SUMMARY

Comparison between flow in the left internal mammary artery harvested via sternotomy and via a left anterior small thoracotomy with clinical impact for the patient

Introduction: In the treatment of coronary artery disease (CAD), in addition to conservative therapy and percutaneous interventions, is irreplacebly belong coronary artery bypass grafting (CABG). The gold standard in the surgical treatment of CAD is CABG from a median sternotomy access using cardiopulmonary bypass (on-pump CABG). A less invasive and economically advantageous is CABG from a median sternotomy access without cardiopulmonary bypass (off-pump CABG) and last but not least CABG through a left anterior small thoracotomy (LAST) approach (MIDCAB – „minimally invasive direct coronary artery bypass“). Although the final technical implementation anastomoses is essentially identical in off-pump CABG and MIDCAB, the difference is very important during left internal mammary artery (LIMA) harvesting, especially through a LAST approach, which can be difficult for the surgeon.

Aim of the study: The aim of these two studies is to assess the effect of surgical approach on the mean flow in LIMA, including short and long term clinical impact for the patient.

Methods: Study 1 (nonrandomized, prospective): In our study we included 60 patients, who underwent planned left anterior descending artery (LAD) revascularization using LIMA in our department - 30 patients underwent MIDCAB (Class 1.1) and 30 patients underwent off-pump CABG from a median sternotomy access (Group 1.2). In the course of the operation we measured flow in LIMA using the flowmeter BF 2004® (Medistim ASA, Norway) in all patients – after harvesting LIMA before transection of the distal end (Q1), after transection distal end of the LIMA and "shortening" LIMA to the desired length (Q2) and after performing anastomosis LIMA-LAD (Q3). Both groups were then evaluated and compared during their hospital stay and annual followup. Study 2 (nonrandomized, retrospective): In our study we included all elective patients (between the years 2007 – 2012) with isolated high-grade LAD stenosis, good ejection fraction (>50%) and without any previous coronary interventions. From that set of patients a group of 40 patients (after CABG through a LAST approach) were evaluated (Group 2.1). The control group was formed from 28 patients (of a comparable profile) who underwent CABG from a median sternotomy access (Group 2.2). We use the questionnaire SF-36 to compare quality of life.

Results: Study 1: The significant difference in mean flow was only in Q1 (22,1 ± 15,8 ml/min. vs. 15,8 ± 19,7 ml/min., p = 0.0159), whereas the mean flow in the group 1.1 was higher than in the group 2.1. In Q2 (61,3 ± 44,6 ml/min. vs. 63,5 ± 39,3 ml/min., p = NS) and Q3 (25,7 ± 15,7 ml/min. vs. 30,3 ± 21,2 ml/min., p = NS) the mean flows were higher in groups 1.2, however, there were no significant differences between group 1.1 and group 1.2. Neither of the patients enrolled into the prospective study suffered postoperative myocardial infarction, stroke or transient ischemic attack during the first 12 months. 1 patient underwent coronary angiography during his hospital stay, with subsequent reoperation. The patient died 126 days later after surgery due to multiple organ failure as a result of sepsis. Study 2: In all 8 evaluated quality of life categories there were no significant differences between group 2.1 and group 2.2.

Conclusions: MIDCAB from a LAST approach represents a suitable alternative for patients who are indicated for CABG with isolated high-grade LAD stenosis at our department. Although surgical approach by MIDCAB is considerably limiting, especially LIMA harvesting, there were no significant differences in mean flow LIMA-LAD anastomosis, compared with conventional sternotomy approach. Likewise the quality of life is comparable in the long term for both surgical approaches. The benefit is the mini-invasiveness of the procedure (mainly preservation of the sternum) which reduces surgical stress as well as the overall recovery time.