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Study of the Pressure Changes Across the Cardiovascular System Using Numerical and Computational Simulations IN-WON CHANG, RICHARD KYUNG, Choice Research Group — Circulatory system disease has induced a growing concern for information on bio-fluid flow analysis in our cardiovascular system. The biomedical engineering approaches have been theoretically and numerically developed with computational and advanced biophysical simulations. In this paper, studies based on the numerical and computational biomechanics of blood flow in the stenosed aortic valve have been carried out. The aortic stenosis leads to a pressure and velocity change across the valve during the time in which blood flows through the valve opening. This aortic valve gradient is expressed as an increase and a decrease on each side of the defective valve. In this paper, the continuity equation and Gorlin equation are used to find the cardio factors affecting the aortic stenosis. Aortic Valve Areas (AVA) are calculated based on the different pressure gradients across the aortic valve. Computational simulations are carried out using the Matlab program. The results of the subject study show that severe aortic stenosis causing systolic dysfunction in the left ventricle depends on the transaortic velocity and pressure.

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