

Comparison of cardiac output determined by arterial pulse pressure waveform analysis method (FloTrac/Vigileo) versus lithium dilution method in anesthetized dogs

Valverde A, Gianotti G, Rioja E, Hathway A. *J Vet Emerg Crit Care* (San Antonio). 2011 Aug;21(4):328-34. doi: 10.1111/j.1476-4431.2011.00650.x. Epub 2011 Jun 20.

Objective: To compare the determination of cardiac output (CO) via arterial pulse pressure waveform analysis (FloTrac/Vigileo) versus lithium dilution method.

Design: Prospective study.

Setting: University teaching hospital.

Animals: Six adult dogs.

Interventions: Dogs were instrumented for CO determinations using lithium dilution (LiDCO) and FloTrac/Vigileo methods. Direct blood pressure, heart rate, arterial blood gases, and end-tidal isoflurane (ETIso) and CO₂ concentrations were measured throughout the study while CO was manipulated with different depth of anesthesia and rapid administration of isotonic crystalloids at 60 mL/kg/h.

Measurements and main results: Baseline CO measurements were obtained at 1.3% ETIso and were lowered by 3% ETIso. Measurements were obtained in duplicate or triplicate with LiDCO and averaged for comparison with corresponding values measured continuously with the FloTrac/Vigileo method. For 30 comparisons between methods, a mean bias of -100 mL/kg/min and 95% limits of agreement between -311 and +112 mL/kg/min (212 mL/kg/min) was determined. The mean (mL/kg/min) of the differences of LiDCO-Vigileo = $62.0402 + 0.8383 \times \text{Vigileo}$, and the correlation coefficient (r) between the 2 methods 0.70 for all CO determinations. The repeatability coefficients for the individual LiDCO and FloTrac/Vigileo methods were 187 and 400 mL/kg/min, respectively. Mean LiDCO and FloTrac/Vigileo values from all measurements were 145 ± 68 mL/kg/min (range, 64-354) and 244 ± 144 mL/kg/min (range, 89-624), respectively. The overall mean relative error was $48 \pm 14\%$.

Conclusion: The FloTrac/Vigileo overestimated CO values compared with LiDCO and the relative error was high, which makes this method unreliable for use in dogs.