ORAL PRESENTATIONS

Preclinical diagnosis of myocardial disease: new indications for tissue Doppler

5 December 2003, 14:00 to 15:30
Location: Room 4

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Relation between regional deformation properties and myocardial wall thickness in patients with fabry disease. An ultrasonic strain rate imaging study.

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Background: In patients with Fabry disease left ventricular (LV) hypertrophy is the most common finding for cardiac involvement. By the use of ultrasound based Strain Rate imaging it is possible to quantify regional myocardial deformation of every single LV segment. The aim of this study was to compare regional deformation properties of the left ventricle posterior wall with the end-diastolic wall thickness.

Methods: Tissue Doppler data were taken from 24 patients with Morbus Fabry (age 8-65 years) and 20 age-matched controls. From this data radial systolic strain (parameter for myocardial thickening) was extracted from the posterior wall. These systolic strain values were compared with the end-diastolic wall thickness of the same segment measured by the anatomic M-mode method.

Results: Radial systolic strain values were significantly reduced in the Morbus Fabry group compared with the control group (averaged systolic strain of Morbus Fabry=34±12%; controls=48±11%; p<0.01). The myocardial wall thickness was 11±2 mm (range: 6 to 16 mm). A significant correlation between regional end-diastolic wall thickness and systolic strain values could be shown with a correlation factor of r=0.78 (figure).

Conclusion: In patients with Fabry disease regional left ventricular deformation properties are significantly reduced and are related to the left ventricular segmental wall thickness.

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Early detection of impaired cardiac function using strain rate in patients with Duchenne muscular dystrophy.

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Background: Dilated cardiomyopathy is common in patients with Duchenne muscular dystrophy (DMD) especially at the later stages of the disease. Strain rate (SR) has been used to study myocardial function in conditions like ischaemia and cardiomyopathies.

The aim of this study was to investigate the usefulness of SR for the early detection of cardiac involvement in young, asymptomatic patients with DMD.

Methods: Fifty three patients with genetically confirmed diagnosis of DMD (mean age 8.7±2.8 years) without clinical symptoms from the cardiac point of view and normal classic echocardiographic studies, were compared with 22 normal controls matched for age (mean age 8.5±2.5 years). We used the HDI 5000 (Philips Medical Systems) to acquire from the parasternal long axis the colour M-mode tissue Doppler (TDI) of the posterior wall of the LV. Images were digitally stored for offline analysis with dedicated software, HDI-lab (Philips Medical Systems). We calculated the SR using the formula SR=Ua-Ub/d where U the velocities of the endocardium a and epicardium b, and d the distance of a and b at each time point.

Results: There was no significant difference for the parameters obtained from conventional echocardiographic studies between the two groups. The velocities derived from the TDI, mean velocity at systole (26.99±7.12mm/sec vs. 33.4±7.3mm/sec, p=0.000), at early diastole (-45.78=13.93mm/sec vs. -60.46±7.58mm/sec, p=0.000) and late diastole (-10.93±3.41mm/sec vs. -13.32±6.4mm/sec, p=0.002) were significantly different in patients with DMD when compared with controls. SR was significantly lower at systole (1.78±0.75s-1 vs. 2.82±0.5s-1, p=0.000) and early diastole (-5.17±1.98s-1 vs. -9.02±1.25s-1, p=0.000) but not at late diastole (-1.92±0.84s-1 vs. -1.6±0.46s-1, p=0.568) in patients with DMD.

Conclusions: SR imaging of the posterior wall of the LV showed regional systolic and diastolic impairment in asymptomatic patients with DMD and when the conventional echocardiography was still normal. Estimation of SR could be a sensitive method to investigate the pathophysiology of the disease and identify deterioration of the cardiac function in early stages.