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Editorial

Is Implantable Cardioverter Defibrillator Useful in Non-Ischaemic Cardiomyopathy Useful?

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Dilated cardiomyopathy (DCM) is defined as left ventricular dilation and enlargement not due to loading condition of the heart which cannot be explained by epicardial coronary artery disease.[1] It has a prevalence of 1/2,500 population, and an annual incidence of 7/100,000. DCM affects men more than women. The causes of cardiovascular death are due to arrhythmias or progressive heart failure. Sudden cardiac death (SCD) is more often due to ventricular tachyarrhythmias (VA), whereas bradycardia and pulseless electrical activities predominate as heart failure progress.[2]

Familial type of DCM can be due to mutations in sarcomere and desmosomal protein gene, proteins that directly affect cardiac contractile muscle. An important gene is the lamin A/C mutations, in which patients present with asymptomatic conduction disease for decades, followed by atrial arrhythmias and VA and DCM. In the setting of a familial occurrence of DCM and conduction disturbance, screening of lamin A/C mutation and SCN5A genes are recommended. A mutation specific screening is indicated in family members if a patient has documented mutation in a DCM related genes.[3]

The majority of DCM patients do not have a familial incidence. Hence predictors of future VA have relied on risk factors testing. These include (1) autonomic parameters, (2) structural/functional parameters such as left ventricular ejection fraction (LVEF) and ventricular dismission; and (3) arrhythmia indicators such as electrophysiology testing, and electrocardiographic (ECG) depolarisation and repolarisation abnormalities. In a meta-analysis of 12 conventional parameters involving 45 trials in 6,088 patients,[4] autonomic parameters were found to be unpredictive. Structural/functional and ECG parameters are helpful, but their overall specificity ranges only from 36.2 to 87.3%, with a sensitivity of 28.8-91.0%. Indeed, LVEF, the basis on which implantable cardioverter defibrillators (ICD) therapy is prescribed, has only a sensitivity and specificity of 71.7 and 50.5% and a positive predictive accuracy of 21.9%.

VA originated from trigger or reentry, often from fibrous tissues that develop in the myocardium of DCM. The use of late gadolinium enhancement (LGE) to detect LV scarring has been proposed as a marker of VA. Indeed, positive LGE in the LV increase the VA risk almost 10 folds, both in patients with LVEF below and above 35%.[5] In a recent cohort studies that include only patients with milely impaired LVEF of ≥40%, the 4 year arrhythmic risk was 17.8% vs 2.3% in those with and without LGE.[6] LGE defines the VA substrate and many emerge as a good marker to predict SCD independent of the LVEF.

What are our therapeutics means now to combat

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*This author takes responsibility for all aspects of the reliability and freedom from bias of the data presented and their discussed interpretation

SCD in patients with DCM? Obviously, optimal pharmacological therapy of heart failure is essential. Triggers for VA such as hypokalaemia, thyrotoxicosis and new onset ischaemia should be promptly diagnosed and treated. VA ablation can be performed, but due to the often patchy fibrosis that can involve multiple myocardial layers, the success rate of VA ablation is less durable than VA ablation in cardiomyopathy due to ischaemic heart disease,[7] notwithstanding the low acute success rate of 22.2%.

Implantation of ICD is the recommended therapy in those survivors of SCD and VA in DCM. For primary prevention, both the ACC/AHA[8] and ESC[1] guidelines have used LVEF and the degree of symptomatic heart failure as criteria for ICD prescription: In patients with DCM and an LVEF ≤35%, with NYHA class I - IV are for ICD implantation. These are based on the CAT,[9] AMIOVIRT,[10] DEFINITE[11] and the SCD-HeFT[12] studies which were published before 2005. These studies showed a combined 31% of reduction in total mortality in the ICD therapy vs medical therapy arms, a result mainly driven by a 56% SCD reduction.

In view of the change in medical therapy that has occurred over the last 15 years, the advent of the cardiac resynchronization therapy (CRT), the increase in patient longevity, and the frequent associated co-morbidities which increases the proportion of death for non-arrhythmic disease, the role of the ICD has now been questioned.

