

Mechanical aorto-ventricular matching in Heart Failure
Romano Zannoli
Professor of Medical Physics, University of Bologna, Italy

Ventricular production of mechanical energy is progressively impaired in heart failure (H.F.) and the biochemical cost of each mechanical energy unit sharply increases. The progression of the H.F. modifies the mechanical matching between ventricle and aorta and also the energy transfer is reduced. In this condition of progressive inadequacy, when the actions on the pump fail, the tentative to improve the transfer of the mechanical energy from the source (heart) to the load (vasculature) is one of the possible choices. This mechanism is very difficult to monitor on the patient, who changes his functional condition very slowly, but it is possible to simulate it and to test possible mechanical interventions.

The lecture will be focused on mechanical changes of ventricular contractile behaviour associated with H.F. progression and consequent mismatching with vascular load. Mechanical simulations of the process will be described and the effect of interventions to recover a better matching will be discussed. Clinical examples of possible application will be shown.