

Use of lithium dilution and pulse contour analysis cardiac output determination in anaesthetized horses: a clinical evaluation

Hallowell GD, Corley KT. *Vet Anaesth Analg*. 2005 Jul;32(4):201-11. doi: 10.1111/j.1467-2995.2005.00249.x.

Objective: To assess the suitability of a human algorithm for calculation of continuous cardiac output from the arterial pulse waveform, in anaesthetized horses.

Study design: Prospective clinical study.

Animals: Twenty-four clinical cases undergoing anaesthesia for various conditions.

Materials and methods: Cardiac output (Qt), measured by lithium dilution (QtLiDCO), was compared with a preceding, calibrated Qt measured from the pulse waveform (QtPulse). These comparisons were repeated every 20-30 minutes. Positive inotropes or vasopressors were administered when clinically indicated. Cardiac indices from 30.7 to 114.9 mL kg⁻¹ minute⁻¹ were recorded. Unusually shaped QtLiDCO curves were rejected and the measurement was repeated immediately.

Results: Eighty-nine comparisons were made between QtLiDCO and QtPulse. The bias between the mean (+/-SD) of the two methods (QtLiDCO - QtPulse) was -0.07 L minute⁻¹(+/-3.08) (0.24 +/- 6.48 mL kg⁻¹ minute⁻¹). The limits of agreement were -12.72 and 13.2 mL kg⁻¹ minute⁻¹ (Bland & Altman 1986; Mantha et al. 2000). Linear regression analysis demonstrated a correlation coefficient (r²) of 0.89. Cardiac output in individual patients varied from 49.1 to 183% of the initial measurement at the time of calibration. Linear regression of log-transformed Qt variation for each method found a mean difference of 9% with limits of agreement of -4.1 to 22.1%.

Conclusions and clinical relevance: This method of pulse contour analysis is a relatively noninvasive and reliable way of monitoring continuous Qt in the horse under anaesthesia. The ability to easily monitor Qt might decrease morbidity and mortality in the anaesthetized horse.