June 2023 - Volume 41 - Issue Suppl 3

- Previous Abstract
- Next Abstract

Eposter Session: BLOOD PRESSURE MEASUREMENT

THE FEASIBILITY OF CUFFLESS, NON-OCCLUSIVE BLOOD PRESSURE ASSESSMENTS USING THE NOVEL LIFELEAF WRISTWATCH AND PLATFORM

Almahmeed, Wael[1]; Kumar, Dilip[2]; Mbouombouo, Benjamin[3]; Banerjee, Nilanjan[3]; Sanyal, Alodeep[3]; Sen-Gupta, Indranil[3]

Author Information

[1]Cleveland Clinic Abu Dhabi, Abu Dhabi, UNITED ARAB EMIRATES

[2]Medica Superspecialty Hospital, Kolkata, INDIA

[3]LifePlus, Inc., San Jose, CA, USA

Journal of Hypertension 41(Suppl 3):p e111-e112, June 2023. | DOI: 10.1097/01.hjh.0000939876.26445.65

- Free

Metrics

Abstract

Objective:

Hypertension affects 1.3 billion people worldwide and is the leading cause of myocardial infarction and stroke. Successful treatment of hypertension continues to be a global challenge, likely given that the most common tool for assessment is the sphygmomanometer, which can be time-consuming and cumbersome to utilize on a consistently compliant basis. More straightforward means of blood pressure (BP) measurement may facilitate earlier detection and closer monitoring of hypertension, thereby helping to alleviate potential comorbidities. The ability to seamlessly collect longitudinal BP data could also enhance ambulatory blood pressure monitoring, which is preferred over in-office BPs for tracking hypertension and decisions regarding pharmacotherapy. BP measurements in the ambulatory setting may also be more representative of true BPs by eliminating white coat syndrome. We therefore investigated the reliability of performing BP measurements via a novel cuffless, non-occlusive photoplethysmography (PPG)-based wristwatch compared to a standard automatic BP cuff reference.

Design and method:

The LIFELEAF® wristwatch (LifePlus, Inc., San Jose, CA) utilizes novel signal processing and machine learning (ML) algorithms to predict real-time systolic and diastolic blood pressures (SBP and DBP) using features extracted from PPG signal at the wrist. 274 total subjects from 3 centers (Cleveland Clinic Abu Dhabi, UAE; Hospital Sebarang Jaya, Malaysia; and iKure Clinic, India) were enrolled. Subjects were outpatients 18 years of age or older; females who were gravid or actively trying to conceive were excluded. Automatic BP cuff reference measurement on the left arm was immediately followed by 1 minute of wristwatch PPG signal acquisition on that arm. An average of 10.77 paired data acquisitions per subject were collected. Datasets were randomly split for model training (60%) and prediction (40%).

Results:

There were no significant differences in mean SBP or mean DBP between cuff reference measurements and wristwatch predictions. The wristwatch-predicted SBPs and DBPs also demonstrated significant linear correlation with cuff reference values.

Image

Conclusions:

Longitudinal SBP and DBP measurements are feasible via non-occlusive methods incorporating sophisticated signal processing and machine learning (ML) applied to wrist PPG. Further algorithmic improvements to accuracy may improve BP/hypertension tracking by facilitating assessments compared to conventional sphygmomanometers.

Related Articles

- **Response to letter 'Are individuals with resistant hypertension not responsive to exercise when using ambulatory blood pressure monitoring?'**
- **It seems that the hidden side of the moon doesn't hide much**
- **Resistant hypertension and responsiveness to exercise in ambulatory blood pressure monitoring: concerns regarding a study by Saco-Ledo et al.**
- **Inter-arm blood pressure difference: is diastolic the hidden side of the moon?**
- **Understanding hypertension following solid organ transplantation: current trends and future perspectives**
- **In defense of β-blockers: a critical role in primary hypertension management**

Most Popular