

Background: Cardiovascular magnetic resonance (CMR) is a rapidly emerging noninvasive imaging technique providing high resolution images without any application of radiation. It has broad range of clinical applications and is increasingly been used in clinical practice in Malaysia. A national CMR Registry is needed to assess its practice in Malaysia.

Objective: To evaluate indications, safety and impact on patient management of CMR in Sarawak Heart Centre.

Materials Methods: A pilot run of CMR Registry in single centre with consecutive patients who underwent clinical CMR from January–June 2015. Retrospective data collection from CMR database and case notes.

Results: A total of 169 patients underwent clinical CMR, with 20 did not complete scan; 25% due to claustrophobia. 94% of patients received gadolinium-based contrast agent. Most important indications were viability assessment (54.4%), cardiomyopathy (28.2%), and risk stratification in suspected coronary artery disease (CAD) (4.7%). 6.7% of patients underwent stress MR (adenosine or dobutamine). Severe complications only occurred in 0.7% of the cases (anaphylactic reaction secondary to contrast agent). No mortality during/due to CMR. There was direct impact of CMR on the clinical management by confirming suspected diagnosis (59.1%), excluding suspected diagnosis (21.5%), providing additional information for suspected diagnosis which is confirmed or excluded (18.1%) and providing unsuspected completely new diagnosis (1.3%). Invasive coronary angiogram was avoided and diagnosis was excluded in all patients referred for risk stratification of suspected coronary artery disease. Invasive therapeutic procedures such as PCI, CABG, valve surgery were triggered in 49.6% of patients after CMR was done, regardless of indication. Out of 81 patients who underwent CMR for viability study, 76.5% were planned for revascularisation (CABG or PCI) with the rest were planned for optimal medical therapy only after the CMR.

Conclusions: The top indications of CMR in Sarawak are viability assessment, cardiomyopathy and risk stratification in suspected CAD, which differs from the EuroCMR registry results. This demonstrated the importance of establishing a national multicentre CMR registry in Malaysia, and subsequently substudy on specific conditions. With appropriate medical personnel training and patient selection, CMR is safe and has strong impact on clinical management.

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Diagnostic Performance of Calcium Score in Detection of Coronary Artery Disease and Prediction of 2-Year Cardiovascular Outcome

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Introduction: Cardiovascular (CV) risk factors are highly prevalent in south east Asia and current risk scoring systems have been proven to have some drawbacks. Calcium score (CAS) has emerged as a potential marker to improve risk prediction in western population however data is lacking on its utility in Malaysia.

Objective: We aim to test the diagnostic performance of CAS in comparison to Framingham risk score (FRS) in a sample of Malaysian population presented with stable chest pain to an outpatient setting.

Method: This is a single-centre retrospective study of patients referred for coronary CT angiography (CTCA) for investigation of stable chest pain in 2014. Their baseline clinical data such as demographics, CV risk profiles, CAS and CTCA results were obtained from electronic medical records. A combined clinical outcome of CV event, the need to undergo invasive coronary angiogram and revascularization over a period of 2 years were also traced.

Result: 130 patients with complete data were analyzed. The mean age was 54 ± 11.6 years. 66% (86 patients) were males and 32% (49 patients) were diabetics. There were 43% (56 patients), 30% (39 patients) and 27% (35 patients) in the low-, intermediate- and high FRS risk respectively. 36% (47 patients) had CAS zero and 33% (43 patients) had CAS <100. CAS of 100–399 and more than 400 had 15% (20 patients) respectively. CAS has higher sensitivity and negative predictive value in detecting obstructive CAD on CTCA compared to FRS (94.6%; 95%CI 81.81.8 to 99.3% and 94.8%; 95%CI 82.4 to 98.6% respectively). CAS has also higher sensitivity and negative predictive value in predicting 2-year CV outcome (97.4%; 95%CI 86.2% to 99.9% and 97.9%; 95%CI 87.1% to 99.7% respectively) compared to FRS (91.2%; 95%CI 76.3 to 98.1% and 92.3%; 95%CI 79.8 to 97.3%).

Conclusion: Even in a population with a high CVD burden, there is a potential role of CAS in refining conventional risk stratification particularly in excluding presence of obstructive CAD and risk of CV outcome within 2 years.

