

The hemodynamic effects of medetomidine continuous rate infusions in the dog

Carter JE, Campbell NB, Posner LP, Swanson C. *Vet Anaesth Analg*. 2010 May;37(3):197-206. doi: 10.1111/j.1467-2995.2009.00522.x. Epub 2010 Mar 10.

Objective: To characterize the hemodynamic effects of continuous rate infusions (CRI) of medetomidine administered at doses ranging from 0 to 3 microg kg⁻¹ hour⁻¹.

Study design: Prospective, blinded, randomized experimental trial.

Animals: Six adult purpose-bred mongrel dogs.

Methods: Anesthesia was induced with sevoflurane for placement of arterial and venous catheters. Dogs recovered from anesthesia after which baseline hemodynamic measurements were obtained via lithium dilution cardiac output (CO) determination, with subsequent measurements via pulse power analysis to provide continuous CO determinations. Medetomidine, 1, 2, or 3 microg kg⁻¹ hour⁻¹ or a volume equivalent placebo, was administered via CRI for 60 minutes. Systolic, mean, and diastolic arterial pressure, heart rate (HR), CO and stroke volume were measured and stroke index (SI), cardiac index (CI), total peripheral resistance (TPR), and total peripheral resistance index (TPRI) were calculated at 3, 7, 10, 20, 30, 45, 60, 90, and 120 minutes from the start of the infusion.

Results: Increase in dose decreased SI by 25%, 19%, and 30%, HR by 33%, 57%, and 60%, CI by 50%, 65%, 70% and increased TPRI by 109%, 235%, and 222% from baseline to the 60-minute measurement for the 1, 2, and 3 microg kg⁻¹ hour⁻¹ doses, respectively. HR, TPRI, and CI all showed significant differences over the duration of the study from the placebo treatment.

Conclusions: Medetomidine CRI produces clinically relevant changes in CO, TPR, and HR. The demonstrated decrease in CO is largely because of bradycardia and the degree of cardiovascular depression appears to be dose-dependent. These findings are consistent with previously described hemodynamic changes with single bolus administration of medetomidine.

Clinical relevance: Low-dose medetomidine CRIs produce clinically relevant hemodynamic depression at doses as low as 1 microg kg⁻¹ hour⁻¹ and should be used cautiously in dogs.