

# 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).

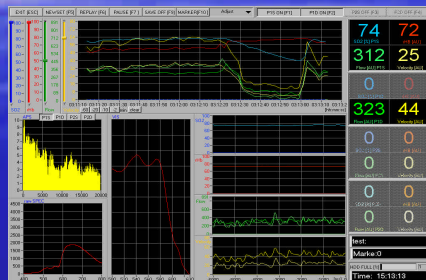


Figure A: Intraoperative image of „O2C“-measurement during LAD-occlusion



Figure B: Oxygen-to-see (O2C)-System in the operating room.

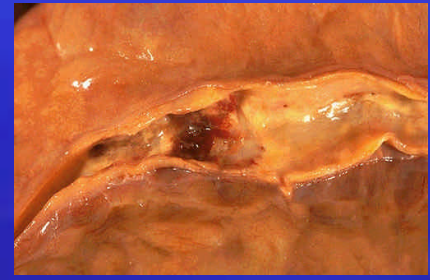


Figure C: Coronary plaque with hemorrhage in unstable angina.

21 patients (14 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 (SO<sub>2</sub>), 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 SO<sub>2</sub> increased going from the first to the third occlusion from 75±11% to 83±8% (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).

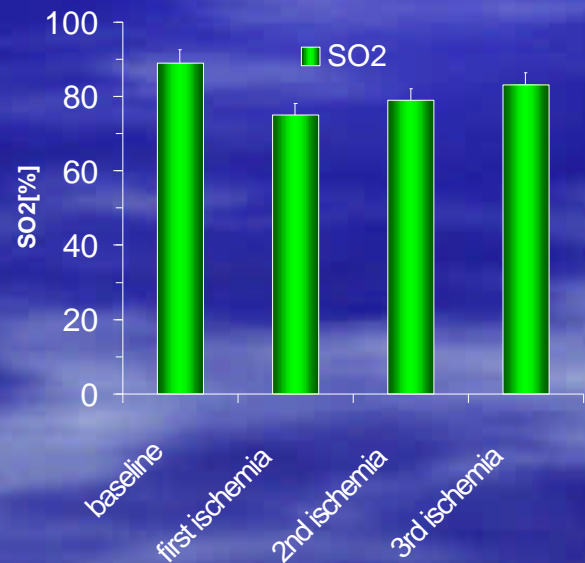


Figure B: Myocardial oxygen saturation (SO<sub>2</sub>) at baseline, during first, second and third occlusion of LAD.

Our study shows that brief intermittent periods of ischemia increase myocardial tissue oxygen saturation. Tolerance of myocardium for Ischemia may thus be increased by occlusion of the LAD prior to creation of coronary bypass anastomosis. *Oxygen-to-see* system is capable of detecting myocardial microcirculation in vivo real time.