The venous-arterial difference in CO2 should be interpreted with caution in case of respiratory alkalosis in healthy volunteers.


ABSTRACT

The venous-arterial difference in CO2 (ΔCO2) has been proposed as an index of the adequacy of tissue perfusion in shock states. We hypothesized that the variation in PaCO2 (hyper- or hypocapnia) could impact ΔCO2, partly through microcirculation adaptations. Fifteen healthy males volunteered to participate. For hypocapnia condition (hCO2), the subjects were asked to hyperventilate, while they were asked to breathe a gas mixture containing 8% CO2 for hypercapnia condition (HCO2). The 2 conditions were randomly assigned. Blood gases were measured at baseline before each condition, and after 5-7 min of either hCO2 or HCO2 condition. Microcirculation was assessed by the muscle reoxygenation slope measured with near infrared spectroscopy following a vascular occlusion test and by skin circulation with in vivo reflectance confocal microscopy. ΔCO2 was significantly increased with hCO2 while it tended to decrease with HCO2 (non-significant). HCO2 induced a moderate increase of the resaturation slope of NIRS oxygenation. Skin microcirculatory blood flow significantly dropped with hCO2, while it remained unchanged with hypercapnia. Our results warrant cautious interpretation of ΔCO2 as an indicator of tissue perfusion during respiratory alkalosis. KEYWORDS: Healthy volunteers; Hypercapnia; Hypocapnia; Microcirculation; Venous-arterial difference in CO2 PMID:27287759