

Abstract Submitted
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Experimental study of asymmetric heart valve prototype M. VUKICEVIC, University of Trieste , S. FORTINI, University of Roma, G. QUERZOLI, University of Cagliari, A. CENEDESE, University of Roma, G. PEDRIZZETTI, University of Trieste — The mechanical heart valves (MHVs) are extremely important medical devices, commonly used for diseased heart valves replacement. Despite the long term of use and constant design refinement, the MHVs are very far from ideal and their performance is very diverse from that of the native ones. It has been approved that small variations in geometry of valvular leaflets influence the significant change in the intraventricular vortical flow, known as one of the most important factors for the overall functionality of the heart. We have experimentally examined the home-made heart valve prototypes, exclusively modeled for the mitral valve replacement. The performance and energetic properties of the prototypes have been compared with those in the presence of standard MHVs. The analysis was based on the testing of intraventricular fluid dynamics, usually missing criteria for the quality of the valve performance. It has been shown that the asymmetric prototype, with unequal leaflets and D-shaped orifice produces flow patterns and energetic properties close to those found in the healthy subjects. Thus, the break of symmetry in the standard bi-leaflet MHV prosthesis, at least from the fluid dynamics point of view, is worthwhile to be considered for the design of MHVs for the mitral valve replacement.

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