Study of the Pressure and Velocity Across the Aortic Valve
SEO YOUNG KYUNG, ERICA SOYUN CHUNG, JOO HEE LEE, HAYOUNG KYUNG, SI YOUNG CHOI, Choice Research Group — Biomechanics of the heart, requiring an extensive understanding of the complexity of the heart, have become the interests of many biomedical engineers in cardiology today. In order to study aortic valve disease, engineers have focused on the data obtained through bio-fluid flow analysis. To further this study, physical and computational analysis on the biomechanical determinants of blood flow in the stenosed aortic valve have been examined. These observations, along with the principles of cardiovascular physiology, confirm that when blood flows through the valve opening, pressure gradient across the valve is produced as a result of stenosis of the aortic valve. The aortic valve gradient is used to interpret the increase and decrease on each side of the defective valve. To compute different pressure gradients across the aortic valve, this paper analyzes Aortic Valve Areas (AVA) using simulations based on the continuity equation and Gorlin equation. The data obtained from such analysis consist of patients in the AS category that display mild Aortic Valve Velocity (AVV) and pressure gradient. Such correlation results in the construction of a dependent relationship between severe AS causing LV systolic dysfunction and the transaortic velocity.

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