality images.

	Sensibility	Specificity	PPV	NPV
64 CTA *	87%	76%	60%	94%
3D Fusion *	93%.. +++	98% ++++	91%	98%
*: average segments	PPV: Positive Prevalence Value	NPV: Negative Prevalence Value	+++=P<0.009	++++=P<0.0001

Conclusion: When using 3D SPECT/64-CTCA fusion images, an improvement of the sensibility, specificity, PPV and NPV were observed. We believe that this methodology offers an incremental diagnostic and represents a new an important step that combines images and myocardial perfusion in coronary artery diseases. The use of this method could potentially allow the carrying out of an earlier and more efficient treatment.