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Minerva Cardiology and Angiology 2025 October;73(5):545-8
DOI: 10.23736/S2724-5683.25.07041-3

EDITORIAL

Collaboration: the way forward for cardiovascular researchers, physicians, societies, and journals

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This brand-new issue of *Minerva Cardiology Angiology* celebrates the pros of a collaborative approach to cardiovascular research and practice, directly involving our twin Journal from the Italian Federation of Cardiology (*i.e.*, the *Journal of Cardiovascular Medicine*) and the Italian Society of Cardiology for Accredited Hospitals, with, respectively, the Editor in Chief of the former, Prof. Ciro Indolfi, and Dr. Laura Adelaide Dalla Vecchia, President of the latter.

Collaborative efforts are key for many reasons in cardiovascular medicine, including its ongoing evolution hinging on unraveling pathophysiologic complexity through molecular and imaging innovation.[1] A compelling example emerges from the diagnostic and mechanistic implications of non-coding RNAs such as circFOXP1 and MIR210HG.[2] The former was shown to be downregulated in acute myocardial infarction (AMI), with functional roles in reducing apoptosis, inflammation, and oxidative stress through miR-9-3p modulation, suggesting its dual potential as a biomarker and therapeutic target. Similarly, MIR210HG is significantly upregulated in hypertensive patients and correlates with disease severity, exerting regulatory effects on endothelial proliferation, apoptosis, and inflammation *via* miR-125b-5p.[3] These findings underscore a growing paradigm where RNA-based regulation contributes to vascular dysfunction and could guide risk stratification.[4] Complementing this molecular lens, the combined use of RAC2 expression and CT-derived fractional flow reserve (CT-FFR) offers an enhanced diagnostic strategy in coronary artery disease (CAD).[5] RAC2, elevated in CAD patients and modifiable by nitrate therapy, independently predicts prognosis and augments the diagnostic yield of CT-FFR – a testimony to the synergistic power of omics and imaging.[6] On the structural front, epicardial adipose tissue (EAT), long considered a passive depot, emerges as a dynamic marker of myocardial strain.[7] EAT thickness correlates nonlinearly with left ventricular and atrial function across heart failure phenotypes, being most pronounced in heart failure with preserved ejection fraction (HFpEF), where it portends poorer systolic and diastolic performance. In contrast, lower EAT values in heart failure with significantly reduced ejection fraction (HFrEF) and heart failure with moderately reduced ejection fraction (HFmrEF) may reflect distinct pathophysiologic underpinnings. Further insight into vascular remodeling is gleaned from coronary ectasia studies, which reveal nuanced associations with systemic inflammation and vasculitis, particularly in patients lacking overt atherosclerosis.[8, 9] Collectively, these contributions affirm the primacy of mecha-

nistic insight in refining disease classification and targeting emerging phenotypes.

Acute coronary syndromes remain a critical focus of research and quality improvement, particularly as real-world data highlight persistent gaps in goal achievement.[10] A large-scale analysis of hypercholesterolemia management reveals that fewer than half of patients reach LDL-C targets, despite a robust therapeutic armamentarium.[11] Factors contributing to this shortfall include limited clinician adherence to updated guidelines, patient disengagement, and fragmented healthcare systems. Bridging this chasm requires structural reform and renewed investment in implementation science. Meanwhile, the procedural milieu of ST-elevation myocardial infarction (STEMI) presents its own challenges, such as the no-reflow phenomenon, which impairs reperfusion despite technically successful angioplasty.[12] In this setting, intracoronary electrocardiogram (ic-ECG) emerges as a real-time biomarker of success: a ≥42% improvement in ST-segment resolution independently predicts left ventricular recovery, offering an intra-procedural feedback mechanism to inform clinical decisions.[13] Equally important is the early triage of patients presenting with acute chest pain – a scenario that tests both diagnostic acumen and resource allocation. Protocols combining clinical appraisal, ECG interpretation, rapid troponin assays, and bedside echocardiography offer a structured and evidence-based approach.[14] Such integration not only facilitates early discharge but also improves diagnostic yield in non-ST elevation settings. In the postoperative domain, secondary prevention following coronary artery bypass grafting (CABG) remains a field in flux.[15] A recent Bayesian network meta-analysis compared various antiplatelet strategies and identified aspirin plus ticagrelor (Asp+Tica) as particularly effective in reducing saphenous vein graft occlusion and all-cause mortality, without significantly increasing major bleeding.[16] This nuanced comparison aids clinicians in selecting the optimal antiplatelet regimen tailored to graft type and patient profile. These data collectively affirm that enhancing risk stratification – whether by molecular tools, imaging, or algorithmic triage – remains foundational to improving outcomes in ischemic heart disease.[17, 18]

