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Sudden cardiac death

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Sudden Cardiac Death (SCD) includes an acute precipitating trigger that lies in the brain and a chronic electrical instability of the myocardium. Majority of the SCDs in absolute terms, occur in subjects with no known pre-existing heart disease. It is possible that the incidence of SCD is about 20% per year in patients with heart failure and those with markers of arrhythmias, compared with about 1-2% in general population, subjects with no known pre-existing heart disease. Acute anxiety, hypertension, hyperlipidemia, family history, personality type; type A behavior, diabetes mellitus, prediabetes, metabolic syndrome and obesity. Behavioral risk factors: Type-A behavior, physical inactivity, smoking, male gender, women after menopausal age, unhealthy diet and modern life style habits, like eating regularly fast foods or foods full with saturated fats, late night sleep, family history, excess alcohol and salt intake can also predispose SCD. Some cations and vitamins deficiency (especially magnesium, potassium, flavonoids and trace elements and thiamine deficiency has been associated with SCD. One or a combination of these risk factors leads to pathological conditions of the Cardio Vascular Diseases (CVD) that predisposes SCD. The most common physio-pathological event is the rupture of the vulnerable atherosclerotic plaque with athero-thrombosis in the majority of the patients with Acute Coronary Syndromes (ACSs) and SCD. In an animal experiment, it has been reported that neutrophil-depleted animals had worsened cardiac function, increased fibrosis and progressively developed heart failure, indicating that high neutrophil counts are considered as predictor of adverse clinical outcomes and mortality in patients with ACS. These cells may cause a detrimental effect in the acute inflammatory phase after infarction. ACS in patients with type-2 diabetes doubles the risk of SCD and the risk is greater with higher blood glucose. ACS patients with STEMI and NSTEMI have increased risk of SCD and there are several gender differences in presentation to emergency care. Prevention of SCD may be possible by prevention of diet and lifestyle factors to prevent cardiovascular diseases and health promotion. Recent advances in cardiac imaging techniques as CMR (Cardiac Magnetic Resonance) imaging can be much helpful in pre-clinical detection of patients at risk of serious cardiac arrhythmias and sudden cardiac death, late gadolinium can identify areas of myocardial fibrosis in arrhythmogenic cardiomyopathy right ventricular dysplasia and some case of mitral valve prolapsed syndrome as well. In addition, speckle tracking echocardiography is recently used as important tool in the diagnosis of non STEMI in critical care departments which can add greatly to the triage of diagnosis of acute coronary syndrome. Finally, tissue Doppler imaging and deformation imaging is crucial for early detection of patients at risk for sudden cardiac death in certain patients with hypertrophic cardiomyopathy in the preclinical phase.

Biography

Galal Eldin Nagib El-kilany is an Assistant Clinical Professor and Consultant of Cardiology at Gulf Medical University (GMU), UAE. He is a distinguished Fellow at International Society of Cardiovascular Ultrasound (ISCU), USA; President of ISCU; Fellow of European Society of Cardiology, France; Associate Editor of Journal of Molecular and Translational Research and Editor of World Heart Journal.

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Green tea extract improves diastolic dysfunction in pediatric cardiomyopathy patients: An observational study

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Hypertrophic Cardiomyopathy (HCM) and Restrictive Cardio-Myopathy (RCM) are the common genetic types of inheritable heart disease and share a common pathophysiologic feature of diastolic dysfunction referring to an impaired cardiac relaxation and a reduced ability in ventricular compliance during diastole. The efficient causative treatments of patients with HCM or RCM are limited. Recent reports indicate the potential effect of Epigallocatechin-3-Gallate (EGCG), the most abundant catechin in green tea, on reducing cardiac myofibril hypersensitivity to Ca²⁺ to improve diastolic dysfunction. In this study, we investigated changes of cardiac function, laboratory tests and clinical characteristic in cardiomyopathy patients with diastolic dysfunction after consumption of Green Tea Extract (GTE). 13 cardiomyopathy patients with diastolic dysfunction underwent clinical examinations, echocardiography, electrography and laboratory tests before and after daily consumption of GTE capsules containing EGCG for at least 6 months. Next generation sequencing was conducted to find out candidate causative gene variants in all patients. A significant decrease of isovolumetric relaxation time, an increase of left ventricle end diastolic volume and stroke volume by echocardiography were observed after a at least 6-month period of GTE consumption. Left ventricular ejection fraction, left ventricular wall thickness, biatrial dimension by echocardiography remained unchanged. No serious adverse effects were reported in any patient. This observational study supports that EGCG, as GTE, have a potential effect on improving the impaired relaxation in pediatric cardiomyopathy patients with diastolic dysfunction.

