

## Microcirculation of the sternum following harvesting of the left internal mammary artery

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### Abstract

**Background:** Internal thoracic arterial grafts (ITA) in coronary bypass surgery provide excellent long-term patency results. Due to the elevated incidence of sternal infections following pedicled ITA harvesting, blood supply to the sternum has gained the focus of attention. This study sought to evaluate real time parameters of sternal microcirculation prior and immediately during harvesting of the ITA by a novel laser Doppler flowmetry and remission spectroscopy system ("Oxygen-To-See (O2C)", LEA Medizintechnik, Giessen). **Methods:** 21 patients (16 males age 63 + 4 years, mean 2.3±0.3) scheduled for coronary artery bypass grafting (CABG) were enrolled into the study. After median sternotomy, the probe was placed sequentially pre- and retrosternal for measurements of tissue oxygen saturation (SO<sub>2</sub>), hemoglobin concentration (rHb), superficial (2 mm) and deep (8 mm) blood flow. Measurements were performed and analyzed before and after surgical harvesting of the ITA with a pedicle. **Results:** Baseline pre- and retrosternal tissue oxygen saturation (SO<sub>2</sub>) was 90±3% and 87±4%, respectively (n.s.). After left ITA harvesting, presternal SO<sub>2</sub> remained unchanged (90±4%, n. s.), whereas retrosternal SO<sub>2</sub> decreased significantly (54±4%, p<0.001). Simultaneously, retrosternal postcapillary venous filling (rHb) increased significantly after ITA harvesting (86±2 vs 93±2, p<0.05), whereas presternal rHb remained unchanged. Retrosternal superficial and deep blood flow also decreased significantly (75±5 vs 41±4, and 94±5 vs 52±6) in contrast to comparable presternal blood flow before and after ITA harvesting. There were neither superficial nor deep sternal wound infections occurred in the studied patient population. **Conclusions:** The pedicled harvesting of ITA leads to a significant decrease, retrosternal tissue oxygen saturation, and an increase of postcapillary venous filling. Parameters of microcirculation in the presternal area after ITA harvesting remained unchanged compared to baseline values. Hence, the incidence of sternal infections after ITA harvesting in coronary surgery may well be explained by a significant decrease of sternal blood supply in the retrosternal area. Further prospective randomized studies are needed to elucidate the potential role of skeletonized ITA preparation in sternal microcirculation.