MYOCARDIAL MICROCIRCULATION DURING ISCHEMIC PRECONDITIONING IN OFF-PUMP BYPASS SURGERY

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The phenomenon of "ischaemic preconditioning" has been described in experimental animals. The mechanisms involved are activation of KATP-channels and adenosine receptors, which are coupled to protein kinase C pathways. In this study we sought to evaluate the myocardial microcirculation during brief intermittent occlusions of the left descending coronary artery (LAD) by a new laser Doppler flowmetry and remission spectroscopy system (Oxygen-To-See-"O2C", LEA Medizintechnik, Giessen, Germany) during off-pump coronary artery bypass grafting (OPCAB).

16 patients (11 males) scheduled for OPCAB were enrolled in the study. Intraoperatively, the LAD was occluded for 2 min followed by a 2 min reperfusion interval. The procedure was repeated three times. The microcirculation in the myocardial area 2 cm distal to the occlusion was continuously monitored using the "O2C" device. Oxygen saturation (SO2), postcapillary haemoglobin concentration (rHB), superficial (2mm) and deep (8mm) blood flow were measured and recorded (sampling rate 500 Hz). The data was analysed adopting the Wilks-Lambda-Test.

Tissue SO2 increased going from the first to the third occlusion from $75\pm11\%$ to $83\pm8\%$ (p<0.001). rHb as a marker of postcapillary venous haemoglobin concentration increased significantly (77 ± 8 vs. 85 ± 6, p=0.002). Superficial and deep myocardial blood flow decreased significantly (317 ± 17 vs. 308 ± 36, p <0.001; 402 ± 56 vs. 350 ± 50, p < 0.001; respectively).

Our study shows that brief intermittent periods of ischaemia increase myocardial tissue oxygen saturation. Ischaemic tolerance may thus be increased by occlusion of the LAD prior to OPCAB. The phenomenon of ischaemic preconditioning has not previously been verified in man.