

The Cerebral Blood Flow as Assessed by The Transcranial US Doppler in Patients Treated with IABP in the Coronary Care Unit

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Background: IABP is a common therapeutic intervention in patients with acute heart failure. It influences the coronary blood flow by changing hemodynamics in the ascending aorta. There is insufficient data about the effects of IABP on the cerebral blood flow. The objective of this study was the determination of such effects.

Patients and methods: The cerebral blood flow of patients treated with IABP in our institution was assessed by TCD. In this ongoing study 8 patients have been recruited so far. We obtained a written informed consent from all conscious patients. Patients unwilling to participate, patients with unstable hemodynamics (inability to wean from IABP) and patients with an abnormal pattern of cerebral blood flow were excluded. Peak velocities of blood flow in left and right middle cerebral and left and right vertebral arteries were assessed without and with IABP augmentation. Blood pressure, pulse and saturation were also recorded.

Results: Of the 8 patients 7 were males, mean age was 70 (range 27 – 88, SD 11.9). Without IABP counterpulsation, the average peak flow velocity in LMCA was 89 m/sec, in RMCA was 73, in LVA was -39, and in RVA was -42 m/sec. Average blood pressure was 133/66 mm Hg, HR was 85 bpm. With full IABP support the average peak flow velocity in LMCA was 91 m/sec, in RMCA was 86, in LVA was -47, and in RVA was -42 m/sec. Average blood pressure was 137/70 mm Hg, HR was 83 bpm.

The mean differences between the measurements with and without IABP were 2.4 m/sec for LMCA, 12.7 for RMCA, -7.6 for LVA, 0.4 for RVA; 3.6/4.3 mm Hg for blood pressure, and -1.3 bpm for HR. The differences measured in blood velocities in RMCA and LVA reached significance ($p=0.04$ & 0.05).

Conclusion: This pilot study demonstrated that IABP counterpulsation significantly influences cerebral blood flow independently from the changes in blood pressure in stable patients without baseline significant cerebrovascular anomalies. More studies are in progress.