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TECHNOLOGY, COMPUTING, AND SIMULATION

**Testing the Reliability of a New Ultrasonic Cardiac Output Monitor, the USCOM, by Using Aortic Flowprobes in Anesthetized Dogs**

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We have used an animal model to test the reliability of a new portable continuous-wave Doppler ultrasonic cardiac output monitor, the USCOM. In six anesthetized dogs, cardiac output was measured with a high-precision transit time ultrasonic flowprobe placed on the ascending aorta. The dogs' cardiac output was increased with a dopamine infusion ( $0\text{--}15 \mu\text{g} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ ). Simultaneous flowprobe and USCOM cardiac output measurements were made. Up to 64 pairs of readings were collected from each dog. Data were compared by using the Bland and Altman plot method and Lin's concordance correlation coefficient. A total of 319 sets of paired readings were collected. The mean ( $\pm$ sd) cardiac output was  $2.62 \pm 1.04$  L/min, and readings ranged from 0.79 to 5.73 L/min. The mean bias between the 2 sets of readings was  $-0.01$  L/min, with limits of agreement (95% confidence intervals) of  $-0.34$  to  $0.31$  L/min. This represents a  $\pm 13\%$  error. In five of six dogs, there was a high degree of concordance, or agreement, between the 2 methods, with coefficients  $>0.9$ . The USCOM provided reliable measurements of cardiac output over a wide range of values. Clinical trials are needed to validate the device in humans.