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A journey in structural heart failure

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EDITORIAL

A journey in structural heart failure

Cardiovascular disease (CVD) is the leading cause of death in Western countries [1, 2]. Structural heart disease refers to conditions that affect the heart valves, walls, chambers, or muscles, with dyspnoea being the common cardinal symptom [3–5]. Heart failure (HF) with preserved ejection fraction (HFpEF) represents nearly half of all HF cases. We have already addressed the difficult question of clinical diagnosis of HFpEF [6, 7]. Wang et al. showed that HFA-PEFF and H2FPEF scores can be used to effectively rule out or confirm HFpEF [7], with the caveat that patients without a high risk score might require interventional catheterisation or stress testing [8]. Growth differentiation factor 15 (GDF-15) is a member of the transforming growth factor-β cytokine superfamily with immunosuppressive, anti-apoptotic, and anti-inflammatory properties [9]. In this issue, Wang et al. reported the high diagnostic value of GDF-15 in patients with HFpEF (Figure 1) [10].

Inflammation has been recognised as a major pathophysiological contributor to HF. Periodontal disease is one of the most prevalent systemic inflammatory diseases worldwide [11]. In their systematic review and meta-analysis, Leelaviwat et al. showed that periodontal disease is associated with an increased risk of HF. Better oral health could therefore constitute an easily modifiable risk factor to reduce the risk of HF, although larger studies are needed to validate this result (Figure 2) [12].

Coronary artery disease (CAD) is a major contributor to cardiovascular disease and HF [4]. Management of CAD is now better guided by the physiological significance of coronary artery stenosis, which can be assessed during invasive coronary angiography by measuring fractional flow reserve (FFR) during adenosine-induced hyperaemia, which can however cause some discomfort to patients [13, 14]. The instantaneous wave-free ratio (iFR), which is a type of non-hyperemic pressure ratio (NHPR), is an innovative test that does not involve the additional administration of drugs [15]. In their, meta-analysis, comprising 1,084 patients with 1,312 lesions, Luo et al. showed that resting full-cycle ratio (RFR), a new non-congestive resting index, has good diagnostic accuracy in detecting coronary ischaemic lesions and may be an effective alternative to FFR in the future [16]. Treatment of CAD is aimed at alleviating angina symptoms and preventing myocardial infarction or premature death. Coronary artery bypass graft (CABG) provides an effective treatment option for patients with CAD. However, patients undergoing CPB may develop systemic inflammatory responses and organ dysfunction, resulting in dismal postoperative outcomes [17]. In their animal study, Zhang et al. showed that overexpression of hypoxia-inducible factor-1alpha (HIF-1α) can improve myocardial injury in cardiopulmonary bypass rats *via* the miR-124-3p/NR4A1 axis [18].

Low-density lipoprotein cholesterol (LDL-C) is a well-established risk factor for cardiovascular disease development [19]. The study by Jiang et al. sheds light on the complex relationship between LDL-C levels and all-cause mortality in patients with idiopathic dilated cardiomyopathy (iDCM) [20, 21]. Indeed, in their retrospective study concerning 1058 patients with iDCM, the authors showed that lower LDL-C level was associated with an increased risk of all-cause mortality. The correlation between mortality and LDL-C level was stronger in patients with worse heart function (Figure 3) [21]. The exact reasons for this