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The Incidence and Clinical Relevance of Coronary Artery Anomalies Detected on Multidetector Computed Tomography in Sarawak

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Background: Coronary artery anomalies (CAAs) are rare. Some anomalies are associated with myocardial ischaemia, heart failure and sudden cardiac death.

Objectives: The aims of this study were to determine the incidence of CAAs detected on multidetector computed tomography (MDCT) and their clinical relevance.

Methods: We reviewed our center's MDCT database from January 2005 to December 2015.

Results: 76 out of 5677 (incidence 0.01%) patients were reported to have CAAs. They consisted of 44 patients (57.9%) with anomalous origin of right coronary artery (RCA), 7 (9.2%) with anomalous origin of left coronary artery (LCA), 3 (3.9%) with anomalous origin of the left circumflex artery (LCX), 1 (1.3%) with abnormal course of LCX, 15 (19.7%) with coronary artery fistulas, 3 (3.9%) with single coronary artery, 3 (3.9%) with anomalous left coronary artery from pulmonary artery (ALCAPA). We were able to retrieve 26 patients' (mean age 49 ± 13 years, 17 male) case folder. They consisted of 11 patients with anomalous origin of the RCA (10 from left coronary sinus), 4 with anomalous origin of LCA from right coronary sinus (3 inter-arterial course), 7 with coronary fistulas (2 large fistulas), 1 with single coronary artery (Lipton III, anterior course), 3 with ALCAPA. Out of the 26 patients, 24 (92.3%) were alive and 2 were lost to follow-up. The commonest presenting symptom was chest pain (65.4%), followed by dyspnea (34.6%) and heart failure (11.5%). 3 patients underwent surgery and 1 underwent transcatheter coiling of fistula. 4 patients had positive functional test (2 anomalous origin of RCA, 1 anomalous origin of LCA from right coronary sinus and 1 ALCAPA). Only 1 patient who had positive functional test underwent surgery. The remaining 3 who did not undergo surgery were still alive. The patient with single coronary artery presented with heart failure and remained alive with pharmacotherapy. All 3 ALCAPA patients were alive, with the oldest patient survived to age 71 years. None of them had surgery performed.

Conclusions: CAAs are rare. Majority of cases may be benign. Large-scale studies are needed to better define the prognosis and optimal treatment of individual forms of CAAs.

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Comparison of Right Ventricle Adaptive Changes in Weekend Warriors, Compared to Normal Sedentary Subjects

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Background: It is known that the heart of an athlete undergoes adaptive changes by training. But as society gets more health conscious, we see a rise in these groups of “weekend warriors” that undergoes vigorous intensity exercise of more than METS 6 of at least 75 minutes twice a week.

Objective: To compare the right ventricle adaptive changes between weekend warriors and healthy sedentary subjects.

Method: 20 “weekend warriors” and 15 sedentary subjects with no past medical problems were evaluated. The subject’s age ranges from 20 to 40-years old. The subjects were evaluated by two-dimensional echocardiography and tricuspid annular plane systolic excursion (TAPSE), right ventricle ejection fraction (RVEF), right ventricle basal dimension, right ventricle mid dimension and tissue doppler systolic wave of tricuspid valve (TDs).

Results: There is no significant difference between the mean RVEF of the weekend warrior ($53.11\% \pm 8.62$) and the sedentary subject ($54\% \pm 36.35$) There were significant difference between the mean TAPSE of the weekend warriors ($2.25 \text{ cm} \pm 0.22$) and sedentary subjects ($1.57 \text{ cm} \pm 1.09$), mean RV basal of the weekend warriors ($3.47 \text{ cm} \pm 0.44$) and sedentary subjects ($2.58 \text{ cm} \pm 1.75$), the mean RVD middle portion of the weekend warriors ($3.18 \text{ cm} \pm 0.59$) and sedentary subjects ($2.0 \text{ cm} \pm 1.38$) and TDS of the weekend warriors ($12.44 \text{ cm/s} \pm 1.24$) and sedentary subjects ($2.5 \text{ cm/s} \pm 5$).

