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Diagnosing Aorta Stiffness by Temporal Analysis of Echocardiographic Images YU-HSI CHENG, The Affiliated Senior High School of National Kaohsiung Normal University, Taiwan, R.O.C., TSU-CHIANG YEN, Dept. of Physics, National Sun Yat-sen University, Taiwan, R.O.C., DOYAL LEE, Cardiology Division, Kaohsiung Vetrans General Hospital, Taiwan, R.O.C. — In the diagnosis of cardiovascular diseases, information about the intracardiac system function and blood flow can be obtained by echocardiography due to its high spatial resolution capability. However, seldom message is known about the aorta stiffness. This work investigated a method to quantitatively analyze the aorta stiffness. The aorta was modeled as a periodic-force-driven damping oscillator, in which the aorta stiffness was the damping factor. From the analysis of echocardiographic images, the delay time of the maximal aorta distention relative to the R-peak of the electrocardiographic trace was measured to reveal the aorta stiffness. A study based on 10 samples suggested that a delay time greater than 0.17 sec could be a criterion to diagnose that the aorta is quite stiff. This method could also clearly discern some abnormal cardiac performance. A large-scale study with this method should be conducted in the future.

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