

An evaluation of cardiac output by five arterial pulse contour techniques during cardiac surgery

de Wilde RB, Schreuder JJ, van den Berg PC, Jansen JR. *Anaesthesia*. 2007 Aug;62(8):760-8. doi: 10.1111/j.1365-2044.2007.05135.x.

The bias, precision and tracking ability of five different pulse contour methods were evaluated by simultaneous comparison of cardiac output values from the conventional thermodilution technique (COtd). The five different pulse contour methods included in this study were: Wesseling's method (cZ); the Modelflow method; the LiDCO system; the PiCCO system and a recently developed Hemac method. We studied 24 cardiac surgery patients undergoing uncomplicated coronary artery bypass grafting. In each patient, the first series of COtd was used to calibrate the five pulse contour methods. In all, 199 series of measurements were accepted by all methods and included in the study. COtd ranged from 2.14 to 7.55 l.min⁻¹, with a mean of 4.81 l.min⁻¹. Bland-Altman analysis showed the following bias and limits of agreement: cZ, 0.23 and - 0.80 to 1.26 l.min⁻¹; Modelflow, 0.00 and - 0.74 to 0.74 l.min⁻¹; LiDCO, - 0.17 and - 1.55 to 1.20 l.min⁻¹; PiCCO, 0.14 and - 1.60 to 1.89 l.min⁻¹; and Hemac, 0.06 and - 0.81 to 0.93 l.min⁻¹. Changes in cardiac output larger than 0.5 l.min⁻¹ (10%) were correctly followed by the Modelflow and the Hemac method in 96% of cases. In this group of subjects, without congestive heart failure, with normal heart rhythm and reasonable peripheral circulation, the best results in absolute values as well as in tracking changes in cardiac output were measured using the Modelflow and Hemac pulse contour methods, based on non-linear three-element Windkessel models.