A new disruptive technology in cardiology is artificial intelligence (AI), a branch of computer science that develops systems that can simulate intelligent behavior, such as learning, reasoning, and decision making. Artificial intelligence applied to the ECG is entering in the diagnostic processes of many cardiovascular diseases, and in this regard the ECG is an ideal substrate for deep-learning AI applications since the ECG is widely available and reproducible, raw data are easy to store and transfer in a digital format and could be used as co-pilot for a second opinion.[19, 20] Similarly rosy are the prospects of applying AI for the management of acute coronary syndromes, to the data collected by wearable devices, such as smartwatches, in order to generate novel insights including multichannel ECG tracing.[21, 22] In fact, AI-generated ECG scores from standard and smartwatch-based ECGs showed high concordance with comparable diagnostic performance in the diagnosis of STEMI.[23]

Beyond acute and ischemic presentations, the landscape of cardiovascular therapeutics is expanding in both breadth and precision. The arrhythmogenic potential of viral myocarditis, long overshadowed by inflammatory and contractile sequelae, is now being more rigorously delineated.[24] Arrhythmias and conduction disturbances, sometimes presenting in the convalescent phase, may underlie unexplained sudden cardiac death in this population. Recognizing this hidden burden prompts a re-evaluation of screening strategies and the potential role for early electrophysiological monitoring. Meanwhile, the role of pharmacologic agents such as angiotensin receptor neprilysin inhibitors (ARNIs) continues to grow.[25] Originally approved for HFrEF, ARNIs now show promise across a broader spectrum (including HFpEF, arrhythmias, hypertension, and chronic kidney disease), through mechanisms that extend beyond neurohormonal modulation to include antifibrotic, vasodilatory, and antiapoptotic effects. The therapeutic horizon also includes procedural innovation. Percutaneous left atrial appendage occlusion (LAAO), initially reserved for high-risk patients contraindicated to oral anticoagulants, is

being refined through better imaging, procedural standardization, and device technology.[26, 27] As safety profiles improve, LAAO may emerge as a mainstream option for stroke prevention in atrial fibrillation, especially in the context of bleeding risk or drug intolerance. These trends reflect a broader shift toward personalized intervention – where structural therapies, systemic pharmacology, and rhythm management coalesce. Importantly, the overarching theme across these studies is integration: molecular diagnostics, imaging modalities, and clinical scoring systems are increasingly converging to offer a holistic view of cardiovascular health. This convergence not only enhances diagnostic precision and therapeutic targeting but also fosters the emergence of a cardiovascular practice that is at once mechanistically informed, data-driven, and deeply patient-centered.

In conclusion, the works featured hereby exemplify the convergence of mechanistic insights, diagnostic refinement, and therapeutic innovation in cardiovascular medicine. From RNA biomarkers to procedural optimization and systemic care strategies, each contribution advances the shared goal of patient-centered precision care. Continued collaboration and data integration will be essential to sustain momentum and translate emerging science into meaningful outcomes.

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Conflicts of interest

Giuseppe Biondi-Zoccai has served as consultant, lecturer and/or served as advisory board member for Abiomed, Advanced Nanotherapies, Aleph, Amarin, AstraZeneca, Balmed, Cardionovum, Cepton, Crannmedical, Endocore Lab, Eukon, Guidotti, Innovheart, Meditrial, Menarini, Microport, Opsens Medical, Synthesa, Terumo, and Translumina, outside the present work.

Authors' contributions

All authors read and approved the final version of the manuscript.

Acknowledgements

This manuscript was drafted with the assistance of artificial intelligence tools, including ChatGPT 4 (OpenAI, San Francisco, CA, USA), in keeping with established best practices (Biondi-Zoccai G. ChatGPT for Medical Research. Turin: Edizioni Minerva Medica; 2024). The final content, including all conclusions and opinions, has been thoroughly revised, edited, and approved by the authors. The authors take full responsibility for the integrity and accuracy of the work and retain full credit for all intellectual contributions. Compliance with ethical standards and guidelines for the use of artificial intelligence in research has been ensured.

History

Manuscript accepted: July 9, 2025. - Manuscript received: July 9, 2025.

(*Cite this article as*: Biondi-Zoccai G, Dalla Vecchia LA, Indolfi C, Frati G. Collaboration: the way forward for cardiovascular researchers, physicians, societies, and journals. Minerva Cardiol Angiol 2025;73:545-8. DOI: 10.23736/S2724-5683.25.07041-3)