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MECC – MORE THAN HEMODILUTION?

Abstract: The use of minimized extracorporeal circulation (MECC) is an established procedure to perform coronary revascularization. Some studies showed positive effects of MECC compared to conventional extracorporeal Bypass (CCPB) procedures in terms of transfusion requirements, less inflammation reactions and neurological impairments. According to a retrospective data analysis, a higher mean arterial pressure (MAP) and a lower frequency of vasoactive drug administration in MECC-patients compared to CCPB-patients was found by Wiesenack et al. Retrospective data analysis done by our workgroup found very similar results in terms of higher MAP´s and less norepinephrine consumption. The current study addressed this observation.

Material and Methods: This was a prospective, controlled, randomized trial with 40 patients (assigned to a MECC and CCPB group) undergoing coronary bypass grafting. Primary endpoints were the perioperative course of mean arterial pressure, system vascular resistance and the consumption of norepinephrine. Secondary endpoints were the measurement of regional oxygen saturation (rSO2) of cerebral and renal tissue as an assessment of the perfusion at these areas. Both, CCPB and MECC were performed at normothermia. Cardiac arrest was achieved with antegrade administration of Calafiore`s cardioplegia.

Results: Eighteen patients were randomized to group 1 (MECC) and 22 to group 2 (CCPB). Clinical and demographic characteristics did not differ significantly between the groups under consideration of age, body surface area, and left ventricular function. Thirty-day mortality was 0%. At four of five time points during ECC the MAP – values were significant higher in the MECC – group compared with CCPB patients (highest differences occurred after starting the ECC 60±11 mmHg vs. 49±10 mmHg p=0.002). MECC patients received significantly less norepinephrine (MECC after start ECC: MECC 0.56±1.6 µg vs. CCPB 5.2 ±9µg p=0.038). Regional saturation: The rSO2 measured at right and left forehead and the renal area (dorsal lateral) was similar for both groups during ECC and significant higher at CCPB Group one and four hours after termination of ECC.

Conclusion: The results of our study support the theory that MECC procedures provide a higher mean arterial pressure during ECC. A critical issue still remains the interpretation of MAP in context with vasopressor administration. However, we found a significant lower consumption of vasoactive drugs in the MECC group. Further investigations considering hemodynamic effects of MECC remain to be elucidated.