474633 - ARTERIAL PULSE CONTOUR CARDIAC OUTPUT IN LIVER TRANSPLANTATION

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Introduction: Cardiac output determination is frequently used during liver transplantation (LTX). While thermodilution cardiac output (TDCO) remains the gold standard, alternative measurement techniques have been developed, including arterial pulse contour based cardiac output (APCO) estimation. APCO has been validated in other patient care areas such as cardiac surgery (1), but has not been assessed in LTX. We evaluated the precision and accuracy of a novel APCO algorithm in patients undergoing LTX.

Methods: After IRB approval and informed patient consent, 23 patients undergoing elective orthotopic LTX were recruited. Each received a standardized propofol/fentanyl/atracurium/sevoflurane-based anesthesia regimen, and was monitored using conventional noninvasive monitoring, radial arterial catheterization and pulmonary artery catheterization via the right internal jugular vein. TDCO data were obtained with the Stewart-Hamilton method (Edwards Vigilance® CCO Monitor; Edwards Lifesciences, Irvine, CA). APCO was estimated using a high-fidelity transducer and proprietary software (Versions 9 and 10, FloTrac®/Vigileo® system, Edwards Lifesciences, Irvine, CA). Cardiac output data were recorded at 30 and 60 min after incision, 5 min before caval clamping, 5, 30, 60 min after caval clamping, and 1, 2, 4, and 5 min after caval unclamping. Data for bias/precision are presented using the method of Bland and Altman (2). The relationships between (1) bias and software version and (2) bias and TDCO were analyzed using ANOVA and linear regression, respectively.

Results: A total of 152 data points were obtained in Version 9, and 82 data points in Version 10. TDCO - APCO bias (mean $\pm$ SD) in versions 9 and 10 were 1.8 ± 2.5 L/min and 2.1 ± 2.7 L/min, respectively ($P > 0.2$) and were comparable between the two versions at all phases ($P > 0.2$). Bias increased in proportion to TDCO, with bias (mean $\pm$ SD) of 4.6 ± 2.8 L/min in the highest TDCO tertile (11.5 ± 2.6 L/min) (Version 10).

Discussion: In LTX patients with normal cardiac outputs, current APCO algorithms provide values comparable to TDCO. As TDCO values increase, APCO underestimates by progressively larger amounts, and in a large percentage of patients APCO underestimates cardiac output markedly. This bias persists despite recent changes in the algorithm. Although proposed as a method of cardiac output determination which does not need calibration, FloTrac®-based APCO in patients undergoing LTX may need an altered algorithm, periodic recalibration or both.

References: 1. J Cardiothorac Vasc Anesth 2007; 21: 3 2. Lancet 1986 (1):307-10

CCO - APCO