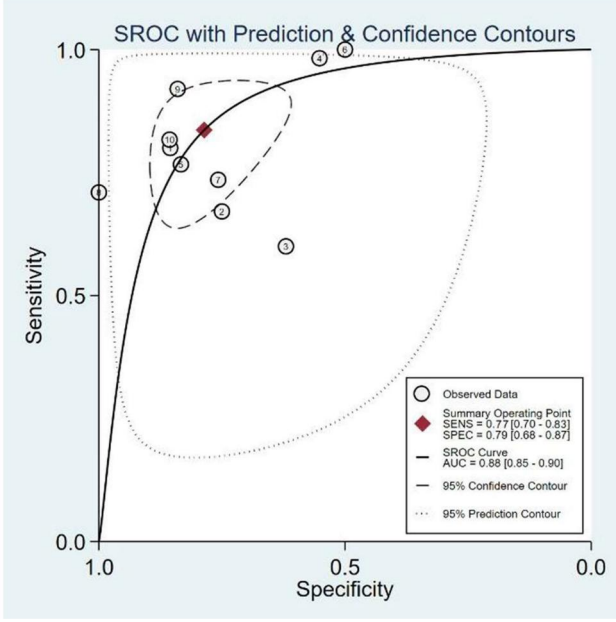

Figure 1. SROC plot of GDF-15 for HFpEF diagnosis (from reference [10]).

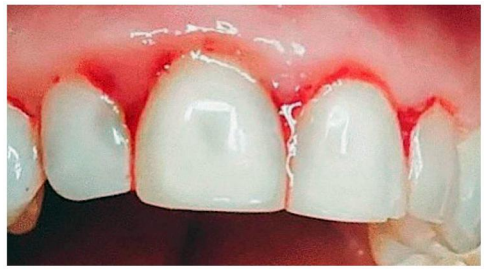

Figure 2. An early stage of periodontitis demonstrates bleeding and puffy gum (from reference [12]).

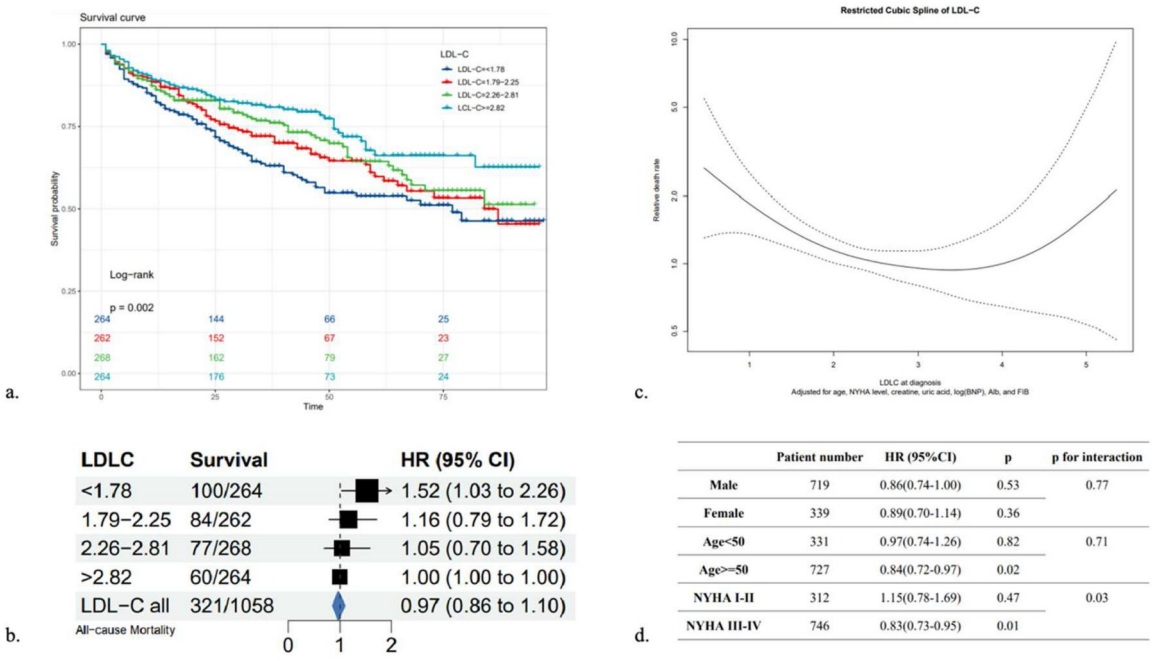

Figure 3. (a) Kaplan–Meier estimates for cumulative survival in patients of different LDL-C levels. (b) Multivariable adjusted hazard ratios for all-cause mortality according to levels of LDL-C on a continuous scale. (c) Forest plot of multivariable-adjusted hazard ratios for all-cause mortality. (d) Interaction and stratified analysis according to potential interaction factors. LDL-C: low-density lipoprotein cholesterol (from reference [21]).

paradoxical observation as referrered to as the 'lipoprotein paradox' still remain enigmatic.

