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Editorial

Special Issue "Multimodality Imaging in Cardiomyopathies"

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Multimodality imaging has a crucial role in the identification and management of patients with suspected cardiomyopathies. Indeed, this approach provides structural and functional details that help in stratification and prognosis of these patients., and variables that facilitate risk stratification and prognosis evaluation. History, physical examination, and electrocardiogram (ECG) are always the first moves in evaluating a patient with cardiac disease. Echocardiography, along with its new functions, is the most common second-line test used to diagnose a cardiomyopathy by depicting structural and functional aberrations even if its role in screening procedures is growing [1]. However, echocardiographic have a limited role in identifying the underlying etiology, since these are often non-specific. Therefore, the use of cardiac magnetic resonance (CMR) [2], cardiac computer tomography (CCT) [3] and nuclear scintigraphy [4] is increasing and new evidence is rapidly accumulating.

Therefore, this Special Issue in the *Journal of Clinical Medicine* (*JCM*) collects high-quality scientific contributions about multimodality imaging in cardiomyopathies diagnosis.

The case–control study by Sarnecki et al. [5] had the aim to assess the structure and functions of the left ventricle (LV) and the right ventricle (RV) in children with left-ventricular non-compaction (LVNC), a rare condition that can cause sudden cardiac death. They compared 16 children with LVNC and 16 matched controls though CMR and tissue-tracking analysis. They found that LVNC in pediatric patients is related with LV enlargement (higher end-diastolic volume) and impaired LV systolic function (lower ejection fraction and lower strain parameters). Moreover, children with LVNC had increased RV trabeculations and asymptomatic impairment of RV myocardial strain.

The study by Cavigli et al. [6] explored the effect induced by marathon sports in a population of 68 healthy master amateur athletes in enhancing arrhythmic events. Through a continuously recorded single-lead ECG, an echocardiogram, and a 12-lead ECG before and after the race, the authors denied the hypothesis of an acute atrial dysfunction induced by ultra-endurance exercise. Indeed, even if higher P wave voltages and more ECG criteria for atrial enlargement were found, atrial longitudinal and contraction strains were normal also after the physical effort and exercise-induced supraventricular arrhythmias were uncommon.

The review by Rimbas et al. [7] focused on transthyretin amyloid cardiomyopathy (ATTR-CM), a condition with widespread amyloid extracellular myocardial deposits, which can lead to heart failure, having high treatment and diagnostic costs. Early diagnosis is crucial for a better therapeutic strategy. The authors concluded that a key diagnostic approach is based on the integration of multimodality cardiac imaging studies (speckle-tracking echocardiography, CMR, cardiac scintigraphy, and CCT) and histological, genetic, and hematological assessments (inflammation, oxidative stress, endothelial dysfunction, and disregulated vasculature structure) in a consecutive algorithm.

Monda et al. [8] applied the concept of multimodality imaging in the context of hypertrophic cardiomyopathy (HCM), a dangerous disease featured by an increased LV wall

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thickness, which is one of the possible reasons for sudden cardiac death. The multimodality approach is crucial both to first confirm the diagnosis and then to start an adequate therapy. While echocardiography is still the first-line diagnostic tool, the role of CMR, CCT, and different cardiac nuclear imaging techniques will increase in the future, given their potential role in explaining further aspect of this pathology, and to uncover some possible secondary form of HCM, such as Fabry disease and cardiac amyloidosis.

Finally, Sperlongano et al. [9] investigated the role of multimodality imaging in athlete's heart, a range of structural and functional adaptations that occur in the heart of athletes [10], which may overlap with some cardiac diseases. The authors suggested that clinicians adopt a step-by-step approach in order to have an effective diagnostic process, starting with screening tools (history, physical examination, and ECG, with the potential role of standard echocardiography) and ending with more complex techniques (speckle-tracking echocardiography, stress echocardiography, CCT, and CMR).

Several interesting findings come from these articles. The multimodality approach is always a good choice when evaluating complex cardiac diseases, such as HCM [8], ATTR-CM [7], and LVNC [5], and in a sports cardiology context [6,9]. The physicianshould be able to select the right imaging technique for each clinical scenario following a reasoned step-by-step approach. Each technique has its own pros and cons, that need to be taken in consideration.

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