

Autonomic Heart Rate Control and Localization of Coronary Artery Stenoses

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Physiological and clinical studies have shown that localization of myocardial ischemia might be responsible for non-uniformity of changes in autonomic heart rate (HR) control after MI due to differences in heart innervation.

The goal of the study was investigation of an impact of coronary artery stenosis to autonomic HR control in relation to localization of stenosis.

The contingent of the study was 234 CAD pts after coronary angiography distributed into groups according localization of dominating stenosis (more than 75% of artery lumen): 15 pts free of stenosis; 20 pts with MLA stenosis; 21 pts with isolated LAD stenosis; 51 with dominating LAD stenosis; 11 pts with LCX stenosis; 13 pts with isolated RCA stenosis; 42 with dominating RCA stenosis; and 61 pts with mixed localization of stenosis (MS). Fifty five patients were excluded from the study due to beta-adrenoblockators use.

Methods. Every patient was subjected to clinical and instrumental investigation of cardiovascular function. Autonomic HR control was evaluated by assessing HR variability (HRV) at rest in supine, during active orthostatic test (AOT), and bicycle ergometry (BE), while part of them during individual sleep stages before coronary arteriography. Very low- (VLFC), low- (LFC), and high-frequency (HFC) components were assessed in HR spectral analysis.

Results. CAD pts free of stenosis demonstrated normal HR variability (SRR=40 ms) with predominance of humoral (VLFC=32 ms) and reflex sympathetic (LFC=19 ms) control followed by slightly reduced parasympathetic one (HFC=15 ms) and normal HR response to AOT (dRRb=31%). Pts with MLA and LAD stenoses were characterized by a significant depression of all components of HR power spectrum (VLFC=22 ms, LFC=11 ms, HFC=10 ms) and markedly reduced maximal HR response to AOT (dRRb=18%), while pts with RCA stenosis - only by slightly reduced HR variability (SRR=30ms) and normal HR response to AOT (dRRb=29%). Intermediate level of HR variability was observed in pts with MS and LCX stenosis. HR responses to BE were reduced, while sleep showed blunted HR differences. Pts with LCX and RCA stenosis, as compared with LAD stenosis pts, show more expressed impact to HR frequency and HRV from beta-adrenoblockade.

Conclusion. Stenoses of coronary arteries demonstrated non-uniform influence to autonomic HR control: most expressed reduction of autonomic control was seen in patients with MLA and LAD stenoses, while in those pts with RCA stenosis it remained nearly normal like in pts free of stenosis.