Assessment of lithium dilution cardiac output as a technique for measurement of cardiac output in dogs

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Objectives: To determine agreement of cardiac output measured by use of lithium dilution cardiac output (LiDCO) and thermodilution cardiac output (TDCO) techniques in dogs and to determine agreement of low- and high-dose LiDCO with TDCO.

Animals: 10 dogs (7 males, 3 females).

Procedure: Cardiac output was measured in anesthetized dogs by use of LiDCO and TDCO techniques. Four rates of cardiac output were induced by occlusion of the caudal vena cava, changes in depth of anesthesia, or administration of dobutamine. Lithium dilution cardiac output was performed, using 2 doses of lithium chloride (low and high dose). Each rate of cardiac output allowed 4 comparisons between LiDCO and TDCO.

Results: 160 comparisons were determined of which 68 were excluded. The remaining 92 comparisons had values ranging from 1.10 to 12.80 L/min. Intraclass correlation coefficient (ICC) between low-dose LiDCO and TDCO was 0.9898 and between high-dose LiDCO and TDCO was 0.9896. When all LiDCO determinations were pooled, ICC was 0.9894. For determinations of cardiac output < 5.0 L/min, ICC was 0.9730. Mean +/- SD of the differences of TDCO minus LiDCO for all measurements was -0.084+/-0.465 L/min, and mean of TDCO minus LiDCO for cardiac outputs < 5.0 L/min was -0.002+/-0.245 L/min.

Conclusions and clinical relevance: The LiDCO technique is a suitable substitute for TDCO to measure cardiac output in dogs. Use of LiDCO eliminates the need for catheterization of a pulmonary artery and could increase use of cardiac output monitoring, which may improve management of cardiovascularly unstable animals.