New horizons in acute cardiovascular care: from tiny hearts to timely diagnoses

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As we open this issue of *European Heart Journal – Acute Cardiovascular Care*, we celebrate a landmark moment: the journal's inaugural focus on paediatric acute cardiovascular and intensive care. This expansion reflects not only a growing scientific interest but a clinical imperative—children with acute cardiac illnesses demand specialized, evidence-driven strategies, and until now, their needs have been underrepresented in the acute cardiovascular literature. Our attention also turns to an increasingly important population: Grown-Up Congenital Heart Disease (GUCH) or GRUNCH or Adult Congenital Heart Disease (ACHD). Thanks to advances in paediatric cardiology and surgery, more patients with congenital heart disease now survive in adulthood, bringing with them complex anatomical and physiological challenges. These patients often present acutely, requiring an integration of congenital expertise with adult intensive cardiac care—a demand that is reshaping the landscape of emergency and critical cardiovascular services across Europe. Their inclusion as the journal's editor's choice this month is a natural extension of our commitment to comprehensive and inclusive acute cardiovascular care. Parallel to these clinical shifts is an equally profound transformation in how we conceptualize coronary disease. As outlined in the recent *Lancet* publication,[1] there is a growing consensus that coronary artery disease (CAD) must be reframed as atherosclerotic CAD (ACAD). Moving away from a late-stage focus on ischaemia and obstruction, this reframing promotes early detection and lifelong prevention strategies—essential tenets for reducing cardiovascular morbidity and mortality on a global scale. This shift is not merely semantic; it is foundational, advocating for a proactive, rather than reactive, model of care.

Meanwhile, the management of catastrophic pulmonary embolism (PE) continues to challenge clinicians across the acute care spectrum.[2–5] As these shifts redefine the contours of acute cardiovascular care, the persistent challenges posed by catastrophic PE remind us that innovation must span the full spectrum—from paediatric heart failure to life-threatening thromboembolic events—each demanding tailored, evidence-based solutions.

We are happy to host the retrospective cohort study by Kurkiewicz-Sawczak et al.,[6] highlighting the complex and heterogeneous landscape of paediatric acute heart failure (AHF). Their study of 162 infants and young children—many just over a year old—

reveals both the severity and the potential for improvement in this vulnerable group. The 12.3% in-hospital mortality is a stark reminder of the stakes, while nearly 71% of patients showed significant echocardiographic improvement with appropriate care. Importantly, outcomes varied by aetiology: children with cardiomyopathies fared worse, whereas those with infections tended to recover more favourably. These insights emphasize the urgent need for tailored therapeutic strategies and multicentre trials to improve paediatric heart failure outcomes. This manuscript is put into perspective by an editorial from Mireles-Cabodevila and Chatburn.[7]

This new paradigm is echoed in the work of Doudesis et al.,[8] who introduce CoDE-HF, a machine learning–based decision-support tool for diagnosing AHF. Their comprehensive meta-analysis, which spans over 12 000 patients across 14 international studies, reveals that traditional fixed thresholds for biomarkers such as B-type natriuretic peptide and mid-regional pro-atrial natriuretic peptide often fail to capture the complexity of clinical presentation. CoDE-HF integrates clinical variables with biomarker levels to offer enhanced diagnostic accuracy—classifying nearly half of patients as low probability for AHF with a 98.5% negative predictive value. This tool exemplifies how artificial intelligence can sharpen clinical precision, particularly in high-stakes, time-sensitive environments.

Another important advance in our understanding of cardiovascular risk comes from the study by Roule et al.,[9] which focuses on SMuRF-less ST-segment elevation myocardial infarction (STEMI) patients—those who suffer myocardial infarction despite lacking standard modifiable risk factors. Their analysis of 1604 STEMI cases identifies a troubling trend: SMuRF-less patients not only have worse outcomes, including an 18.5% 1-year mortality, but also demonstrate elevated markers of subclinical inflammation (interleukin-1β and high-sensitivity C-reactive protein) and impaired HDL function. These findings suggest a new pathophysiological narrative—one that implicates immune-metabolic dysfunction rather than traditional lipid or hypertensive pathways. In this context, early intervention in ACAD becomes even more urgent, and novel therapeutic targets such as inflammation may offer new hope.

Tailoring therapy in a more wholistic framework is a theme carried on by Baltsen et al.,[3] who, in an elegant porcine model, tested the

haemodynamic effects of targeted ventilator settings in acute PE. Their randomized, controlled interventions—including reducing PEEP, increasing FiO_2, inducing hypocapnia, and metabolic alkalosis—all significantly lowered mean pulmonary artery pressure and reduced right ventricular afterload. This physiological insight offers a potential lifeline for patients who require mechanical ventilation in PE, pointing to a lower-risk strategy to stabilize cardiopulmonary dynamics in the acute phase.

Clinical data from the University Hospitals Leuven further underscore the gravity of catastrophic PE. Verstraete et al.[10] reviewed 90 adult patients treated with advanced therapies including thrombolysis, surgical thrombectomy, and veno-arterial extracorporeal membrane oxygenation. Among those classified as catastrophic PE—many presenting with cardiac arrest—the in-hospital mortality reached a staggering 57%. Notably, surgical thrombectomy was associated with significantly lower mortality (9%) compared with thrombolysis (49%), and major bleeding complications were confined to thrombolysis recipients. These sobering statistics call for refined selection algorithms, improved access to mechanical circulatory support, and the development of standardized care pathways to improve outcomes in these critically ill patients.

In closing, this issue of the *European Heart Journal – Acute Cardiovascular Care* reflects a field that is expanding—across the lifespan, across disciplines, and across frontiers of knowledge. From fragile paediatric hearts to adult patients with inherited cardiac legacies, from machine-enhanced diagnostics to precision ventilation strategies, we see a common thread: the need for rapid, tailored, and forward-looking interventions. We are proud to welcome paediatric and congenital heart disease specialists into our community of authors and readers. Acute cardiovascular care is no longer confined to the boundaries of adult pathology—it is lifespan-spanning, multidisciplinary, and driven by innovation. We hope this issue inspires clinicians, researchers, and policymakers alike to continue pushing the boundaries of what is possible in our shared mission to save lives.

Warm regards,
The Editors
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Author contributions

Pascal Vranckx (Writing—original draft [lead]), David Morrow (Writing—review & editing [equal]), Sean van Diepen (Writing—review & editing [equal]), and Frederik H. Verbrugge (Writing—review & editing [equal])

Data availability

No new data were generated or analysed in support of this research.

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