Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

230

Cardiac Magnetic Resonance Relaxometry Compared to Left Ventricular Ejection Fraction in the Identification of Anthracycline Related Cardiac Changes: A Systematic Review and Meta-analysis

C. Yu [1,2,3,*], S. Pathan [1,3], P. Jeyaprakash [1,2], F. Pathan [1,2], L. Kritharides [1,3], K. Negishi [1,2]

[1] *University Of Sydney, Sydney, NSW, Australia*
[2] *Cardiology Department, Nepean Hospital, Penrith, NSW, Australia*
[3] *Cardiology Department, Concord Hospital, Concord, NSW, Australia*

Background: Anthracyclines are associated with cancer therapeutics-related cardiac dysfunction (CTRCD). The identification of CTRCD currently uses a change in left ventricular ejection fraction (LVEF). Myocardial damage associated with anthracyclines include myocardial inflammation and oedema, which can be assessed using cardiac magnetic resonance (CMR) relaxometry techniques, T1 and T2 mapping and extracellular volume (ECV) fraction.

Objectives: In this meta-analysis, we compared the magnitude of the changes in LVEF and CMR relaxometry parameters within a month of anthracycline therapy completion.

Methods: Three databases (Embase, MEDLINE, and Scopus) were systematically searched for studies evaluating CMR relaxometry parameter pre and post anthracycline-based chemotherapy, which were abstracted. A random effects model was used to pool mean difference (MD) and standardised mean difference (SMD) in LVEF, T1, T2 and ECV after anthracycline. SMD was used to adjust for variations in imaging techniques and comparison between techniques.

Results: A total of 174 patients (91% female, 55.6yrs) were included from seven studies. The pooled MD in LVEF and ECV was -3.15 (95%CI -4.99, -1.31) and 1.61 (95%CI 0.90, 2.32), respectively. The pooled SMD in LVEF, T1, T2 and ECV was -0.61 (95%CI -0.96, -0.25) 0.34 (95%CI 0.04, 0.63), 0.67 (95%CI 0.12, 1.21), 0.60 (95%CI 0.31, 0.89), respectively.

Conclusions: T2 mapping identifies immediate myocardial changes after anthracycline, closely followed by LVEF and ECV, whereas T1 mapping was less sensitive. These changes may be consistent with myocardial oedema from anthracycline therapy. Whilst these findings support the role of CMR relaxometry in identifying acute CTRCD, further studies are required.

https://doi.org/10.1016/j.hlc.2022.06.232

231

Cardiac MRI Findings in Patients presenting With Advanced Conduction System Disease

H. Jumaah *, P. Kistler, J. Mariani, H. Patel, J. Hare, D. Kaye, A. Taylor, A. Voskoboinik

Alfred Health, Melbourne, Vic, Australia

Background: Conduction system disturbance can be the first presentation of underlying structural heart disease, including infiltrative disorders such as sarcoidosis. Appropriate diagnosis may critically influence patient care, including immunosuppression and ICD therapy. We sought to investigate the clinical utility of cardiac MRI in this patient population.

Methods: We evaluated all patients undergoing cardiac MRI between 2005–2021 at The Alfred for investigation of complete AV block or advanced distal conduction system disease (Mobitz II 2nd degree AV block, LBBB or bifascicular block). Patients with pre-existing devices were included in the analysis.

Results: We identified 122 patients (mean age 48±15 yrs, 57% male) fulfilling inclusion criteria. Complete heart block was the leading conduction abnormality (37%), followed by LBBB (17%) and Mobitz II second degree AV block (12%). Twenty-nine patients (24%) had a diagnosis of extra-cardiac sarcoidosis at the time of CMR referral. The majority of patients (80%) had normal LV systolic function (LVEF > 50%) on echocardiography. Left ventricular fibrosis (LGE) was seen in 33/122 (27%) patients. Cardiac sarcoid was the most common final diagnosis (n=16, 13%), of whom only 5 (31%) had known extracardiac sarcoid prior to CMR. Other diagnoses were: non-ischaemic cardiomyopathy (n=2), myocarditis (n=2), amyloid (n=1).

