

Abstract Submitted
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Biophysical Aspects of Blood Flow in the Cardiac Valve AYOUNG CHO, SOON SUNG HONG, MATTHEW SEH, CRG (Choice Research Group) — Blood flow through cardiac valve occurs by the pressure gradient in the cardiovascular system. Assuming the incompressibility of the blood in the cardiovascular system, this paper applied a numerical method to find the blood flow rate and biofluid parameters in the mitral valve. Also biomechanical analysis was performed on a disk-type prosthetic mitral valve in heart. For the purpose of computational and mathematical modeling, the valve was assumed to be immersed in fluid and symmetric about the midline plane. Incompressible laminar steady flow with constant viscosity was assumed. The flow is considered during the greater part of systole when the valve is fully open. Stress, displacement distributions are computed at every grid point. And two-dimensional velocity profiles across anterior mitral valve are presented. In this study, computational and numerical method were attempted to analyze the mitral valve quantitatively by using finite element analysis. A finite element model of the mitral valve showed that the maximum pressure occurs at the early diastolic period. Also, high velocity flow through the mitral valve was observed due to pressure buildup during initial filling.

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