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Arginine vasopressin reduces intestinal oxygen supply and mucosal tissue oxygen tension.

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We investigated intestinal oxygen supply and mucosal tissue PO₂ during administration of increasing dosages of continuously infused arginine vasopressin (AVP) in an autoperfused, innervated jejunal segments in anesthetized pigs. Mucosal tissue PO₂ was measured by employing two Clark-type surface oxygen electrodes. Oxygen saturation of jejunal microvascular hemoglobin was determined by tissue reflectance spectrophotometry. Microvascular blood flow was assessed by laser-Doppler velocimetry. Systemic hemodynamic variables, mesenteric venous and systemic acid-base and blood gas variables, and lactate measurements were recorded. Measurements were performed at baseline and at 20-min intervals during incremental AVP infusion (n = 8; 0.007, 0.014, 0.029, 0.057, 0.114, and 0.229 IU.kg(-1).h(-1), respectively) or infusion of saline (n=8). AVP infusion led to a significant (P < .05), dose-dependent decrease in cardiac index (from 121 +/- 31 to 77 +/- 27 ml.kg(-1).min(-1) at 0.229 IU.kg(-1).h(-1)) and systemic oxygen delivery (from 14 +/- 3 to 9 +/- 3 ml.kg(-1).min(-1) at 0.229 IU.kg(-1).h(-1)) concomitant with an increase in systemic oxygen extraction ratio (from 31 +/- 4 to 48 +/- 10%). AVP decreased microvascular blood flow (from 133 +/- 47 to 82 +/- 35 perfusion units at 0.114 IU.kg(-1).h(-1)), mucosal tissue PO₂ (from 26 +/- 7 to 7 +/- 2 mmHg at 0.229 IU.kg(-1).h(-1)), and microvascular hemoglobin oxygen saturation (from 51 +/- 9 to 26 +/- 12% at 0.229 IU.kg(-1).h(-1)) without a significant increase in mesenteric venous lactate concentration (2.3 +/- 0.8 vs. 3.4 +/- 0.7 mmol/l). We conclude that continuously infused AVP decreases intestinal oxygen supply and mucosal tissue PO₂ due to a reduction in microvascular blood flow and due to the special vascular supply in the jejunal mucosa in a dose-dependent manner in pigs.

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