

Abstract Submitted
for the DFD11 Meeting of
The American Physical Society

The effect of mitral orifice eccentricity on the left ventricular hemodynamics¹ TRUNG LE, FOTIS SOTIROPOULOS, University of Minnesota — We investigate the left ventricular hemodynamics using high resolution Direct Numerical Simulation. The LV geometry is reconstructed from Magnetic Resonance Imaging (MRI) data of a healthy volunteer. The diastolic kinematics of the LV wall is modelled using a cell-based electrical activation methodology, which yields global left-heart motion parameters well within the physiologic range of an adult. By prescribing the kinematics and the physiologic mitral valve waveform, numerical simulations are carried out to investigate the intraventricular flow patterns during the diastolic filling. The results show that the intraventricular flow is dominated by the formation and breakdown of a vortex ring originating from the mitral orifice. The eccentricity of the mitral orifice is found to be the determining factor controlling the dynamics of vortex formation and rotational flow patterns at the end of diastole.

¹This work was supported by NIH Grant RO1-HL-07262 and the Minnesota Super-computing Institute.

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Date submitted: 01 Aug 2011

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