Conclusion: Nearly a third of patients undergoing CMR for investigation of conduction disease had evidence of fibrosis. Cardiac sarcoid was diagnosed in nearly half of these patients, most of whom had no features of extra-cardiac sarcoid. Cardiac MRI may be an important adjunctive tool for investigation of conduction disease, particularly in younger patients.

https://doi.org/10.1016/j.hlc.2022.06.233

232

Clinical and Echocardiographic Parameters in Community-Based Individuals Symptomatic Post Pfizer and AstraZeneca COVID-19 Vaccination

S. Chand [1,*], I. Wilcox [1,2,3,5], M. McGrady [1,2,3], S. Lal [1,2,3,6], I. Hunyor [1,2,3], J. O'Sullivan [1,2,3,4,6], E. Fulthorp [1], M. Price [1], A. Mccoll [1,2]

[1] *Central Sydney Cardiology, Royal Prince Alfred Medical Centre, Newtown, NSW, Australia*
[2] *Royal Prince Alfred Hospital, Newtown, NSW, Australia*
[3] *University of Sydney, Camperdown, NSW, Australia*
[4] *Heart Research Institute, Camperdown, NSW, Australia*
[5] *University of New South Wales, Kensington, NSW, Australia*
[6] *Charles Perkins Centre, Newtown, NSW, Australia*

Background: Cardiovascular side-effects of the AstraZeneca (AZ) or Pfizer (PZ) COVID-19 vaccines have generated concerns in Australians of all ages, despite the adverse cardiac symptoms mainly reported in younger patients.

Method: We assessed 89 consecutive symptomatic patients referred post-AZ (19%), PZ (78%) or combined AZ/PZ vaccination (2%), clinically and with transthoracic echocardiogram (TTE) in an academic practice. Abnormal TTE

values were defined as: LVEF <52% (males), LVEF <54% (females), peak GLS <-17%, left atrial volume indexed (LAVI) >34 mL/m^2 and the presence of pericardial effusion. Patients with previous TTE were excluded if the above abnormal parameters were pre-existing and/or known prior COVID-19 infection.

Results: 51% of the cohort was female, mean age 40 years. Pre-existing cardiac disease was rare in our cohort: including valvular heart disease (7%), pericardial disease (3%), ischaemic heart disease (2%) and hypertrophic cardiomyopathy (1%). Presenting symptoms included: chest pain (69%), palpitations (25%), dyspnoea (19%), and non-specific malaise (13%). 99% of patients at TTE were in sinus rhythm and 1% in atrial fibrillation. The most common abnormalities found were increased LA volume (19%, mean 30 mL/m^2) followed by impaired peak GLS (11%, mean -19%), impaired LVEF (4%, mean 59%) and pericardial effusion (1%).

Conclusion: In this community cohort of patients with symptoms post COVID-19 vaccination, the incidence of abnormal echocardiographic parameters was reassuringly low. We investigated short-term outcomes in a relatively young population most of whom had not had a pre-vaccination TTE. Future studies focusing on prospective TTE analysis of patients receiving COVID-19 vaccination could further enhance our findings.

https://doi.org/10.1016/j.hlc.2022.06.234

233

CMR Evaluation of Aortic Distensibility in Well=Controlled Diabetic Patients

T. Wu [2,3], D. Mark [2,3], S. Howpage [2,3], S. Lal [2,3], S. Twigg [2,3], R. Puranik [2,3], Y. Omran [1,2,3,*]

[1] *Cardiovascular MRI Sydney, Newtown, NSW, Australia*
[2] *The University of Sydney, Camperdown, NSW, Australia*
[3] *Royal Prince Alfred Hospital, Camperdown, NSW, Australia*

Background: Diabetes mellitus is strongly associated with cardiovascular disease. Specifically, aortopathy can directly contribute to adverse outcomes in diabetic patients but where the precise mechanism of such disease remains unknown. Cardiac MRI (CMRI) provides an opportunity to assess aortopathy by quantitating regional aortic distensibility (AoD).

