

## Editorial

# Heart Failure

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Heart failure is a growing epidemic. Over the last decade, the annual number of hospitalizations has increased from 800,000 to over a million for heart failure as a primary, and from 2.4 to 3.6 million for heart failure as a primary or secondary diagnosis. Approximately 50% of heart failure patients are rehospitalized within 6 months of discharge. With aging of the population, heart failure rates and the associated hospitalizations will continue to rise. The complex array of physiologic, psychological, social, and health care delivery issues makes it a challenging chronic disease to manage. Understanding the epidemiology and pathophysiology of the syndrome, identifying the predictors and their strength of association with outcomes, and using the available diagnostic modalities cost-effectively are essential in order to devise effective prevention interventions and implement novel therapeutic approaches to curb this epidemic. In this special issue on heart failure, we have invited a few papers that address such issues.

The first two papers provide insight into the epidemiology of two specific populations: women and children. The former is a systematic review of qualitative studies that examined the influence of sex and gender on heart failure self-care. It identifies that women with chronic heart failure represent a highly vulnerable population that needs more support for psychosocial well-being and self-care. The latter is a prospective study aiming to evaluate the long-term effects of therapy for childhood lymphoma on cardiac function using clinical parameters, electrocardiography, and echocardiography. The authors report that most parameters of cardiac function remain normal in survivors of childhood lymphoma after a mean follow up of almost 11 years. This is

likely due to relatively low doses of anthracyclines in modern protocol modalities. However, they comment that frequent abnormalities in mitral valve flow and QTc prolongation necessitate long-term cardiac follow up in this population.

Shedding light into pathophysiology pathways the following 3 papers deal with 3 distinct and interesting fields: hyperthyroidism, right ventricular function, and inflammatory cardiomyopathy. The first is an original research paper that evaluates the effect of acute experimental hyperthyroidism on basal and volume-induced atrial natriuretic peptide secretion in healthy subjects. The second describes the development of right ventricular dysfunction and failure in patients with chronic pressure overload. The third review gives an overview about how inflammation triggers the functionality of mesenchymal stem cells, how it induces cardiac homing and, finally, discusses the potential of intravenous application of such cells.

Moving to noninvasive diagnostic modalities, we provide a thorough review of multimodality imaging of chronic ischemia using echocardiographic strain, magnetic resonance, and histology findings in a chronic ischemia model in preclinical study. This case illustrates the features of multimodality imaging in chronic obstructive coronary disease and gives us great insight in understanding the mechanism of ischemic cardiomyopathy. The next paper underscores the role of acoustic cardiography in the detection of left ventricular systolic dysfunction in patients with chronic atrial fibrillation. In the same section, the reader may find an interesting case report of isolated left ventricular non-compaction with a strange ECG-tracing strongly suggestive of Brugada syndrome.

The following section of this focused issue contains 3 papers devoted to novel therapeutic approaches in heart failure. The first is an original prospective study that evaluates the efficacy and safety of prolonged levosimendan infusion, an inotropic drug with unique pharmacological advantages, in patients admitted with acute heart failure. The second is a review paper that provides an evidence-based analysis of how heart failure patients—with and without systolic dysfunction—benefit from exercise training. The last paper evaluates the effect of exercise training on interleukin-6, tumour necrosis factor alpha, and functional capacity in heart failure patients.

Next session moves the reader to the fields of personalized medicine and myocardial regeneration therapy. First, we discuss the role of individual genetic background in the progression of left ventricular dysfunction and remodelling in heart failure patients under optimal medical therapy, in a prospective study that performed a genotype analysis for ACE I/D,  $\beta$ -1 adrenergic receptor (AR) Arg389Gly,  $\beta$ -2AR Arg16Gly, and  $\beta$ -2AR Gln27Glu polymorphisms. Then, we present a novel technique for the development of bioartificial myocardium using stem cells and nanobiotechnology templates.

The final part of this special issue is devoted to contemporary device therapies and contains 5 papers. An original study suggests that cardiac resynchronization therapy (CRT) improves hemodynamic condition and exercise capacity and reduces the ventilator response during effort. The second paper presents a prospective study that aims to predict the response to CRT implantation by comparing pre-CRT left ventricular dyssynchrony by tissue Doppler imaging and regional volumetric analysis by 3-dimensional transthoracic echocardiography. The following paper describes the use of epicardial electrogram as a simple guide to select optimal site of left ventricular pacing in CRT. The forth paper is a focused review on transthoracic echocardiographic assessment of patients with continuous axial left ventricular assist devices. We close this special issue with a thorough review on the role of device diagnostic algorithms in the assessment and management of patients with systolic heart failure.

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