Conflict of Interest CO has received travel support from Biomarin and Amicus therapeutics, as well as a research grant from Amicus therapeutics

150 CARDIOVASCULAR MAGNETIC RESONANCE IMAGING IN PATIENTS WITH CLINICAL POST-COVID-19 SYNDROME

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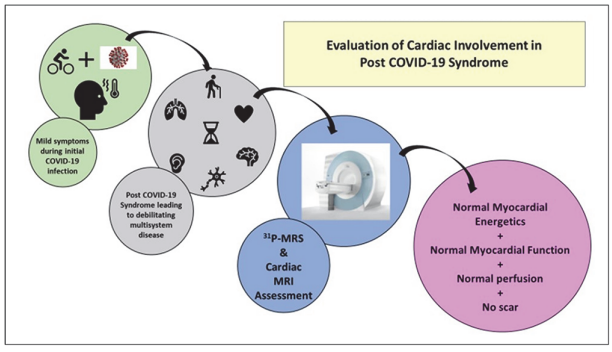
Introduction The underlying pathophysiology of Post-COVID-19 syndrome remains unknown, but increased cardiometabolic demand and state of mitochondrial dysfunction have emerged as candidate mechanisms. Cardiovascular magnetic resonance (CMR) provides insight into pathophysiological mechanisms underlying cardiovascular disease and 31-phosphorus magnetic resonance spectroscopy (31P-MRS) allows non-invasive assessment of the myocardial energetic state. We sought to assess whether Post-COVID-19 syndrome is associated with abnormalities of myocardial structure, function, perfusion and tissue characteristics or energetic derangement. (Figure 1)Methods- Prospective case-control study. A total of 20 patients with a clinical diagnosis of Post-COVID-19 syndrome (seropositive) and no prior underlying cardiovascular disease (CVD) and ten matching controls underwent 31P-MRS and CMR at 3T at a single time point. All patients had been symptomatic with acute COVID-19, but none required hospital admission. Results- Between the Post-COVID-19 syndrome patients and matched contemporary controls there were no differences in myocardial energetics (phosphocreatine to ATP ratio), in cardiac structure (biventricular volumes, left ventricular mass), function (biventricular ejection fractions, global longitudinal strain), tissue characterization (T1 and extracellular volume [ECV] fraction mapping, late gadolinium enhancement) or perfusion (myocardial rest and stress blood flow, myocardial perfusion reserve). (Table 1) One patient with Post-COVID-19 syndrome showed subepicardial hyperenhancement on the late gadolinium enhancement imaging compatible with prior myocarditis, but no accompanying abnormality in cardiac size, function, perfusion, ECV, T1, T2 mapping or energetics. This patient was excluded from statistical analyses. Conclusion- In this study, the overwhelming majority of patients with a clinical Post-COVID-19 syndrome with no prior CVD did not exhibit any abnormalities in myocardial energetics, structure, function, blood flow or tissue characteristics.

Conflict of Interest None



Abstract 150 Figure 1 Evaluation of Cardiac Involvement in Post COVID-19 Syndrome

Abstract 150 Table 1 Comparison of ^{31}P-MRS and CMR findings between patients with Post-COVID-19 syndrome and healthy volunteers

Variable	Healthy volunteers (n=10)	Post-COVID-19 Syndrome (n=19)	p-value
PCr/ATP ratio	2.11±0.5	2.24±0.4	0.49
LV end diastolic volume index (ml/m^2)	87±20	81±10	0.43
LV ejection fraction (%)	64±4	61±4	0.07
RV end diastolic volume index (ml/m^2)	93±23	83±13	0.24
RV ejection fraction (%)	55±8	57±6	0.49
Global longitudinal strain (%)	-13.3±2.3	-11.9±3.7	0.21
Mean T1 (ms)	1206±64	1158±114	0.15
Extra-cellular volume (%)	25±2.3	22±4.5	0.03
T2 (ms)	39±2.4	40±2.9	0.46
MPR	3.1±0.9	3.0±0.8	0.89

Continuous variables are expressed as mean (SD) or median (IQR) and categorical variables as number (%). PCr/ATP=phosphocreatine and adenosine triphosphate ratio; LV=left ventricular; ml/m2=milliliters per square meter of body surface area; RV=right ventricular; ms=milliseconds; MPR=myocardial perfusion reserve.

