21-23 October, Vilnius, Lithuania
13th International Conference
BIOMDLORE 2021

Influence of Signal Acquisition Location on Blood Pressure Parameters in Photoplethysmogram

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ABSTRACT

BACKGROUND: Abnormal changes in blood pressure (BP) may be an indicator of developing cardiovascular diseases. Thus, continuous BP monitoring can facilitate early diagnosis and treatment of cardiovascular diseases. Since there is a lack of convenient methods for continuous BP monitoring, morphological analysis of an optical photoplethysmogram (PPG) signal is considered as an alternative.

OBJECTIVE: Although PPG can be acquired from different body locations, it is unclear which is the most suitable for obtaining BP-related parameters. Hence, the aim of this study is to investigate the influence of the signal acquisition location on morphological PPG parameters.

METHODS: PPG parameters from different body locations, i.e., finger, ear, and neck, were assessed for 48 healthy participants performing 2 cold water tests. Changes in parameters between cold water and rest phases were checked for significance.

RESULTS: Five out of seven parameters for the finger PPG changed significantly between all adjacent phases, whereas only sporadic changes were observed in the parameters for the ear and neck PPGs. However, all parameters except one showed significant changes at least once between cold water and rest phases.

CONCLUSIONS: PPG signals acquired from the finger are the most suitable for assessing parameters potentially associated with changes in BP.

KEYWORDS: optical signal, continuous monitoring, pulse wave analysis, morphological parameters.