Correlation between Mean Arterial Pressure and Regional Cerebral Oxygen Saturation on Cardiopulmonary Bypass in Pediatric Cardiac Surgery

Running title: Correlation between MAP and rSO_2

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Abstract

Some pediatric cardiac patients might experience low regional cerebral oxygen saturation (rSO_2) during surgery. We investigated whether a pediatric patient's mean arterial pressure (MAP) can affect the rSO_2 value during cardiopulmonary bypass (CPB). We retrospectively analyzed the cases of the pediatric patients who underwent cardiac surgery at our hospital (Jan.–Dec. 2019; n=141). At each MAP stage, we constructed line charts through the mean of the rSO_2 values corresponding to each MAP and then calculated the correlation coefficients. We next divided the patients into age subgroups (neonates, infants, children) and into cyanotic congenital heart disease (CHD) and acyanotic CHD groups and analyzed these groups in the same way. The analyses of all 141 patients revealed that during CPB the rSO_2 value increased with an increase in MAP (r=0.1626). There was a correlation between rSO_2 and MAP in the children (r=0.2720) but not in the neonates (r=0.06626) or infants (r=0.05260). Cyanotic CHD or acyanotic CHD did not have a significant effect on the rSO_2/MAP correlation. Our analysis demonstrated different patterns of a correlation between MAP and rSO_2 in pediatric cardiac surgery patients, depending on age. MAP was positively correlated with rSO_2 typically in children but not in neonate or infant patients.

Key words: mean arterial pressure, cerebral oxygen saturation