

Continuous hemodynamic monitoring during minimally invasive coronary surgery: A comparative study

Adrian Ursulescu*, Marc Albert*, Murat Cavdar*, Matthias Hansen**, Gerhardt Wagner**, Ulrich F. W. Franke*

Objectives. Continuous monitoring of cardiac performance is very important to guide the operative strategy and therapy in patients undergoing minimally invasive coronary surgery. The aim of this study was to compare the effectiveness from Vigileo (Flo Trac/Vigileo™ system, Edwards Lifesciences, Irvine, CA), PiCCO (PiCCOplus™, Pulsion Medical Systems, Munich, Germany) and from pulmonary artery catheterization (PAC) using the intermittent thermodilution, during minimally invasive off pump coronary procedures.

Methods. This retrospective analysis evaluated all elective coronary patients between October 2007 and September 2008 (n=482). All patients, consecutive and unselected, were operated without ECC in off pump fashion. The operative continuous hemodynamic monitoring was performed by Vigileo (Group A), PiCCO (Group B) and pulmonary artery catheterization (Group C). The patients operated with the standard monitoring, without continuous hemodynamic monitoring, were excluded (n=103). The standard surgical approach was a median sternotomy, using the both internal thoracic arteries in most of patients. Additional endoscopic harvested saphenous and radial artery grafts were used also in no touch aortic technique (clempless procedure). Cardiac output measurements were performed during the off pump coronary surgery in group A, 254 patients (52.7%), in group B, 73 patients (15.1%) and in group C, 52 patients (10.8%).

* Department for Cardiovascular Surgery, Robert Bosch Hospital, Stuttgart, Germany

** Department for Anaesthesiology, Robert Bosch Hospital, Stuttgart, Germany

Results. The overall conversion rate to the ECC was 7.05% but it was significantly higher in Group C 19.23% (10 patients) than in Group A 5.51% (14 patients) or Group B 8.22% (6 patients) respectively ($p=0.008$). Myocardial infarction occurred in 7 patients of the Group A (2.76%), in one patient of the Group B (1.37%) and in 3 patients of the Group C (5.76%, $p=0.601$). The incidence of cerebrovascular events was 0.39% (1 patient) in Group A, respectively 1.92% (1 patient) in Group C ($p=0.210$). There was no incidence of cerebrovascular events in Group B. Four patients of the Group A (1.57%) and 2 patients (3.84%) of the Group C died within the first 30 days postoperative ($p=0.310$). The mortality in the Group B was 0.0 %, no patient died after the surgery.

Conclusions. The continuous hemodynamic monitoring during off pump coronary surgery with the FloTrac/Vigileo and PiCCOplus allows the significantly reduction of the conversion rate to the ECC compares to the pulmonary artery catheterization. The consistent use of these systems improved the results of the off pump coronary surgery and reduced the incidence of the postoperative complications.