Automated Ejection Fraction Measurement using Sensydia CPS

A Comparison with Echocardiography

Kimberly Howard-Quijano[1], Kanav Saraf[2], Henrik Borgstrom[2], Chris Baek[2], Michael Wasko[2], Xu Zhang[2], Yi Zheng[2], Samir Saba[1], William Kaiser[2], Aman Mahajan[1]

[1] UPMC University of Pittsburgh Medical Center, Pittsburgh, PA
[2] UCLA University of California Los Angeles, CA

Background

Ejection Fraction (EF) measurement using echocardiography requires the availability of trained personnel. In this study, we test the accuracy and reliability of automated, real-time EF measurements performed by a novel non-invasive device, the Cardiac Performance System ("CPS"; Sensydia), which uses acoustic sensors placed on the chest.

Methods

Patients first underwent EF measurements via transthoracic echocardiography performed by a trained sonographer, followed by EF measurements with Sensydia CPS performed by a non-specialist. We evaluated CPS EF – Echo EF equivalence, CPS operator variability, and the ability of CPS to identify patients with reduced EF.

Results

81 patients
- 19-88 years old
- 1 in 3 were female
- from Cardiology, presurgical, and diagnostic radiology clinical settings

20% – 80%
EF Range

3 in 4
had a diagnosis of cardiac pathology

6% CPS EF – Echo EF Bland-Altman SD

<5% CPS Operator Variability

0.93
ROC AUC for CPS identification of EF<40%

Conclusion

Sensydia CPS provides an innovative platform for non-invasive, automated, and reliable measurement of EF in real time that can be performed in various clinical settings by personnel without specialized training.

Clinical Study

Measuring EF without an echocardiogram?

It's possible.

Real-time, automated EF measurement performed by a novel heart-sound-based device are **accurate** and **reliable**.

View Abstract

Visit Website

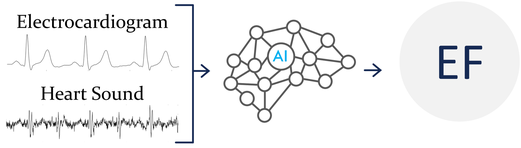
Contact Authors

What is Sensydia CPS?

FDA
510(k) Cleared for EF Breakthrough Device

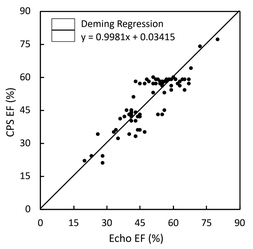
How Does CPS Work?

CPS EF computation involves cardiac acoustic signal processing to characterize physiologically relevant waveform features and the subsequent application of a previously trained machine-learning algorithm.

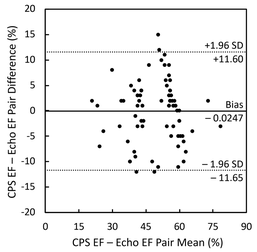


CPS EF - Echo EF Scatter Plots

Deming Regression



Bland-Altman Analysis



Disclosures

Research supported by Sensydia Corporation through the University of California Los Angeles. 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.

Kimberly-Howard Quijano was the principal investigator for the study and oversaw every aspect of the investigation.
Aman Mahajan and **William Kaiser** are inventors of the acoustic waveform machine learning technology employed in the CPS and serve as co-founders of Sensydia. They contributed to the scientific discussions and design of the study but did not participate in patient recruitment, data collection, or computation of EF by echocardiography or CPS.
Samir Saba is an advisor to Sensydia.
Kanav Saraf, **Henrik Borgstrom**, **Chris Baek**, **Michael Wasko**, **Xu Zhang**, and **Yi Zheng** were students and/or employees at the University of California Los Angeles at the time of the study and are now Sensydia employees.