THE IMPACT OF EXERCISE AND DIET INTERVENTION ON 18F-SODIUM FLUORIDE POSITRON EMISSION TOMOGRAPHY IN ACUTE AORTIC SYNDROME

Background Acute aortic syndrome is a catastrophic condition characterised by medial degeneration and cellular destruction within the aortic wall. 18F-Sodium fluoride (18F-NaF) positron emission tomography (PET) detects microscopic calcification as a marker of disease activity. This proof-of-concept study aims characterise 18F-NaF PET in patients with acute aortic syndrome.

Methods Aortic tissue obtained from patients with acute aortic syndrome was stained using von Kossa’s stain for calcium phosphate complexes and then exposed to 18F-sodium fluoride to confirm radiotracer binding to microcalcification. Next, patients with aortic dissection or intramural haematomas and healthy controls underwent 18F-NaF PET/CT and CT angiography of the aorta. A threshold of 12 weeks since diagnosis was used to classify patients to ‘recent’ or ‘prior’ acute aortic syndrome groups. Peak aortic 18F-NaF uptake was corrected for background blood pool activity to obtain a most-diseased segment tissue-to-background ratio (MDS TBRmax). Radiotracer binding was compared with aortic size in a linear regression model and major adverse aortic events (aortic rupture, aorta-related death or aortic repair) in a proportional hazard Cox survival analysis.

Results Aortic 18F-NaF uptake co-localized with histologically defined regions of microcalcification (n=15). Patients with acute aortic syndrome had increased 18F-NaF binding compared to healthy controls (TBRmax 2.02±0.42 (n=47) vs 1.36±0.39 (n=20) respectively, p<0.001). Peak radiotracer uptake occurred at the site of intimal disruption (+27.5% compared to the proximal aorta, p<0.001). 18F-NaF binding to the false lumen was associated with aortic growth (+7.1 mm/yr, p=0.011) and uptake in the outer aortic wall was associated with major adverse aortic events (hazard ratio 8.6 [95% CI, 1.1-68.1], p=0.041) in patients with recent acute aortic syndrome.

Conclusion 18F-NaF PET/CT uptake was increased in patients with acute aortic syndrome at sites of disease activity. Radiotracer binding was associated with aortic growth and clinical outcomes.
events. 18F-NaF PET-CT holds promise as a non-invasive marker of disease severity and future risk in patients with acute aortic syndrome.

Conflict of Interest None

MULTI-MODALITY IMAGING IN SURVIVORS OF COVID-19

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Background Widespread abnormalities of the myocardium have been reported in patients with COVID-19. However, these patients often have substantial co-morbidities and it is essential to understand whether cardiac abnormalities represent pre-existing disease or are the consequence of COVID-19.

Objective To determine the contribution and cardiac impact of co-morbidities in patients who have recovered from COVID-19.

Methods In a prospective observational study, adult patients hospitalized with confirmed COVID-19 were recruited from the Edinburgh Heart Centre between May and November 2020 and compared to healthy and co-morbidity-matched volunteers. Patients underwent gadolinium and manganese-enhanced magnetic resonance imaging and coronary computed tomography angiography.

Results Twenty-three patients (54±11 years, 20 male) who recovered from COVID-19 were recruited. Half (n=11, 48%) required admission to the intensive care unit and a third (n=7, 31%) received non-invasive or invasive ventilation. Patients had a high prevalence of known cardiovascular disease (n=18, 78%), associated risk factors (n=11, 45%) and coronary artery disease (n=8, 35%). Compared with younger healthy volunteers (n=10), myocardial native T1 values (1202±25 versus 1162±27 ms, P=0.008, figure 1) and extracellular volume fraction (31.9±1.7 versus 29.8±0.5 %, P=0.001, figure 1) were higher with no differences in manganese uptake. Compared to co-morbidity-matched volunteers (n=20), there were no differences in native T1 values (1202±25 versus 1196±39 ms, P=0.61, figure 1), extracellular volume fraction (31.9±1.7 versus 31.0±0.5 %, P=0.11), presence of late gadolinium enhancement or manganese uptake. These findings remained irrespective of COVID-19 disease severity, presence of concomitant myocardial injury or coronary artery disease.

Conclusions Patients who have recovered following hospitalization with COVID-19 have no evidence of a major excess in myocardial injury or dysfunction compared to co-morbidity-matched volunteers. The presence of co-morbidities likely explains many of the previously reported myocardial abnormalities.

Conflict of Interest None

FIRST IN VIVO PRETARGETED PET IMAGING OF ATHEROSCLEROSIS WITH ANTIBODIES AGAINST FORMS OF MODIFIED LIPOPROTEINS

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Atherosclerosis is a cardiovascular disease initiated by the deposition of Low Density Proteins (LDL) within the intima and...