Small-Dose Epoprostenol Decreases Systemic Oxygen Consumption and Splanchnic Oxygen Extraction During Normothermic Cardiopulmonary Bypass


Normothermic, nonpulsatile cardiopulmonary bypass (CPB) impairs systemic and splanchnic oxygen transport and increases gastrointestinal permeability. It is an important therapeutic goal to avoid splanchnic dysoxia during CPB. Small-dose prostacyclin therapy improves splanchnic oxygen transport and microcirculation in septic patients. In this study, we sought to determine if during cardiac surgery, the prostacyclin analog epoprostenol improves the balance of systemic and splanchnic oxygen transport. Eighteen patients undergoing cardiac valve replacement were randomized to receive either epoprostenol (3 ng · kg⁻¹ · min⁻¹) or placebo during, and for 1 hour after, surgery. Systemic and splanchnic oxygen delivery, consumption, and extraction and arterial, mixed venous, and hepato-venous lactate concentrations were measured before, during and after CPB. Gastrointestinal permeability was measured 1 day before and 1 day after surgery using the triple sugar permeability test. During CPB, the epoprostenol group had decreased systemic oxygen consumption and splanchnic oxygen extraction (P=0.024). These effects were not present 1 hour after the end of epoprostenol infusion. The study was not adequately powered to determine whether epoprostenol altered the trend towards increased lactate metabolism and Increased postoperative gastrointestinal permeability, nor could we demonstrate any differences between groups in clinically relevant end-points. In conclusion, these findings suggest that during normothermic CPB, small-dose epoprostenol therapy may reduce systemic oxygen consumption and splanchnic oxygen extraction.

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