

POSTER PRESENTATION

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Cerebral and somatic oxygen saturation in pediatric cardiac patients with delayed sternal closure

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Introduction

Near-infrared spectroscopy offers non-invasive online monitoring of tissue oxygenation in a wide range of clinical scenarios.

Objectives

The purpose of this study was to assess near-infrared spectroscopy-derived cerebral and somatic oxygen saturations (rSO_{2b} and rSO_{2s}) in children after cardiac surgery with delayed sternal closure (DSC). We hypothesized that rSO_{2b} and rSO_{2s} correlate with other indicators of hemodynamic compromise after DSC.

Methods

We studied 43 postoperative children (median age, 8 days; range, 1-148 days) with DSC. The most common cardiac diagnosis was hypoplastic left heart syndrome (30%). rSO_{2b} and rSO_{2s} and other hemodynamic and metabolic parameters were analyzed on the day of surgery, 3 days after surgery (POD1-3), and prior to and 24 hours after DSC.

Results

rSO_{2b} increased at 12 hours ($p = 0.0039$), and rSO_{2s} did not change compared to data immediately after surgery. Deficit base decreased ($p = 0.016$) and standard bicarbonates increased ($p = 0.016$) on POD1, lactate decreased ($p = 0.0001$) and diuresis increased ($p = 0.013$) on POD2, heart rate decreased ($p = 0.035$) on POD3. There was no change in systemic arterial blood pressure, left atrial pressure (LAP) and central venous pressure (CVP), arteriovenous oxygen saturation difference (a-vO₂ dif.), pH,

paO₂, and paCO₂. Vasoactive inotropic score was lower on POD2 and 3 compared to the day of surgery ($p = 0.041$ and $p = 0.048$). DSC resulted in an increase in LAP, CVP, a-vO₂ dif., and base deficit ($p < 0.05$). Increase in LAP lasted 24 hours, other changes were present during 18 hours. rSO_{2b} and rSO_{2s} were lower at 1 - 6 hour and during 24 hours, respectively ($p < 0.05$). There was no change in lactate levels. pH and standard bicarbonate were lower and vasoactive inotropic score was higher compared to preclosure values ($p < 0.05$). rSO_{2b} and rSO_{2s} values did not correlate with lactate and a-vO₂ dif. values.

Conclusions

In pediatric cardiac patients with left open chest rSO_{2b} values increase on the day of surgery and rSO_{2s} do not change. DSC is associated with a decrease in rSO_{2b} and rSO_{2s} that persists for 6 and 24 hours, respectively. rSO_{2b} and rSO_{2s} values do not correlate with other metabolic indicators of hemodynamic status.

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