

A Continuous Infusion of Dextrane-Hypertonic Saline Reduce Fluid Overload and Prevent Increase in Intracranial Pressure During Cardiopulmonary Bypass in Piglets.

Venny Kvalheim, M. Farstad, O. Haugen, P. Husby, S.Rynning. Bergen, Norway

Objective: Cardiopulmonary bypass (CPB) is associated with fluid overload and tissue edema. In this study we examined whether a continuous infusion of a hypertonic saline 7.5%/ dextran 6%-solution influenced fluid balance during cardiopulmonary bypass in piglets.

Materials and methods: 14 animals were randomized to a control-group (CT-group) or a hypertonic saline/dextran-group (HSD-group). The CPB circuit was primed with acetated Ringer's solution. The animals recived an infusion of acetated Ringers solution at a rate of 5 ml/kg/ hour. In the HSD group, 1 ml/kg/ hour was replaced with HSD. After 1 hour of normothermic CPB, hypothermic CPB (28 °C) was initiated and continued for 90 min. Fluid was added to the CPB-circuit as needed to maintain the 300 ml fluid level of the venous reservoir.

Fluid balance, plasma volume, fluid extravasation rate (FER), tissue water content and acid-base parameters were monitored or calculated. Intracranial pressure and parameters of cerebral metabolism were measured by cerebral microdialysis.

Results: There was a significant reduction of FER during normothermic and hypothermic CPB, 24.5 ± 3.7 ml/kg/hour and 47.0 ± 10 ml/kg/hour in the HSD-group and CT-group, respectively ($p < 0.002$). Total fluid addition in the HSD group was significantly reduced to less than 50% of values in the CT-group at termination of CPB ($p < 0.002$) (figure). Myocardial and visceral tissue edema was significantly reduced in the HSD-group. Intracranial pressure (ICP) remained stable during CPB in the HSD-group, whereas ICP increased in the CT-group ($p < 0.02$). There was a trend towards higher cerebral perfusion pressure and lower lactate /pyruvate ratio in the HSD-group as compared with the CT-group during normothermic CPB.

Hemodynamics, diuresis, hematocrit and acid-base parameters were similiar in the groups, whereas se-natrium increased to a maximum level of 149 ± 1.3 mmol/L in the HSD-group.

Conclusions: A low-dose continuous infusion of HSD during CPB significantly reduced the fluid extravasation rate and total fluid gain during CPB. Total tissue water content was significantly reduced in myocard and visceral organs in the HSD-group. ICP remained within normal range during CPB in the HSD-group, whereas ICP increased significantly in the CT-group. No adverse effects were observed in the HSD-group. We suggest that HSD may be of value in patients on CPB.

