EDITORIAL

Illuminating the Myocardium: Cardiac Magnetic Resonance Imaging as an Ally in the Cardiologist's Daily Practice

Iluminando el miocardio: la resonancia magnética cardíaca como aliada en la práctica diaria del cardiólogo

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Since the acquisition of the first cardiac images in the 1980s, cardiac magnetic resonance imaging (CMR) has evolved from a technical curiosity to become the "gold standard" for non-invasive morphological and functional assessment and tissue characterization. (1) Currently, the technique transcends mere anatomical description to become a precision phenotyping tool, where Artificial Intelligence (AI) is no longer a future promise but a reality that optimizes everything from accelerated image acquisition to automated post-processing, enabling more personalized medicine. (2) This progress is reflected in the global expansion of the method, although, as Sierra-Galán et al. aptly describe, CMR practice shows significant variations worldwide, depending on the size of the centers and regional technological disparities. (3)

In this scenario of constant innovation, tissue characterization has taken a qualitative leap. Beyond the detection of focal fibrosis evidenced by the presence of late gadolinium enhancement, the development of T1 and T2 parametric mapping techniques, along with extracellular volume (ECV) quantification, now allows the identification of diffuse myocardial alterations and subclinical inflammation that were previously unvisualizable. (4) These metrics provide essential biological information in the field of cardiomyopathies and allow a transition from a static diagnosis to a dynamic understanding of the myocardial interstitium. This evolution is complemented by the analysis of ventricular mechanics, evaluating strain using feature tracking, a tool that has proven to be a robust predictor of events. However, the clinical implementation of strain measurement faces the challenge of standardization; recent meta-analyses underscore the complexity of establishing normal values, which vary significantly according to age, sex, and, fundamentally, the software provider used, necessitating a cautious and contextualized interpretation of the results. (5, 6)

The relevance of these metrics is evident in this issue of the Journal through the work of Cantora et al., which analyzes the association between the deterioration of global longitudinal strain and functional capacity—measured by peak oxygen consumption—in patients with hypertrophic cardiomyopathy (HCM). (7) In this pathology, cardiac magnetic resonance (CMR) has become indispensable for risk stratification of sudden death, integrating ventricular mechanics with fibrosis findings. Such is its importance that the 2025 Argentine Consensus on the Diagnosis and Treatment of Hypertrophic Cardiomyopathy of the Argentine Society of Cardiology assigns it a central role in the management algorithm, reflecting how technique guides the clinical cardiologist's conduct in the daily practice. (8) In Argentina, although disparities in access persist depending on the region, cardiac magnetic resonance (CMR) is an increasingly incorporated tool, serving as the link between clinical suspicion and the definitive therapeutic decision.

Alongside these cutting-edge technologies, the originality of local research also focuses on the optimization of fundamental measurements with accessible resources. The work of Jaimovich et al. on the quantification of left atrial volume (LAV) is a paradigmatic example. By proposing a cylindrical model with an irregular base, the authors achieve superior geometric precision compared to traditional methods, with the enormous advantage of being applicable in routine practice without requiring more time, sophisticated post-processing software, or expensive licenses. (9) This ability to generate accurate and reproducible data with basic tools is vital for the generalization of

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the method in our centers, allowing such a sensitive marker of diastolic dysfunction and atrial fibrillation risk to be available to all operators. (10)

In conclusion, CMR imaging has reached a point of maturity where the sophistication of AI and tissue mapping coexist with the need to standardize processes and simplify critical measurements. The integration of these advances, supported by local guidelines and growing international evidence, ensures that the technique continues to illuminate the path toward precision cardiology. (11) The original works presented in this issue not only contribute to the scientific body of knowledge but also demonstrate that, beyond the complexity of the software, excellence in interpretation and the adaptation of methods to our clinical reality are the true drivers of medical progress in our country.

Conflicts of interest

None declared

(See authors conflicts of interest forms on the website).

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