The goal of therapy for chronic HF is to improve symptom management and quality of life, decrease hospitalisations, and decrease overall mortality associated with this disease. The core foundational medication classes for HFrEF includes a renin-angiotensin system inhibitor (such as an angiotensin receptor neprilysin inhibitor (ARNI), angiotensin-converting enzyme (ACE) inhibitor, or angiotensin II receptor blockers (ARB)), a beta-blocker, a mineralcorticoid receptor antagonist (MRA) and a sodium-glucose co-transporter 2 Inhibitor (SGLT2i) [3, 22–24]. In their article, El-Hefny et al. presented novel findings on the predictive value and difference in serum aldosterone level between right side HF, HFrEF and HFpEF, and compared the efficacy and safety of adding MRA for treatment of right HF versus left HF. A total of 151 patients were studied. As expected, aldosterone levels were significantly higher in HF patients than in controls, although levels were lower in right HF than left HF. In the HFrEF group, there was a significant decrease in LV end diastolic dimension and a significant increase in LVEF after treatment. In the HFpEF group, there was a significant decrease in E/A and E/e' after MRA treatment [25]. In acute pulmonary embolism (APE), echocardiographic markers of right ventricular (RV) dysfunction (d) or RV pressure overload (PO) have been used for risk stratification of APE [26, 27]. Ballas et al. showed that non-conventional echocardiographic indices of $RV_{d/PO}$ were correlated with biochemical and clinical prognostic markers and *RV free wall longitudinal strain (*FWLS) was by far the most frequent index of $RV_{d/PO}$ in patients with APE. These findings suggest that conventional echocardiographic markers of $RV_{d/PO}$ underestimate the true incidence of RVd in patients with APE [28].

In this issue of Acta Cardiologica, several focus images and cases highlighting interesting clinical conditions have also been reported [29–38].

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

[1] Lancellotti P, Cosyns B. Highlights of acta cardiologica. Acta Cardiol. 2022;77(6):469–470. doi:10.1080/00015385.2022.2143092.

[2] Lancellotti P, Postolache A, Dulgheru R. Highlights of imaging heart structure and function. Acta Cardiol. 2023;78(4):383–386. doi:10.1080/00015385.2023.2206690.

[3] Lancellotti P, Ribeiro Coelho S, Nguyen Trung ML, et al. Special issue on heart failure. Acta Cardiol. 2023;78(2):165–167. doi:10.1080/00015385.2023.2182985.

[4] Lancellotti P, Petitjean H, Nchimi A, et al. Special issue on ischemic heart disease. Acta Cardiol. 2023;78(1):1–4. doi:10.1080/00015385.2023.2170563.

[5] Lancellotti P, Piette C. Special issue on atrial fibrillation. Acta Cardiol. 2023;78(3):269–273. doi:10.1080/00015385.2023.2205277.

[6] Lancellotti P. Special issue on diagnosis and management of heart failure. Acta Cardiol. 2023;78(7):749–753. doi:10.1080/00015385.2023.2250199.

