Publication Brief

Comparison of a New Cardiac Output Ultrasound Dilution Method with Thermodilution Technique in Adult Patients Under General Anesthesia

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PURPOSE
1) To investigate the reliability of cardiac output (CO) measured by ultrasound dilution (COud);
2) To compare COud results to those measured by Swan Ganz pulmonary artery thermodilution (COsw) in adult patients undergoing abdominal surgery.

MEASUREMENTS
• 142 comparison measurements were obtained in 29 patients: average of 3 COud; 5 COsw
• COsw MEASUREMENTS: pulmonary artery and radial catheters were inserted after anesthesia induction.
• COud MEASUREMENTS: a disposable extracorporeal AV loop was connected to the existing arterial (radial a) and central venous (pulmonary a) catheters. Flow/dilution sensors were clamped onto the arterial and venous limbs of the loop to measure changes in blood ultrasound velocity after dilution by 30 mL of body-temperature isotonic saline injected into the venous limb of the AV loop. Ultrasound dilution (ud) measurements (COstatus®; Transonic Systems, Inc, Ithaca, NY) were calculated.

RESULTS
The correlation coefficient between the 2 techniques was r = 0.91. Bland Altman analysis did not produce any significant bias (bias = 0.02, standard deviation = 0.56). The percentage error of these data was 23.53%.

STUDY’S CONCLUSIONS
The good agreement between COud and COsw measurements indicated that COud might be interchangeable with conventional COsw in perioperative adult patients.

Linear regression of paired cardiac output measurements obtained by thermodilution (COsw) and ultrasound dilution (COud). After Tsutsui, J Cardiothor Vasc Anesth 2009;23(6):835-840.

Bland-Altman plot of COtd and COud. Mean difference, 0.02 L/min (solid line); standard deviation, 0.56 L/min; limits of agreement (1.96 standard deviation) (dashed lines), 1.04, 1.08 L/min. After Tsutsui, J Cardiothor Vasc Anesth 2009;23(6):835-840.

TRANSONIC OBSERVATION
This study is the first validation paper of COstatus® with adult general surgical patients under general anesthesia.

REFERENCES