Aims: Using CMRI at 1.5 T, we compared AoD in individuals with well-controlled diabetes and no definite coronary artery disease with healthy controls. Early detection of AoD changes could improve clinical surveillance strategies by identifying individuals with "at risk" phenotype for aortic and vascular complications relating to diabetes.

Methods: CMRI generated cine b-SSFP imaging was acquired in the mid ascending aorta and retrospectively gated throughout the entire cardiac cycle. AoD was then calculated via Aomax – Aomin / Aomin * central pulse pressure in subjects with diabetes attending the RPA Diabetes Centre and matched control subjects. Patient demographics and blood pressure was collected.

Results: Patients with T2DM (n=49, age 59±5yrs, 63% male, HbA1c 7.4±1.8%, systolic blood pressure 127±9mmHg) had a mean AoD of 2.32±1.34 mmgh^{-1} * 10^{-3} compared to controls (n=23, age 57±7, systolic blood pressure 137±13) mean AoD of 4.05+/-2.00 mmgh^{-1} * 10^{-3} (p=0.046).

Conclusions: We have demonstrated reduced AoD in well controlled diabetics using CMRI. This finding contributes to our understanding of how diabetes leads to the development of aortopathy and warrants longitudinal monitoring for the development of complications.

https://doi.org/10.1016/j.hlc.2022.06.235

234

Comparative Assessment of Motion Averaged Free-Breathing or Breath-Held Cardiac Magnetic Resonance Imaging Protocols in a Porcine Myocardial Infarction Model

D. Selvakumar [1,*], T. Deshmukh [1], S. Foster [2], N. Sinaei [2], A. Min [2], S. Grieve [3], F. Pathan [4], J. Chong [1]

[1] *Westmead Institute for Medical Research, Westmead, NSW, Australia*
[2] *Westmead Hospital, Westmead, NSW, Australia*
[3] *The University of Sydney, Sydney, NSW, Australia*
[4] *Nepean Hospital, Kingswood, NSW, Australia*

Background: Breath-held (BH) cardiac magnetic resonance imaging (CMR) is the gold standard for volumetric quantification. However, large animals for pre-clinical research are unable to voluntarily breath-hold, necessitating general anaesthesia and mechanical ventilation, increasing research costs and affecting cardiovascular physiology. Conducting CMR in lightly sedated, free-breathing (FB) animal subjects is an alternative strategy which can overcome these constraints, however, may result in poorer image quality due to breathing motion artefact.

Aims: We sought to assess the reproducibility of CMR metrics between FB and BH CMR in a porcine model of ischaemic cardiomyopathy.

Methods: FB or BH CMR was performed in 38 porcine subjects following percutaneous induction of myocardial infarction. Analysis was performed by two independent, blinded observers according to standard reporting guidelines.

Results: Subjective and objective image quality was significantly improved in the BH cohort (image quality score: 3.9/5 vs 2.4/5; $p < 0.0001$ and myocardium:blood pool intensity ratio: 2.6-3.3 vs 1.9-2.3; $p < 0.001$), along with scan acquisition time (4 min 06 sec±1 min 55 sec vs 8 min 53 sec±2 min 39 sec; $p < 0.000$). Intra- and inter-observer reproducibility of volumetric analysis was substantially improved in BH scans (correlation coefficients: 0.94-0.99 vs 0.76-0.91; coefficients of variation: <5% in BH and >5% in FB; Bland-Altman limits of agreement: <10 in BH and >10 in FB). Interstudy variation between approaches was used to calculate sample sizes, with BH CMR resulting in greater than 85% reduction in animal numbers required to show clinically significant treatment effects.