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Evaluating a patient on cardiotoxic chemotherapy for left ventricle dysfunction

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The evidence regarding the association of cardiac disease and cancer is increasing. Risk evaluation for cardiotoxicity is mandatory for patients undergoing chemotherapy. Evidence review states that patients diagnosed with cancer must have treatment planning with risk assessment of cardiovascular toxicity prior to initiating cancer specific treatment. Serial evaluation for patients who have risk factors for cardio-toxicity is needed to early diagnose subclinical cardiotoxicity. The recent guidelines had defined Heart Failure (HF) in cancer patients as, Stage-A HF: Patients with high risk for cardio toxicity have the risk factors such as, previous cardiotoxicity, previous CV disease, potentially toxic chemotherapy, thoracic radiotherapy and CV risk factors. Stage-B HF: Evidence of cell damage and early LV dysfunction. LV dysfunction defined by reduction of EF>10% to an EF<53, reduction GLS> 15%. Subclinical dysfunction defined as reduction of GLS with preserved EF>53%. Stage-C: Symptomatic HF. Stage-D: Refractory Symptoms. The guidelines recommend specific actions for each stage of HF in patients on chemotherapy. The goal is to prevent progression to Stage-D heart failure and to complete appropriate chemotherapy safely. There are critical concerns around new class of chemotherapy that may have acute cardiovascular toxicity rather than accumulative dose effect. We can conclude the review of guidelines and discuss ways that clinicians and centers may adopt it into practice.

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Left ventricle myocardial performance index by tissue Doppler in healthy adults

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Background & Aim: The Myocardial Performance Index (MPI) by Tissue Doppler (TD) is a reliable and reproducible parameter to identify left ventricle function. There is a significant correlation between the MPI values by standard Pulse Wave (PW) Doppler and TD modalities in normal left ventricle function. It is unknown if this correlation is maintained throughout a wide range of age in healthy population. The aim was to identify the normal reference range for MPI by TD in healthy individuals across a wide range of age.

Method: MPI by TD and PW Doppler were obtained via trans-thoracic ECHO. The LV MPI via PW was calculated from the mitral valve inflow in apical four and the aortic valve out flow in apical three chamber windows. MPI calculated using the formula $MVCO-AV ET/AVET$. The LV MPI by TD was calculated by the standard TD in apical four-chamber view at the mitral annulus level of the anterolateral and inferoseptal walls, calculated using the formula $IVRT+IVCT/ET$. Two readers confirmed the inter-observer variability.

Result: The MPI was measured in 99 cases with normal left ventricle function and no prior cardiac event. Of these, 50 individuals were male and 49 were female. The mean LVEF was 61.5%. The means of systolic and diastolic diameters were 3.1 mm and 4.7 mm respectively. Mean LV mass 146 cm². The enrolled cases were further divided by age into four groups. Group-I: 17-44 years, Group-II: 45-60 years, Group-III: 61-75 years and Group-IV: >75 years. The mean LVEF and LV dimensions were similar among these groups. The LV MPI was obtained at a mean heart rate 76 bpm. The time required performing measurements in each view. Mean MPI for all the healthy cases by PW 0.5 and TD septal/lateral 0.384/0.386. The LV MPI for each group range by PW for male were [G-I 0.52, G-II 0.59, G-III 0.49, G-IV 0.48]. The LV MPI for each age group by PW for female were [G-I 0.49, G-II 0.54, G-III 0.45, G-IV 0.47]. The LV MPI for each age group by TD septal and lateral for male were [G-I 0.36/0.3, G-II 0.35/0.36, G-III 0.46/0.39, G-IV 0.35/0.36]. The LV MPI for each age group by TD septal and lateral for female were [G-I 0.37/0.36, G-II 0.37/0.42, G-III 0.41/0.42, G-IV 0.33/0.45]. The Pearson correlation between the TD septal MPI and TD lateral MPI= 0.337 with p value=0.001 The Pearson correlation between the PW MPI and TD septal MPI= 0.18 with p value=0.078. The Pearson correlation between the PW MPI and TD lateral MPI= 0.13 with p value=0.217.

Conclusion: This study is a comprehensive assessment for TDI-MPI across a wide age range in males and females. The septal and lateral LV TD MPI are well correlated for all the groups in both genders. However, in age group 61-75years there is an increase in the reference value for the normal MPI by TDI. The RV MPI by PWD showed significant variation when divided by gender especially in the in-age group 61-75years. This variation is not seen by TDI for the RV MPI. This may be of value in clinical application.

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Study on the conventional risk factors in patients with coronary artery disease in tertiary care hospitals, Pokhara, Nepal

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Background: Coronary Artery Disease (CAD) has shown a remarkable decline in the developed world in past few years but has shown an alarming increase in the developing world especially in south Asia.

Objective: To study the four conventional risk factors-hypertension, diabetes mellitus, dyslipidemia and smoking in patients with coronary heart disease in tertiary care hospitals of Pokhara valley, Nepal.

Method: This study was conducted after getting approval from institutional research committee of Manipal College of Medical Sciences, Pokhara. 100 patients (63 males and 37 females) with CAD who were admitted in the wards and CCU participated in the study. Their demographic information was noted. Height, weight and blood pressure were recorded with standard methods. Blood glucose and lipid profile were estimated by using XL-300 auto-analyzer after 12 hours of fasting overnight. History of smoking was taken in pack/year along with history of hypertension, diabetes mellitus and medication history. Risk factors were determined using the measurements, laboratory values and also from the past history of the same illness and medications if any. SPSS-16 was used for statistical analysis.

