Continuous cardiac output monitoring with pulse contour analysis: a comparison with lithium indicator dilution cardiac output measurement

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Objective: Pulse contour analysis can be used to provide beat-to-beat cardiac output (CO) measurement. The current study sought to evaluate this technique by comparing its results with lithium dilution CO (LiCO) measurements.

Design: Prospective, observational study.

Setting: Surgical intensive care unit.

Patients: Twenty-two patients after cardiac or major noncardiac surgery.

Measurements: After initial calibration of the pulse contour CO (PCO) method, CO was measured by PCO and by LiCO methods at 4, 8, 16, and 24 hrs. Recalibration of PCO was performed every 8 hrs. The systemic vascular resistance and dynamic response characteristics of the arterial catheter-transducer system were measured at each time point to determine whether these influenced the agreement between PCO and LiCO methods.

Main results: There was an excellent correlation between methods (r = .94). Bias was small (-0.005 L/min), and clinically acceptable limits of agreement were demonstrated between techniques. Although many catheter-transducer systems had poor dynamic response characteristics, this did not influence the level of agreement between the two techniques. An increase in systemic vascular resistance between two time points did tend to cause overestimation of LiCO by the PCO.

Conclusions: PCO measurement compared well with the lithium dilution method and can be considered an accurate technique for measuring beat-to-beat CO with limited risk to the patient.