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(G) (POS-29) Optical Investigations of Endothelial Dysfunction: Exploring Pressures for Induced Ischemia

Tuesday, May 28, 2024 6:21 PM (2 minutes)

The discovery of the endothelial wall within human vasculature has significantly advanced our comprehension of cardiovascular physiology and pathology. Endothelial function, which governs vascular dilation and constriction in response to stimuli, is crucial for maintaining optimal blood flow dynamics. Any disruptions in endothelial function can lead to dysregulation of blood flow, ultimately contributing to the development and progression of cardiovascular diseases. The goal of this study is to evaluate responses elicited through induced ischemia utilizing a blood pressure cuff and to analyze the reactive hyperemic response through the use of optical means such as photoplethysmography (PPG) and a muscle saturation oximeter. Existing applications of endothelial function assessment induce occlusion at 50 mmHg above systolic pressure. However, there is no golden standard pressure for full arterial occlusion, so the current focus of this research is based on refining the protocol, exploring different pressures, and attempting to enhance the strength of the signals produced through the PPG sensor and the muscle oximeter. 10 healthy participants were subject to an 8-minute experiment that encompassed a 1-minute baseline reading, arterial occlusion at 150 mmHg for 3 minutes, and a recovery period of 4 minutes. The procedure was repeated at a pressure of 200 mmHg on the opposing hand. The primary focus of the analysis was examining the hyperemic response of the muscle oxygen saturation data, specifically the amplitude of the muscle oxygen saturation and the time duration to the maximum saturation amongst participants. The first derivative test was also applied to the hyperemic response, and analysis was completed on the peak time of the slope, peak slope value, and the full-width half maximum. Overall, the two pressures provided no statistically significant results, which can conclude that for forearm occlusion, 150 mmHg can be used as it is more tolerable and comfortable for participants.

Keyword-1

Ischemia

Keyword-2

Endothelial Dysfunction

Keyword-3

Reactive Hyperaemia

Author: DVEKAR, Vanja

Presenter: DVEKAR, Vanja

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