Effects of cardiopulmonary bypass on neurocognitive performance and cytokine release in old and diabetic rats.

BACKGROUND: Age and diabetes mellitus have been identified as independent risk factors for cognitive decline after cardiac surgery with cardiopulmonary bypass (CPB). We tested the effects of CPB on cognitive function in aged and diabetic rats utilizing the Morris water maze (MWM). METHODS: Aged rats (26 months) were randomized into a sham group (cannulation but no CPB, n = 11) and a 90 min CPB group (n = 11). In addition, young rats (n = 14) were made diabetic with streptozotocin 9 weeks before experimentation and randomized to a sham or 90 min CPB group. Cytokine release [interleukin (IL-6)] and short-term MWM performance (days 8-14 after operation) were assessed in all animals. Long-term MWM performance (8 weeks after operation) was assessed in aged rats only.

RESULTS: There were no differences between the aged groups in short-term (P = 0.58) or long-term MWM performances (P = 0.69). The diabetic animals also showed no differences between the sham and CPB groups in MWM performance (P = 0.64). IL-6 assays showed an increased inflammatory response after CPB in the diabetic animals, but not in the elderly groups.

CONCLUSIONS: Ninety minutes of normothermic CPB had no deleterious effect on neurocognitive outcome in elderly or chronically diabetic animals, suggesting that CPB in itself is not a sufficient stressor of the rat central
nervous system.

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