7 PROGNOSTIC VALUE OF LEFT ATRIAL STRUCTURE AND FUNCTION IN DILATED CARDIOMYOPATHY

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10.1136/heartjnl-2024-BSCMR.5

Introduction Improvements in cardiac magnetic resonance (CMR) have enabled better phenotyping of the left atrium (LA). However, little is known of the incremental prognostic value of the novel LA measurements (phasic LA strain, LA ejection fraction [LAEF], and LA minimum volume [LAVImin]) compared to LA maximum volume [LAVImax] in dilated cardiomyopathy (DCM). Thus, we decided to evaluate the prognostic value of each LA measure in DCM.

Materials and Methods CMR studies of 580 DCM patients, in sinus rhythm, prospectively enrolled into a biobank between 2009 and 2017 were used. The primary endpoint was a composite of cardiovascular (CV) mortality and non-fatal major heart failure (HF) events, which included HF hospitalisations, heart transplantation or Left Ventricular (LV) assist device implantation. Event rates were compared between patients in sinus rhythm and those with persistent atrial fibrillation (AF).

Results Over a median follow-up duration of 7.4 years (IQR 4.7–9.3), 103 patients (18%) met the primary endpoint. On univariable Cox regression analysis, all LA metrics were significantly associated with the primary endpoint (all, $p<0.05$). All indices, apart from LA conduit strain, remained associated with the endpoint on multivariate analyses adjusted for age, sex, NYHA, LV ejection fraction and the presence of fibrosis (all, $p<0.05$). The addition of the LA metrics to a baseline model containing conventional risk predictors improved model discrimination, with LAVImin providing the greatest improvement (C-statistic 0.702 to 0.738), similar to that of LAVImax (C-Statistic: 0.702 to 0.732) and LAEF (C-Statistic: 0.702 to 0.734). LA strain variables did not improve baseline model discrimination over LA volumes. Patients in the highest tercile of LAVImin had similar event rates to those with persistent atrial fibrillation.

Discussion In line with previous studies, LA structure and function was independently associated with CV death and HF events. LA volumes and LAEF provided better prognostication than LA strain. Amongst the volumes, LAVImin improved baseline model discrimination better than LAVImax, perhaps because it reflects both LA structure and function. This is important as LAVImin can easily be added to CMR reporting protocols.

Conclusion LA metrics provide incremental prognostic information in DCM patients. LA strain did not provide any additional prognostic information over LA volumes.

Acknowledgements We would like to thank the Royal Brompton and Harefield Cardiovascular Research Centre nurses and support staff.

8 ASSOCIATION BETWEEN SUBCLINICAL RIGHT VENTRICULAR ALTERATIONS AND AEROBIC EXERCISE CAPACITY IN TYPE 2 DIABETES

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10.1136/heartjnl-2024-BSCMR.6

Introduction Type 2 Diabetes (T2D) leads to cardiovascular remodelling, and heart failure has emerged as a major complication of T2D. There is a limited understanding of the impact of T2D on the right heart. This study aimed to assess subclinical right heart alterations and their contribution to aerobic exercise capacity (peak VO_2) in adults with T2D.

Materials and Methods Single centre, prospective, case-control comparison of adults with and without T2D, and no prevalent cardiac disease. Comprehensive evaluation of the left and right heart was performed using transthoracic echocardiography and multiparametric stress cardiovascular magnetic resonance. Cardiopulmonary exercise testing on a bicycle ergometer with expired gas analysis was performed to determine peak VO_2. Between group comparison was adjusted for age, sex and ethnicity using ANCOVA. Multivariable linear regression including key clinical and left heart variables, was undertaken in people with T2D to identify independent associations between measures of right ventricular (RV) structure and function with peak VO_2.

Results 340 people with T2D (median age 64 years, 62% male, mean HbA1c 7.3%) and 46 controls (median age 59 years, 59% male, mean HbA1c 5.5%) were included. T2D participants had markedly lower peak VO_2 (19.9±5.3 vs. 24.2 ±5.9mL/kg/min, $P<0.001$) than controls and had smaller left ventricular (LV) volumes, LV concentric remodelling and reduced LV systolic strain. Those with T2D also had lower RV volumes (indexed RV end-diastolic volume: 85±20 vs. 96 ±19mL/m, $P<0.001$) with evidence of hyperdynamic RV systolic function (circumferential strain: 16.0±3.1 vs. 14.7 ±3.7%, $P=0.018$) and impaired RV relaxation (circumferential peak early diastolic strain rate: 0.56±0.15 vs. 0.60±0.20 s^{-1}, $P=0.047$; peak late diastolic strain rate: 0.33±0.16 vs. 0.24 ±0.11 s^{-1}, $P=0.001$). Multivariable linear regression demonstrated that RV end-diastolic volume (β =-0.240, $P=0.002$), RV cardiac index (β = 0.316, $P<0.001$) and RV circumferential peak late diastolic strain rate (β = -0.148, $P=0.018$), but not LV parameters, were independent determinants of peak VO_2.

Discussion

Conclusion In T2D, RV remodelling and diastolic dysfunction are key determinants of aerobic exercise capacity, independent of left heart alterations.

Acknowledgements