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**Biophysical and Computational Analysis of Aortic Stenosis and Systemic Hypertension** RICHARD KYUNG, JEONG H. (PETER) YOON, YOON JI JUNG, CRG-Choice Research Group — One of the most common cardiovascular diseases, along with hypertension and coronary artery disease, is aortic stenosis (AS). In today's society, the most frequent cause of AS is the formation of calcium salts on aortic valve tissues that impede new tissues from developing. AS is a disease that causes aortic valve openings to narrow, decreasing blood flow from the left ventricle to the aorta and increasing blood pressure in the left ventricle. Thirty to forty percent of AS patients are in risk of systemic hypertension. For this reason, the biophysical and computational cardiovascular models to evaluate the effect of AS on the left ventricle are shown in this paper. Numerical models and relationship between the transvalvular flow rate and the pressure difference are presented. The results demonstrate that there are patients who can be classified in AS category with mild or moderate Aortic Valve Velocity(AVV) and pressure gradient, which makes therapeutic management complicated. The data show the Aortic Valve Velocity(AVV) causing AS occurs at 3.0-3.5 cm/sec.

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