

Automated Cardiac Output Measurement using Sensydia CPS

A Comparison with Catheterization

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BACKGROUND

Thermodilution cardiac output (TDCO) measurements using catheterization are invasive, resource intensive, operator dependent, and carry risk of complications. In this study, we test the accuracy of cardiac output (CO) measurements from the Cardiac Performance System ("CPS"; Sensydia), a novel non-invasive and automated device that measures CO from cardiac acoustic signals using machine learning.

METHODS

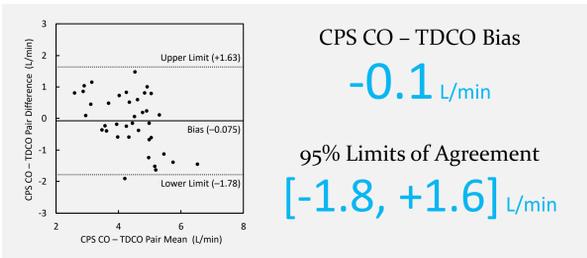
Patients undergoing right heart catheterization underwent simultaneous CPS measurements, which involved the placement of acoustic sensors and ECG electrodes on the patient's chest by a non-specialist. The agreement between CPS CO and TDCO measurements was evaluated.

RESULTS

38 patients

- 24-85 years old
- 14 were female
- had a variety of afflictions such as heart failure, pulmonary hypertension, cardiomyopathy, valvular disease, and atrial fibrillation

CO Range (L/min): 2.2 to 7.3



CONCLUSION

Sensydia CPS provides non-invasive, automated, and accurate measurement of CO and can enable clinicians to perform faster and safer hemodynamic assessment.

CLINICAL STUDY

Towards faster and safer hemodynamics

Real-time, automated CO measurements performed by a novel, non-invasive heart-sound based device are accurate.

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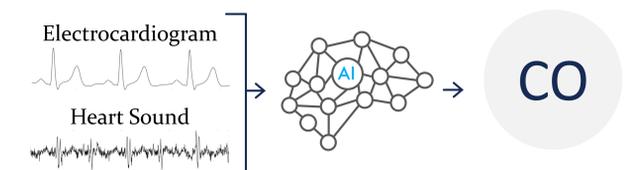
WHAT IS SENSYDIA CPS?

FDA
BREAKTHROUGH DEVICE



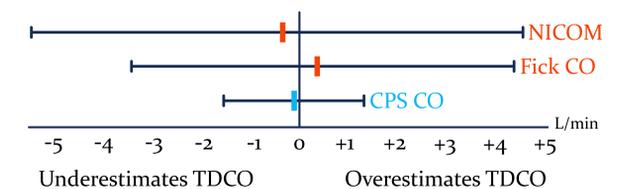
HOW DOES CPS WORK?

CPS CO computation leverages cardiac acoustic signal processing and machine learning to enable the identification and use of acoustic waveform features that characterize physiological phenomena such as cardiac pressure gradients, blood flow, and cardiac tissue motion.



CPS CO VS OTHERS

The agreement between CPS CO and TDCO is better than that between bioimpedance-based NICOM and TDCO (as well as that between indirect-Fick CO and TDCO) as determined by an analysis of data presented in the literature.



CPS CO: WORK IN PROGRESS

- Determining accuracy of related parameters such as Stroke Volume and Cardiac Index
- Testing for ability to track fluid responsiveness
- Testing operator variability

DISCLOSURES

Research supported by Sensydia Corporation through the Oregon Health & Science University. The authors had full access to data, devices and materials used in this study and take full responsibility for the integrity of data, accuracy of analyses and interpretation of outcomes.

Harsh Golwala was the principal investigator for the study and oversaw every aspect of the investigation. He is involved in clinical trials with Boston Scientific, Edwards Lifesciences, and Medtronic; however, these do not present any conflicts with the study presented here.