Regional Diagnosic imaging in patients with unstable angina is a challenge for cardiologists. To determine whether or not nicorandil, a hybrid compound of KATP-channels opener and nitrate, streets myocardial contrast echocardiography (MCE) and magnetic resonance imaging (MRI) are clinically useful in prediction of coronary arterial stenosis in angina pectoris (API) including unstable API, we conducted a prospective study.

Methods: Consecutive 101 patients with API including unstable API (n=50) without a history of ST elevation, previous myocardial infarction and coronary bypass surgery were enrolled. All the patients underwent nicorandil stress MCE and MRI. MCE was performed with gray-scale ultrasonic mode (1.3 MHz/3.6 MHz) under maximum mechanical index during intravenous drip infusion of Levotens during rest and nicorandil stress (0.1 mg/kg). End-systolic triggering images (triggering interval of 1, 2, 3 and 4 beats) were recorded. Gadolinium-enhanced MRI was acquired at late systolic phase during rest and nicorandil stress. Each myocardial region (left anterior descending artery, left circumflex artery, right coronary artery) imaged by MCE and MRI was evaluated before coronary arteriography (CAG) by two independent reviewers who were blinded to the clinical data. All the patients underwent quantitative CAG within five days after MCE and MRI.

Results: There was no adverse effects or angina during nicorandil stress MCE in any patients. Prediction rate by the nicorandil stress MCE (302 regions) and MRI of critical stenosis (70% in QCA) were 79% and 89% in sensitivity, 96% and 96% in specificity, and 88% and 93% in positive predictive value, respectively. Similar results were obtained for diagnosing intracoronary reperfusion (86% vs 79%, p<0.001). The combination of nicorandil stress MCE and MRI was more accurate than either stress testing alone (sensitivity 86% in MCE and 93% in MRI and specificity 93% in MCE and 96% in MRI, p<0.05).

Conclusion: Nicorandil stress MCE and MRI are safe and useful for non-invasive perfusion assessment. Sensitivity and specificity of these techniques to assess myocardial regional perfusion in patients with API including unstable API, especially associated with multivessel lesions.

Myocardial Contrast Echocardiography is Superior to Tc-99m Single-Photon Emission Computed Tomography for the Diagnosis of Coronary Artery Disease in Patients Without Prior Acute Myocardial Infarction: A Multicenter Study

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Background: We used dipyridamole stress to test the hypothesis that myocardial contrast echocardiography (MCE) is superior to Tc-99m single photon emission computed tomography (SPECT) for the detection of coronary artery disease (CAD).

Methods: Fifty-five patients with no previous myocardial infarction underwent MCE (during continuous infusion of Sodium and NITROUS) and SPECT and were compared to quantitative coronary angiography (CAD was defined as >50% stenosis). Each patient was also examined for the presence of posterior and diaphragmatic segments. All images were analyzed blindly and separately at non-recruiting centres.

Results: On a coronary circulation basis (n=110), the sensitivity for MCE was significantly greater than that of SPECT for the detection of CAD (66 vs 43%, p<0.001). The specificity of MCE and SPECT, however, were similar 88% and 83%, respectively. Similarly, on a patient basis, the sensitivity of MCE was significantly greater than that of SPECT for the detection of CAD (83% vs 49%, p=0.05) with no significant differences in specificities. Furthermore, sensitivity of MCE was significantly (p<0.01) superior to SPECT for every level of coronary stenosis (50-75%, 76-90% & >90%).

Conclusion: Dipyridamole MCE is superior to SPECT for the diagnosis of CAD in patients with no prior MI.

How Valuable Is Real-Time Myocardial Contrast Echocardiography for Pharmacological Stress Testing?

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Background: Little is known about the feasibility and diagnostic accuracy of real-time myocardial contrast echocardiography (MCE) as an adjunct to stress testing. Thus, this study was performed to test the agreement between MCE and 99mTc-Se-Tebi-SPECT in the evaluation of myocardial perfusion defects on a segmental level.

Methods: MCE (Option, 8-10 mCi) was performed at rest and during peak dipyridamole stress in 70 (50) unselected patients (age: 65±9, gender: 54m, 16f, Infarcts: 25 anterior, 10 inferior, 11 lateral; coronary arteries: 3 single, 32 multivessel) with previous coronary artery disease undergoing SPECT imaging for clinical reasons. 4 patients were excluded due to extremely limited ejection fraction. From 4- and 2-chamber MCE and corresponding SPECT views, 12 myocardial segments were generated for each patient (12 regional opacification/uptake (0=absent, 1=low, 2= incomplete, 3= complete, 4= indeterminate) by two pairs of blinded observers. Segmental ischemia was defined as the reduction of opacification/uptake under stress by one degree. Concordance between MCE and SPECT and interobserver variability were assessed using kappa statistics.

Results: Of 792 assessed segments 143 were not adequate for reading by MCE, mostly confined to basal segments. Interobserver variability was good (kappa=0.76). Overall agreement between the two methods was poor (59%, kappa =0.25) when including unreadable segments but good (86%, kappa =0.73) when excluding those segments. Concordance on segmental level was highest in apico-lateral (86%) and lowest in basal segments (18%). Concordance between the methods was higher for diagnosing fixed defects (72%) and normal perfusion (86%), but for diagnosing reversible defects (65%). Conclusion: This study demonstrates that real-time MCE can detect perfusion defects during pharmacological stress and agrees reasonably well with 99mTc-Se-Tebi-SPECT. However, diagnostic feasibility is limited in basal segments and caution should be exercised when diagnosing stress induced ischemia.