

Warning about the Risk of Blood Flow Stagnation after Transcatheter Aortic Valve Implantation

Authors : Aymen Laadhari, Gábor Székely

Abstract : In this work, the hemodynamics in the sinuses of Valsalva after Transcatheter Aortic Valve Implantation is numerically examined. We focus on the physical results in the two-dimensional case. We use a finite element methodology based on a Lagrange multiplier technique that enables to couple the dynamics of blood flow and the leaflets' movement. A massively parallel implementation of a monolithic and fully implicit solver allows more accuracy and significant computational savings. The elastic properties of the aortic valve are disregarded, and the numerical computations are performed under physiologically correct pressure loads. Computational results depict that blood flow may be subject to stagnation in the lower domain of the sinuses of Valsalva after Transcatheter Aortic Valve Implantation.

Keywords : hemodynamics, simulations, stagnation, valve

Conference Title : ICSR2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020