

## **Lithium dilution cardiac output measurement in the critically ill patient: determination of precision of the technique**

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**Background:** Lithium dilution cardiac output by LiDCOplus (LiDCO, Cambridge, UK) is a validated methodology for measuring cardiac output. It is used to calibrate a pulse pressure analysis algorithm (PulseCO) for the continuous measurement of subsequent changes in this variable. The variability of measurements, or precision, within patients of lithium dilution cardiac output has not previously been described.

**Material and methods:** Thirty-five hemodynamically stable patients in intensive care, with no significant variability in heart rate, mean arterial pressure or central venous pressure, were recruited. Fifty-three determinations of cardiac output were made, each using four lithium dilution measurement curves performed consecutively within a maximum period of 10 min. The coefficient of variation of the measurements was determined and used to derive the least significant change in cardiac output that this technique could reliably detect.

**Results:** For a single measurement, the coefficient of variation was 8%. This equates to the technique being able to detect a change (least significant change) between two measurements of 24%. Averaging two lithium dilution measurements improved the coefficient of variation to 6% with a least significant change of 17%. Using the average of three curves reduced the coefficient of variation to 5% with a least significant change of 14%.

**Conclusions:** To achieve a good precision with this technique, three lithium dilution measurements should be averaged. This will allow changes in cardiac output of more than 14% to be reliably detected. The understanding of the precision of this technique allows the user to know when a real change has happened to their patient.