

Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

On the effect of the electrophysiology fast conduction system in the mitral valve closure GIULIO DEL CORSO, ROBERTO VERZICCO, FRANCESCO VIOLA, Gran Sasso Science Institute — The mitral valve assures the correct direction of the left atrial flow into the ventricle and is made of two leaflets that are fastened to the papillary muscles (PM) through the chordae tendineae. The PM are located in the bottom ventricular myocardium and contract at early systole in order to stretch the chordae tendineae, thus preventing the prolapse of the mitral valve. Hence, the timely electrical activation of the PM is crucial for the correct closing of the valve and a delayed muscular contraction would yield an incomplete valve closure and an undesired backflow in the atrium. In this work, the effect of the fast conduction system (that is responsible for the electrical activation of the PM) on the mitral valve kinematics and on the cardiac hemodynamics is investigated. In particular, the in-house electrophysiology model comprises (i) the whole network of fast conduction bundles originating at the sino-atrial node, (ii) the branched Purkinje network activating the ventricles and the PA, and (iii) the three-dimensional myocardium. The results are seen to agree with the available clinical data, therefore suggesting that this computational tool could be used to predict the effects of valve disease and to improve the outcome of surgical interventions.

Giulio Del Corso
Gran Sasso Science Institute

Date submitted: 03 Aug 2020

Electronic form version 1.4