Splanchnic Oxygen Transport and Lactate Metabolism During Normothermic Cardiopulmonary Bypass in Humans

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The effect of normothermic (36.2 grade C ±0.6 grade C) nonpulsatile cardiopulmonary bypass (CPB) on splanchnic (hepatic) blood flow (SBF), splanchic oxygen transport DO\textsubscript{2spl} and oxygen consumption (VO\textsubscript{2spl}), splanchic lactate uptake and gastric mucosal pH (pHi, gastric tonometrie) was studied in 12 adults (New York Heart Association class II, ejection fraction >=0.4) undergoing coronary artery surgery. SBF was estimated with the constant-infusion indocyanine green (ICG) technique using a hepatic venous catheter. DO\textsubscript{2spl}, and splanchic lactate uptake were calculated using the Fick principle after the induction of anesthesia, during aortic cross-clamping, after CPB, and 2 and 7 hours after admission to the intensive care unit (ICU). SBF, DO\textsubscript{2spl}, and VO\textsubscript{2spl} did not decrease during CPB but increased after ICU admission, whereas pHi decreased 7 h after ICU admission. Initial ICG extraction was 0.78, which decreased to 0.54 during aortic clamping and remained low thereafter. The increased blood lactate concentrations were not associated with a decreased splanchic lactate uptake. We conclude that normothermic CPB is not associated with deterioration in the global intestinal oxygen supply. The increase of blood lactate levels and the decrease in ICG extractions, as well as in pHi, are consistent with a systemic inflammatory response to CPB.

**Implications:**

± This study demonstrated that normothermic cardiopulmonary bypass (at flows >2.4 L min\textsuperscript{-1} m\textsuperscript{-2}) was not associated with deterioration in global intestinal oxygen delivery, which suggests that increased blood lactate concentrations and decreased gastric mucosal pH and indocyanine green extraction are manifestations of a systemic inflammatory response to cardiopulmonary bypass.

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