151 MANGANESE ENHANCED MAGNETIC RESONANCE IMAGING IN TYPE 1 AND TYPE 2 DIABETES MELLITUS

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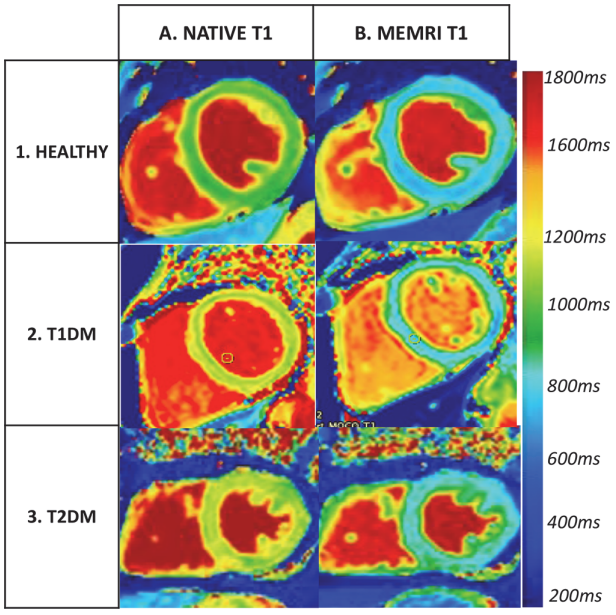
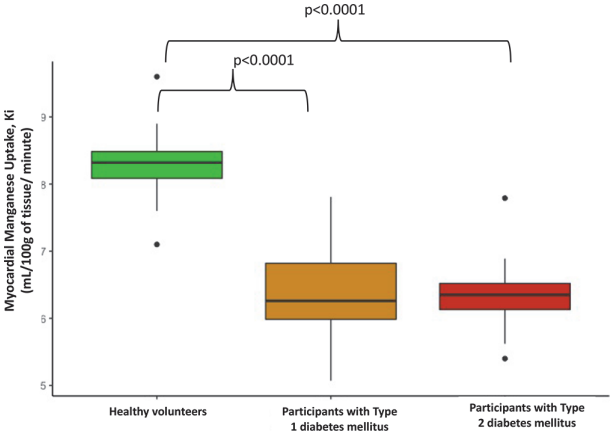
Introduction The pathophysiology of diabetic cardiomyopathy has yet to be established although pre-clinical studies suggest a role for altered myocardial calcium handling. Manganese-enhanced magnetic resonance imaging (MEMRI) is a novel non-invasive method of assessing in vivo myocardial calcium handling. The purpose of this study was to investigate whether myocardial calcium handling is impaired in patients with either type 1 or type 2 diabetes mellitus in the absence of underlying heart disease.

Methods In a prospective case-control study, patients with type 1 (n=19) or type 2 (n=10) diabetes mellitus and healthy volunteers (n=15) underwent MEMRI. Participants with prior coronary artery disease, cardiomyopathy or an abnormal electrocardiogram were excluded. Manganese dipyridoxyl diphosphate (0.1 mL/kg) was administered over 10 min and



Abstract 151 Figure 1 Manganese-enhanced magnetic resonance imaging (MEMRI) in patients with type 1 and type 2 diabetes mellitus. Column A shows baseline native T1 maps and column B shows post-contrast T1 maps obtained 30 min after manganese contrast infusion in (1) a healthy volunteer, (2) a participant with type 1 diabetes mellitus (T1DM) and (3) a participant with type 2 diabetes mellitus (T2DM)