Conclusion: Moderate intensity exercise causes adaptive changes to the right ventricles when compared to sedentary subjects. These changes show that exercise enhances the function of the right ventricle even in non-athlete individuals with vigorous exercise intensity habit.

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Chronic Kidney Disease Stage 2 Should Be Considered High Risk Individuals for Primary Prevention

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Background: Arterial damage in chronic kidney disease (CKD) is characterized by aortic stiffness. This is seen in elderly patients with advanced CKD. Patients with CKD stages 3 and above are considered high risk for cardiovascular disease with two-fold higher cardiovascular mortality rate when compared with patients with normal renal function. The association between arterial stiffness and early CKD is not well established.

Objective: We aimed to study the presence of arterial stiffness using pulse wave velocity (PWV) in patients with CKD stage 2 of younger-age population.

Materials Methods: Patients below the age of 55 years with CKD stage 2 and normal renal function were recruited. Demographic details, co-morbidity, risk factors, medications as well as blood investigations were collected. Arterial stiffness was determined using carotid-femoral (aortic) PWV. Results were analysed using SPSS version 22.0.

Results: 39 patients with CKD stage 2 and 39 control patients were recruited. The mean age of CKD patients was $46 \text{ years} \pm 5.7$. Patients with CKD stage 2 had a significant higher mean PWV ($7.5 \text{ m/s} \pm 1.5$) compared to controls ($5.7 \text{ m/s} \pm 1.1$) ($p < 0.001$, 95% CI $-2.45, -1.21$). Diabetic patients had higher mean PWV ($7.8 \text{ m/s} \pm 1.7$) compared to non-diabetics ($7.3 \text{ m/s} \pm 1.3$) ($p = 0.34$, 95% CI $-1.50, 0.53$). Multiple linear regression analysis revealed pulse pressure as the independent predictor of abnormal PWV ($r^2 = 0.568$, $p = 0.006$).

Conclusions: Arterial stiffness as assessed by PWV occurs early in the young CKD stage 2 patients.

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Comparing Warfarin with Novel Oral Anticoagulants in Stroke Events for Patients with Atrial Fibrillation Undergoing Electrical Cardioversion

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Background: Patients with atrial fibrillation (AF) undergoing electrical cardioversion (ECV) may experience stroke as a complication. Although warfarin is conventionally used in ECV, novel oral anticoagulants (NOACs) are being increasingly used. Observational studies have shown that these two agents are comparable in stroke risks after ECV.

Objective: We aimed to compare stroke rates among Asian patients undergoing ECV in Hospital Pulau Pinang who were treated on NOACs with those treated on warfarin.

Materials & Methods: Medical records from patients with AF undergoing ECV between July 2014 and January 2017 were retrospectively analysed. One group was patients taking warfarin with INR between 2 to 3 for at least 3 weeks prior to ECV. Another group was patients on NOACs, namely dabigatran, rivaroxaban or apixaban, for at least 3 weeks prior to ECV. Both groups continued oral anticoagulants for at least 4 weeks after ECV. Stroke rates at 30 days after ECV were examined.

Results: Fifty-four ECV were carried out on 48 patients. Twenty procedures were on warfarin while 34 on NOACs. Patients in NOACs group were older (67 ± 5.4 years versus 60.5 ± 7.5 years, $p = 0.01$). Both groups had median CHA2DS2-VASc score of 3 ($p = 0.65$). Three (15%) patients in warfarin group have valvular AF. Both warfarin and NOACs groups had male predominance 13 (65%) versus 24 (70.6%), $p = 0.76$. In total, there were 29 (60.4%) Chinese, 17 (35.4%) Malay and 2 (4.2%) Indian patients. Six patients in warfarin group (30%) and 11 in NOACs group (32.4%) had transoesophageal echocardiogram (TOE) prior to ECV, $p = 0.86$. In the NOACs group, 18 (52.9%) were on dabigatran, 12 (35.3%) rivaroxaban and 4 (11.8%) apixaban. There were no stroke events observed for both groups at 30 days.

Conclusion: Within the limitation of sample size in a single-centre retrospective study, we observed no difference in stroke events at 30 days after ECV between warfarin and NOACs groups among our Asian patients.

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