Autoregressive Modeling of the Photoplethysmogram AC Signal Amplitude Changes After Flow-Mediated Dilation in Healthy and Diabetic Subjects

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It is proved that the endothelial (artery inner lumen cells) function is associated with cardiovascular risk factors. Of all the current non-invasive tests employed in the research setting, flow-mediated dilation is the most widely used for assessing endothelial function. This technique measures endothelial function by inducing reactive hyperemia via temporary arterial occlusion and measuring the resultant relative increase in blood vessel diameter via ultrasound. In this paper, the limitations associated with the ultrasound technique are overcome by using the photoplethysmogram (PPG) signal recorded during FMD. The correctness of this approach is investigated by modeling the AC changes of PPG after FMD by a 2nd order autoregressive model. A sensitivity of 78.6%, specificity of 81.6% and total accuracy of 80% were achieved in classification of 16 healthy and 14 diabetic subjects.