Abstract 151 Figure 2 Myocardial manganese uptake in healthy volunteers, participants with type 1 diabetes mellitus and type 2 diabetes mellitus

myocardial T1 mapping was performed prior to and every 2.5 min for 30 min after contrast infusion (Figure 1). Quantitative manganese uptake analysis was performed by measuring T1 relaxation times in a region of interest within the interventricular septum and compared to the left ventricular blood pool. The rate of myocardial manganese uptake was determined by Patlak modelling [1].Results:Participants with type 1 and type 2 diabetes mellitus were older (50±13 and 55±15.3 years) than the healthy volunteers (32±10 years). All participants had preserved left ventricular ejection fraction (type 1 diabetes mellitus, 67.7±6.1%; type 2 diabetes mellitus, 66.8±3.2%; healthy volunteers, 65±3.5%). Mean myocardial manganese uptake was reduced in participants with both type 1 (6.4±0.6 mL/100 g of tissue/min) and type 2 (6.4±0.5 mL/100 g of tissue/min) diabetes mellitus compared with healthy volunteers (8.3±0.5 mL/100 g of tissue/min; p<0.0001 for both, Figure 2). There were no differences in myocardial manganese uptake between those with type 1 or type 2 diabetes mellitus (p=0.22). There was no statistically significant correlation between myocardial manganese uptake and age in the study population (r=-0.28, p=0.07).

Conclusion Using MEMRI, we have demonstrated that myocardial calcium handling is impaired in patients with either type 1 or type 2 diabetes mellitus even in the absence of left ventricular systolic dysfunction. This suggests altered myocardial calcium handling may underlie, or contribute to, diabetic cardiomyopathy which has implications in developing novel therapeutic targets for the prevention and treatment of diabetic cardiomyopathy. [1] Skjold, A et al. J Magn Reson Imaging 2006;24:1047–1055.

Conflict of Interest None

152 CT-DERIVED FRACTIONAL FLOW RESERVE – OUTCOMES FROM A DISTRICT GENERAL HOSPITAL-LED SERVICE

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Objectives As stipulated by the 2016 NICE Chest Pain of recent onset guidelines, Computed Tomography Coronary Angiography (CTCA) is the recommended first line investigation when stable angina cannot be excluded by clinical assessment alone (1). Non-invasive Computed Fractional Flow Reserve (CT-FFR; Heartflow) is a method which utilises CT data as a diagnostic tool in identification of patients that may benefit from coronary revascularisation (2). We aimed to evaluate the diagnostic utility of CT-FFR in a district general setting in predicting significant coronary disease, defined as a positive functional test or the need for revascularisation (percutaneous or coronary artery bypass grafting).Method:This was a single centre, retrospective study of patients who had CTCA with subsequent FFR analysis from July 2019 to February 2021 (n=106). Electronic records were used to determine subsequent downstream testing and revascularisation. Lesions were documented as concordant or discordant; the former indicating an FFR result that was in keeping with the reported anatomical severity and the latter indicated discrepant results. Due to the intermediate nature of CAD-RADS 3 results, CT-FFR findings could not be defined as either concordant or discordant. Positive and negative predictive values of both CTCA and CT-FFR in identifying significant coronary pathology were calculated.Results:106 patients underwent CTCA with FFR analysis. 15 were excluded from this study due to suboptimal image quality preventing reliable FFR results. The Positive Predictive Value (PPV) and Negative Predictive Value (NPV) for CTCA alone in predicting functionally significant coronary disease was 41.3% and 86.9%, respectively. When the CAD-RADS 3 cohort was eliminated, PPV increased to 71.4% and the NPV remained unchanged (86.9%). The combination of CTCA with FFR gives a Positive and Negative Predictive Value of 48.4% and 83.3%, respectively. With elimination of the CAD-RADS 3 group, PPV was 85.7% and NPV of 80%.

Conclusion As supported by previously published literature, the negative predictive value of both CTCA in isolation, and