Effect of Different Pump Heads for CPB on Early Cognitive Outcome after Coronary Artery Bypass Surgery

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Objectives
Reduction of cognitive function is a possible side effect after coronary artery surgery using cardiopulmonary bypass (CPB). We investigated the effect of roller versus centrifugal pumps for CPB on cognitive performance in patients undergoing coronary artery bypass grafting (CABG).

Methods
50 consecutive CABG patients operated with centrifugal pump were compared to 50 roller pump patients matched for age and duration of CPB. Six neuropsychological subtests from the Syndrom Kurz Test and the Alzheimer's Disease Assessment Scale were performed preoperatively and on the third postoperative day in a double blind fashion. To assess the overall cognitive function and the degree of cognitive decline across all tests after surgery we combined the six test-scores by principal component analysis.

Results
Patients with a mean age of 63.9±8.4 years received a mean of 3.0±0.9 bypasses within an average of 80.6±20.7 mins on CPB. These parameters as well as the preoperative combined neurocognitive score were not significantly different between the groups. After the operation there was a significant deterioration of the combined neuropsychological score in both groups (centrifugal: preop 0.41±2.49 vs. postop -2.86±2.70, p <0.0005 and roller: preop -0.41±2.35 vs. postop -2.73±3.16, p <0.0005). However, the patients operated with a centrifugal pump had a significantly greater decline of overall cognitive function compared to the roller pump patients (3.3±1.7 vs. 2.3±2.7, p = 0.04).

Conclusion
Roller pumps have a less cerebro-damaging effect than centrifugal pumps since they lead to a smaller postoperative decline of neuropsychological abilities in coronary bypass patients.