

PULSATILE HEMODYNAMICS IN HEART FAILURE

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Abstract

Due to the cyclic function of the human heart, pressure and flow in the circulation are pulsatile rather than continuous. Investigating pulsatile hemodynamics starts with the most simple measurement, brachial pulse pressure. Brachial pulse pressure, despite its simplicity and wide availability, is related to development and treatment of heart failure. However, pulse pressure is often confounded in patients with established heart failure, because it depends not only on arterial properties, but also on stroke volume. The next step of analysis consists of central (rather than brachial) pressures, and, more importantly, of wave reflections. Wave reflections are closely related to left ventricular late systolic afterload, ventricular remodeling, diastolic dysfunction, exercise capacity, and, in the long term, the risk of new-onset heart failure. Wave reflection may also represent a therapeutic target. Treatments for heart failure with preserved and reduced ejection fraction, based on a reduction of wave reflection, are emerging. A full understanding of ventricular-arterial coupling, however, requires complex analysis of time-resolved pressure and flow signals, which can be accomplished with contemporary non-invasive imaging and modeling techniques. This presentation provides a summary of our current understanding of pulsatile hemodynamics in heart failure.

Keywords

Pulsatile hemodynamics, wave reflections, heart failure