The COMPANION trial[13] has involved patients with both DCM and ischemic heart failure who are in Class III-IV heart failure with a wide QRS width, a group that has high baseline mortality. The use of cardiac resynchronization therapy defibrillator (CRT-D) but not CRT reduces total mortality over medical therapy, although it is not sure the effect is due to ICD or CRT alone. Indeed, the study did not show mortality difference between CRT-D vs CRT.

The recent DANISH trial[14] is a focus study on this issue. In a randomized control study of 1,116 patients with heart failure, half of them were randomized to ICD (or CRT-D) and half to medical therapy (or corresponding CRT). CRT-D or CRT were used in 58% in total. ICD/CRT-D therapy was shown not to change the risk of total mortality vs control arm over a median of over 5 years of follow up, although the SCD risk was significantly reduced from 8.3 to 4.3%. The study was powered to detect a difference of 25% total mortality. According to the authors, this difference from prior trials of ICD can be due to less VA risk in DCM than ischaemic cardiomyopathy, the beneficial impact of CRT, and the high percentage of use of angiotensin-receptor and betablockers (>90%) compared to older studies, and vigorous exclusion of coronary artery disease.

Figure 1 shows the demographics and the SCD rates in the controlled arms of the major studies of ICD in DCM. With the exception of the COMPANION trial, which is a CRT trial in sicker patients, the DANISH recruited the oldest patients, had the longest follow up and the lowest annual mortality. In addition, there was an initial separation of mortality rates between the ICD vs control arms, although the 2 curves come together with follow up, quite unlike the continued separation of ICD trial for MADIT-II[15] for ischaemic cardiomyopathy (Figure 2). This suggests that over time with progression of heart failure or development of comorbidities or both in these patients, the benefit of ICD in DCM is reduced. Several meta-analysis have since been published combining these trial data. The total mortality reduction for all trials using ICD/CRT-D and ICD only were 24 and 23% reduction, whereas CRT-D did not reduce mortality.[16] Such meta-analyse that include trials performed at disparate time are limited by major difference in the patients demographic and changes in heart failure treatment.

In conclusion, the benefit (if present) of primary prevention for mortality in DCM is now significantly reduced due to better medical care and the use of CRT. Nevertheless, the benefit on SCD prevention remains valid. Better identification of subjects with higher risk of SCD such as younger patients and those with LGE may allow a better cost-performance of ICD, although dedicated trials using these parameters will be needed.

