Dopexamine but not dopamine increases gastric mucosal oxygenation during mechanical ventilation in dogs.  

Scheeren TW, Schwarte LA, Loer SA, Picker O, Fournell A.

Department of Anesthesiology, Heinrich-Heine-University, Dusseldorf, Germany.

OBJECTIVE: To compare the effects of dopamine and dopexamine on gastric mucosal oxygenation during mechanical ventilation without and with positive end-expiratory airway pressure (PEEP) and after compensation of the PEEP-induced hemodynamic suppression. DESIGN: Randomized controlled animal study. SETTING: University research department of experimental anesthesiology. SUBJECTS: Ten anesthetized dogs with chronically implanted ultrasound flow probes around the pulmonary artery for continuous measurement of cardiac output. INTERVENTIONS: On different days, the dogs randomly received dopamine (2.5 and 5.0 microg x kg(-1) x min(-1), n = 10), dopexamine (0.5 and 1.0 microg x kg(-1) x min(-1)) without (n = 8) or with pretreatment with a selective beta2-adrenoceptor antagonist (ICI 118,551, n = 7), or saline (control, n = 7). To simulate common clinical situations, these interventions were performed during different ventilation modes: during mechanical ventilation without and with high levels of PEEP, and after compensation of the PEEP-induced systemic hemodynamic suppression by titrated volume resuscitation with hydroxyethyl starch. MEASUREMENTS AND MAIN RESULTS: We continuously measured microvascular hemoglobin saturation (mu-Hbo2) by light-guide spectrophotometry in the gastric mucosa. Dopexamine, but not dopamine, significantly increased gastric mucosal mu-Hbo2 by about 20%, regardless of the dose and the ventilation mode. Both catecholamines dose-dependently increased cardiac output and oxygen delivery by up to 75% without effects on systemic oxygen saturation. The effects of dopexamine on mu-Hbo2 as well as on cardiac output and oxygen delivery were prevented by selective beta2-adrenoceptor-blockade. CONCLUSIONS: Dopexamine but not dopamine improved gastric mucosal oxygenation in dogs. This effect was independent of the dosage and the ventilation mode. Thus, dopexamine may reverse a decrease in splanchic oxygenation induced by ventilation with PEEP. The dopexamine-induced increase in gastric mucosal oxygenation was mediated by beta2-adrenoceptors, which explains the superior effects of dopexamine to dopamine on mu-Hbo2. The regional effects of both catecholamines were not mirrored by systemic hemodynamics.

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