[7] Wang Z, Fang J, Hong H. Evaluation the value of H2FPEF score and HFA-PEFF step E score in the diagnosis of heart failure

with preserved ejection fraction. Acta Cardiol. 2023;78(7):790–795.
[8] Özlek B, Özlek E. How useful are the H2FPEF and HFA-PEFF scoring algorithms in the diagnosis of heart failure with preserved ejection fraction? Acta Cardiol. 2023 Sep 12:1–2. doi:10.1080/00015385.2023.2257522.
[9] Santhanakrishnan R, Chong J, Ng TP, et al. Growth differentiation factor 15, ST2, high-sensitivity troponin T, and N-terminal pro brain natriuretic peptide in heart failure with preserved versus reduced ejection fraction. Eur J Heart Fail. 2012;14(12):1338–1347. doi:10.1093/eurjhf/hfs130.
[10] Wang C, Gu Z, Guo Y. Meta-analysis of the applied value of the growth differentiation factor 15 detection in HFpEF diagnosis. Acta Cardiol. 2023;78(10):1120–1128. doi:10.1080/00015385.2023.2266670.
[11] Carrizales-Sepúlveda EF, Ordaz-Farías A, Vera-Pineda R, et al. Periodontal disease, systemic inflammation and the risk of cardiovascular disease. Heart Lung Circ. 2018;27(11):1327–1334. doi:10.1016/j.hlc.2018.05.102.
[12] Leelaviwat N, Kewcharoen J, Trongtorsak A, et al. Association between periodontal disease and heart failure: a systematic review and Meta-Analysis. Acta Cardiol. 2023 Sep 28:1–5. doi:10.1080/00015385.2023.2259192.
[13] Picano E. Coronary flow velocity reserve with transthoracic echocardiography: a game changer. Acta Cardiol. 2023;78(4):491–494. doi:10.1080/00015385.2021.1980957.
[14] Kasinadhuni G, Batta A, Gawalkar AA, et al. Validity and correlation of quantitative flow ratio with fractional flow reserve for assessment of intermediate coronary lesions. Acta Cardiol. 2023;78(1):91–98. doi:10.1080/00015385.2022.2059857.
[15] Jerabek S, Zemanek D, Pudil J, et al. Endothelial dysfunction assessed by digital tonometry and discrepancy between fraction flow reserve and instantaneous wave free ratio. Acta Cardiol. 2020;75(4):323–328. doi:10.1080/00015385.2019.1586089.
[16] Luo Y, Mao M, Wu F, et al. Diagnostic performance of resting Full-Cycle ratio in identifying coronary lesions causing myocardial ischemia: a meta-analysis. Acta Cardiol. 2023;78(10):1103–1109.
[17] Tan A, Newey C, Falter F. Pulsatile perfusion during cardiopulmonary bypass: a literature review. J Extra Corpor Technol. 2022;54(1):50–60. doi:10.1051/ject/202254050.
[18] Zhang M, Zhou N, Cao F, et al. The role and regulatory mechanism of HIF-1α in myocardial injury in rats undergoing cardiopulmonary bypass. Acta Cardiol. 2023;78(10):1070–1080. doi:10.1080/00015385.2023.2229584.
[19] Deconinck A, Morra S, Glassée N, et al. Value of repeated measurements of lipoprotein (a) to assess cardiovascular risk: a retrospective study. Acta Cardiol. 2023;78(5):536–542. doi:10.1080/00015385.2022.2031377.
[20] Sveric KM, Linke A, Winzer EB. Commentary to association between low-density lipoprotein cholesterol level and all-cause mortality in idiopathic dilated cardiomyopathy patients: a single-institutional study. Acta Cardiol. 2023;78(10):1156–1157. doi:10.1080/00015385.2023.2268421.
[21] Jiang K, Pu X, Liu Y, et al. Association between low-density lipoprotein cholesterol level and all-cause mortality in idiopathic dilated cardiomyopathy patients: a single-institutional study. Acta Cardiol. 2023;78(10):1081–1088. doi:10.1080/00015385.2023.2243127.