Result: Mean age of the patients was 64.61 ± 11.363 years with minimum age 40 and maximum 94 years. Overall distribution of risk factors in descending order was smoking (55%), hypertension (50%), dyslipidemia (49%) and diabetes mellitus (32%). Distribution of risk factors was maximum in the age group 55-69 years. Most of the patients had combination of more than one risk factor. Only 27% of the patients had single risk factor and 4% were found to have no conventional risk factor. Significant association was found between age and hypertension; age and dyslipidemia. Similarly gender was found to be highly associated with smoking. Except diabetes mellitus no other risk factor was found to have significant association with ethnicity.

Conclusion: This study shows that most of the patients with coronary heart disease have conventional risk factors and they play a major role in the development of the disease. All the risk factors were found to be more in males. Significant association was found between age and hypertension and between age and dyslipidemia. So, beside the four modifiable risk factors, our study also shows that age and gender can be major contributors of the disease which cannot be modified.

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Factor XII gene mutations in acute myocardial infarction patient with Factor XII defect

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Statement of the Problem: A 51-year-old man had a myocardial infarction. The patient disclosed medical history of hypertension and coagulation Factor XII defect. Later coronary angiography showed triple vessels lesions. In the present study, the risk of coronary artery diseases related to Factor XII gene was investigated.

Method: Factor κ coagulation activity was detected by clotting test and 46C>T polymorphism was genotyped using a Restriction Fragment Length Polymorphism (RFLP) method. Gene mutations were analyzed in patients with DNA sequencing. Expression plasmids were constructed by site-directed mutagenesis based on the wild-type and transiently transfected into 293T cells. Factor κ activity of the expression products were tested in the cell lysates.

Findings: A functional promoter polymorphism F12 46C/T (rs1801020) that results in decreased translation efficiency was investigated and a homozygote TT was revealed. Genetic analysis of Factor XII polymorphisms displayed that a non-synonymous mutation p.D562G and a stop codon p.W258X were disclosed in this patient with myocardial infarction. The results of the transfection revealed that Factor XII antigens in cell lysates of mutant protein W258X was significantly lower.

Conclusion: Rather than bleeding tendency, Factor XII defect may be associated with possible thrombotic disorders. Both p.D562G and p.W258X mutations may contribute to the pathogenesis of acute myocardial infarction patient with Factor XII defect.

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Modified ultrafiltration versus conventional ultrafiltration in adults undergoing coronary artery bypass grafting-effects on inflammatory cytokine response, rotational thromboelastometry parameters and hemodilution: A randomized controlled trial

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Statement of the Problem: Cardiopulmonary bypass is associated with increased inflammatory system responses and alterations of the hemostatic factors and coagulation system. Modulation of the inflammatory response through medical and non-medical approaches is important in reducing the post-operative complications. In the present study we investigated the outcomes of using Modified Ultra Filtration (MUF) in adults undergoing Coronary Artery Bypass Grafting (CABG) operation.

Method: 56 patients candidate for elective CABG were randomly assigned in two groups including Conventional Ultra Filtration (CUF) and MUF groups. Preoperative and postoperative clinical parameters, serum level of inflammatory cytokines and ROTEM indices were measured pre-operation, after de-clamping of aorta, Intensive Care Unit (ICU) entrance and on 24 and 48 hours after operation.

Findings: Two groups were similar in the clinical perioperative parameters including hemodynamics, transfusions, ROTEM indices, mechanical ventilation and cardiopulmonary bypass (CPB) time and ICU stay. Interleukin (IL)-6, -8 and -10 measures were equal between two groups in all trial measurement points. The levels of inflammatory mediators were significantly increased after CPB in both groups. TNF- α was significantly elevated after CPB compared with de-clamping time ($P<0.05$). MUF group demonstrated significantly lower level of TNF- α compared with CUF group at the same time ($P=0.031$). Hemoglobin and hematocrit levels were significantly increased in the MUF group after CPB ($P<0.05$).

Conclusion: MUF is effective in improving the hemodynamics and hemoglobin level after CPB among patients undergoing CABG. It also modulates the immune response post-operation.

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Incidence and of ischemic heart disease in Jubail industrial city

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Coronary Artery Disease (CAD) is a major public health problem worldwide. Jubail is considered one of the biggest industrial city in the world and its population is about 200,000 to 250,000. Our objective was to study the incidence of acute ischemic heart disease visiting the ED in RCH Hospital within a year 2017. To our knowledge, there is no similar data available from similar community to compare. Therefore, we designed this study with the objective to determine the incidence of CAD among the population of this city of both sexes. Furthermore, to determine the prevalence and clinical pattern of the major modifiable risk factors for CAD among the same population.

Biography

Munawar Almajnoni has completed his Internal Medicine Board from Saudi Commission, King Fahad Hospital, Madinah and Post-doctoral studies in Cardiology from King Faisal Specialist Hospital and Research Center in Riyadh. He has then completed Echocardiography Fellowship in Vivantes Hospital in Berlin, Germany. He is the Head of Cardiology Department in Royal Commission Hospital. He has been serving as an Editorial Board Member of online *Cardiology* journal.

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