Effects of Upper Limb Ischemia-Reperfusion on Regional Oxidative Stress During Aortic Surgery with Moderate Hypothermia

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Abstract

INTRODUCTION: The aim of this study is to evaluate the effect of acute, iatrogenic right arm ischemia and reperfusion on microcirculation using tissue perfusion markers like central venous oxygen saturation, lactate, the difference between central venous and arterial CO2 pressure, Near-infrared spectroscopy, and biomarkers like sialic acid, malondialdehyde, advanced oxidative protein products in aortic surgery with moderate hypothermia. METHODS: Adult patients undergoing ascending aorta repair with antegrade cerebral perfusion via axillary artery participated in the study. Blood samples were collected from the radial artery, internal juguler vein, right arm cubital vein and left arm cubital vein and analysis were performed at five intraoperative time points. Blood samples for biomarkers were obtained at three intraoperative time points. RESULTS: Right arm venous oxygen saturation are significantly lower than left arm and central venous. Right arm lactate levels are significantly higher than left arm and central venous lactate levels. Somatic right arm near-infrared spectroscopy values are significantly lower than somatic left arm. There are no significant differences for biomarkers throughout the time points. CONCLUSIONS: We have concluded that well-known markers such as central venous oxygen saturation and lactate reflect the results of ischemia-reperfusion faster, and are more valuable than novel biomarkers. Near-infrared spectroscopy is a promising monitor in terms of providing information about tissue oxygenation. However, oxidative stress biomarkers seem to be far from following the results of ischemia-reperfusion damage in an instant or short time, moreover, their costs are high and laboratory studies take time.

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