[22] Rosano GMC, Allen LA, Abdin A, et al. Drug layering in heart failure: phenotype-Guided initiation. JACC Heart Fail. 2021;9(11):775–783. doi:10.1016/j.jchf.2021.06.011.
[23] Iacoviello M, Marini M, Gori M, et al. DAPA-HF applicability: the point of view of a cardiology setting. Acta Cardiol. 2023;78(7):840–845. doi:10.1080/00015385.2023.2243130.
[24] Yuheng J, Yanyan L, Song Z, et al. The effects of sacubitril/valsartan on heart failure with preserved ejection fraction: a meta-analysis. Acta Cardiol. 2022;77(6):471–479. doi:10.1080/00015385.2021.1963101.
[25] El-Hefny NEAM, Mohammed HSE, El-Mahdy RI, et al. Serum aldosterone in right ventricular failure versus left ventricular failure before and after mineralocorticoid receptor antagonists: case-control clinical trial. Acta Cardiol. 2023;78(10):1110–1119. doi:10.1080/00015385.2023.2266648.
[26] Siniscalchi C, Palumbo A, Rocci A, et al. Usefulness of echocardiographic McConnell's sign in the computerized-medicine-era. Acta Cardiol. 2019;74(4):365–366. doi:10.1080/00015385.2018.1507304.
[27] Sekulic I, Dzudovic B, Matijasevic J, et al. Ultrasound assisted thrombolysis in intermediate-risk patients with pulmonary thromboembolism. Acta Cardiol. 2020;75(7):623–630. doi:10.1080/00015385.2019.1646850.
[28] Ballas C, Lakkas L, Kardakari O, et al. What is the real incidence of right ventricular affection in patients with acute pulmonary embolism? Acta Cardiol. 2023;78(10):1089–1098. doi:10.1080/00015385.2023.2246197.
[29] Alhage EM, Coquilhat A, Viaene D. Incidental finding of an aneurysmal dilatation of pericardial patch closure of ventricular septal defect, completed by multi-modality imaging. Acta Cardiol. 2023;78(10):1131–1132. doi:10.1080/00015385.2023.2229598.
[30] Anghel L, Castro Rodriguez J, Dessy H, et al. Hypertension during pregnancy unveils a congenital triade. Acta Cardiol. 2023;78(10):1133–1135. doi:10.1080/00015385.2023.2232689.
[31] Mondal S, Raj R R, Gopalakrishnan A, et al. Scimitar syndrome with hemi-cor triatriatum. Acta Cardiol. 2023;78(10):1136–1137. doi:10.1080/00015385.2023.2232690.
[32] Konishi T, Funayama N, Hotta D, et al. Deep vein thrombosis due to left iliac vein compression syndrome complicated by acute pulmonary thromboembolism and cerebral infarction. Acta Cardiol. 2023;78(10):1138–1139. doi:10.1080/00015385.2023.2250945.
[33] Liu C, Plein D, Van Loo I, et al. Coronary to left ventricular fistula following septal myectomy. Acta Cardiol. 2023;78(10):1144–1145. doi:10.1080/00015385.2023.2250946.
[34] Ferreira J, Gonçalves S, Coelho R, et al. What lies beneath peripheral edema and atrioventricular block. Acta Cardiol. 2023;78(10):1146–1148. doi:10.1080/00015385.2023.2256183.
[35] Mondal S, Sivadasanpillai H, Poyuran R. Olfactory Schwannoma with hypertrophic cardiomyopathy: Incidental association? Acta Cardiol. 2023;78(10):1149–1150. doi:10.1080/00015385.2023.2256184.
[36] Pujitha V, Pandey NN, Kumar S, et al. Variant course of left atrial circumflex artery mimicking a dual left circumflex artery. Acta Cardiol. 2023 Sep 28:1–2. doi:10.1080/00015385.2023.2259194.
[37] Pujitha V, Pandey NN, Kumar S, et al. Anomalous band in the right atrium: depiction on virtual dissection. Acta Cardiol. 2023;78(10):1151–1152. doi:10.1080/00015385.2023.2268419.
[38] Mondal S, Kumar SS, Iliyas M. Atrial myxoma presenting as bilateral cerebellar infarct and mitral obstruction. Acta Cardiol. 2023;78(10):1153–1155. doi:10.1080/00015385.2023.2268420.

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