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The difference between superior vena caval and mixed venous saturations correlates with the duration of cardiopulmonary bypass

Hrvoje Gasparovic
University Hospital Rebro Zagreb, Croatia

Abstract

Background: Global tissue hypoxia portends poor outcomes. Detection and prompt interventions designed to counter the effects of inadequate tissue perfusion are paramount. The relationship between venous saturations in different venous pools remains elusive and dependent upon the patient's hemodynamic status.

Methods: Venous samples were drawn from the superior vena cava ($S_{SVC}O_2$)and pulmonary artery (MvO_2) at three different time points (prior to operation (T0), immediately after weaning from CPB (T1) and on postoperative day 1 (T2)) from 89 consecutive cardiac surgical patients. Thermodilution cardiac indices and serum lactate measurements were obtained. Clinical outcomes were monitored.

Results: The difference between the $MvO_2$and $S_{SVC}O_2$widened over the monitored period (0.08±8.66 at T0, -1.17±7.62 at T1 and -3.12±5.88 at T2). Patients with a larger postoperative negative MvO_2-$S_{SVC}O_2$gradienthad longer CPB and cross-clamp times (122±74 vs. 97±40, P=0.08; 87±48 vs. 68±26, P=0.04). This did not correlate with inferior clinical outcomes or laboratory markers of hypoperfusion.

Conclusions: The relationship between the venous saturations between different venous pools was inconsistent over the course of the immediate postoperative period, with a tendency towardsexpansion of the negative MvO_2-$S_{SVC}O_2$gradient. Widening of the gradient between $MvO_2$and $S_{SVC}O_2$in favor of the latter correlated with the duration of the CPB and ischemic times. Extrapolating functional cardiac performance based on $S_{SVC}O_2$ would be unreliable in this setting, with greater errors seen following more complex operations.

Biography

Hrvoje Gasparovic has completed his Ph.D at the age of 23 years from University of Zagreb, Croatia. He has been working as an attending cardiac surgeon since 2004. He is the director of the Postoperative Cardiac Surgical Care Unit at the University Hospital Rebro Zagreb. He has published more than 45 papers in reputed journals and has been serving as an editorial board member of repute in the Croatian Medical Journal