

The History of Research into Heart Failure

Shigetake Sasayama

Doshisha University, Faculty of Life and Medical Science

The first clear description of the circulation by William Harvey in 1628 put medical science on a new footing and made it possible to recognize the causal link between blood flow abnormalities in the heart and cardiac enlargement.

Subsequently, two patterns of cardiac enlargement were identified. Lancisi first distinguished between enlarged hearts with increased cavity size (eccentric hypertrophy, dilatation), and with increased wall thickness (concentric hypertrophy, hypertrophy). Corvisart wrote an even more detailed description of these two types of cardiac enlargement and noted that dilatation has a worse prognosis.

Early in 20th century, Starling demonstrated the major principles of cardiac function that increasing end-diastolic volume enhances cardiac performance. This view contradicted the above mentioned 18th century view that dilatation weakens the heart. Starling's law is based on the myocardial length-active tension relation and its ascending and descending limbs were explained by the relation between sarcomere length and ventricular performance in the intact ejecting heart. Ventricular function was measured during the ejecting phase of contraction in terms of the appropriateness of the matching between afterload and the level of inotropic state as modulated by the preload. Then, the concept of afterload mismatch was illustrated and used as a basis for characterizing response to afterload changes. William Osler described three stages in the development of hypertrophy from adaptive to maladaptive. The latter half of the 20th century was devoted to elucidate the mechanisms responsible for progression in heart failure caused by maladaptive hypertrophy in the perspective of modern concept.

Looking back at the history of the research in heart failure, the evolving concepts of heart failure encourage us to challenge the future trend of the study incorporating new information from molecular biology.