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

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ABSTRACT

The venous-arterial difference in CO₂ (Δ CO₂) 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 Δ CO₂, 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. Δ CO₂ 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 Δ CO₂ as an indicator of tissue perfusion during respiratory alkalosis. **KEYWORDS:** Healthy volunteers; Hypercapnia; Hypocapnia; Microcirculation; Venous-arterial difference in CO₂ PMID:27287759