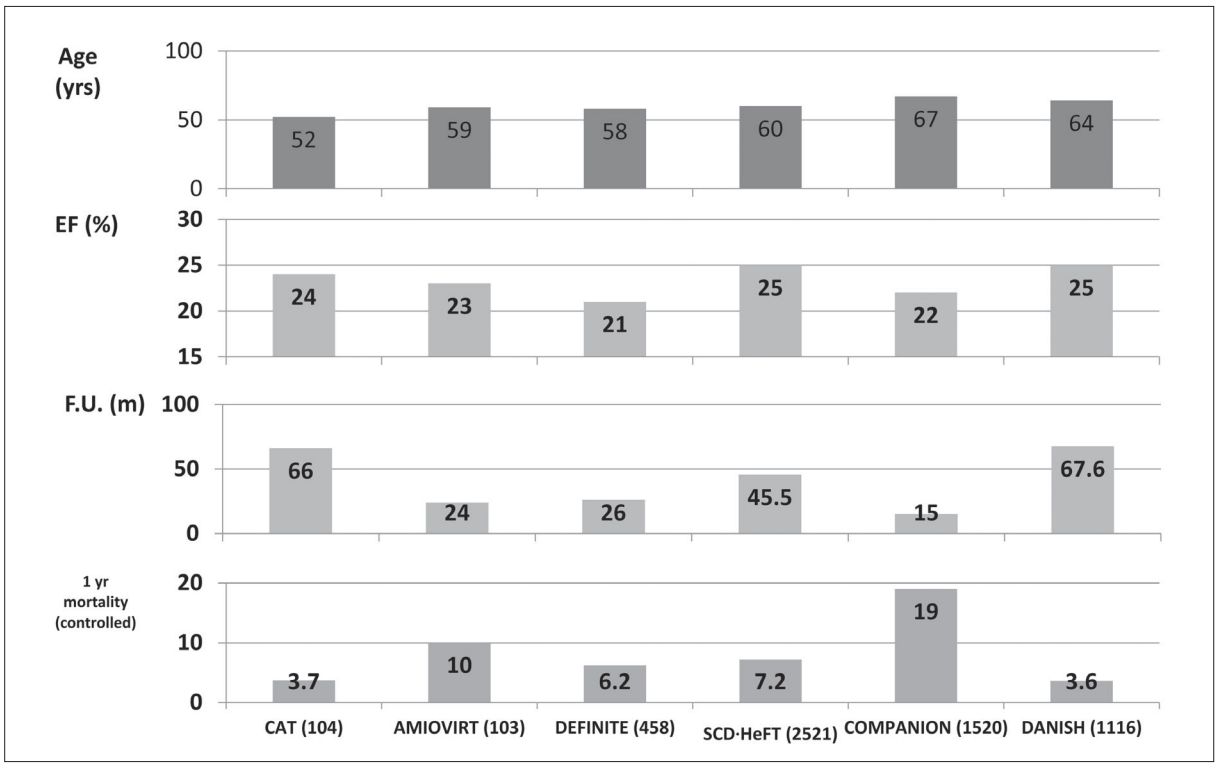

Figure 1. *Demographic and outcome of 6 randomized trials on implantable cardioverter defibrillator in non-ischaemic dilated cardiomyopathy.*[9-14]

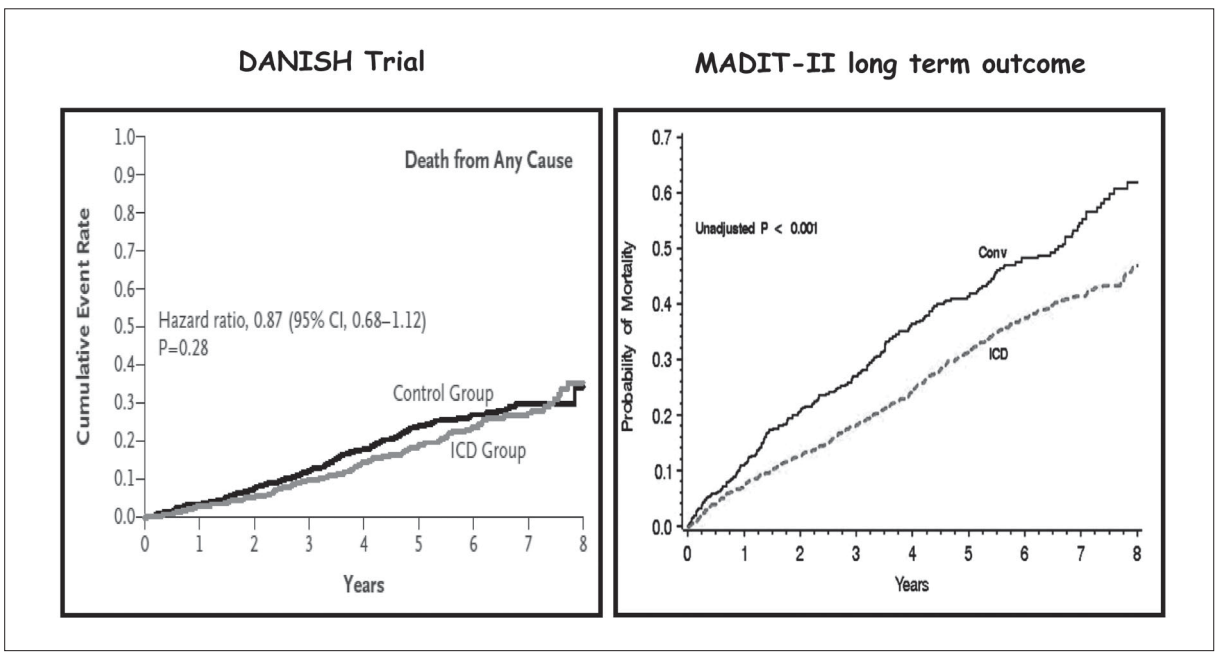

Figure 2. *Total mortality between implantable cardioverter defibrillator and control arm in dilated cardiomyopathy (DANISH trial*[14]*) and ischaemic cardiomyopathy (MADIT-II long term outcome*[15]*). The curves separate and converge overtime for dilated cardiomyopathy, but continue to separate in the ischaemic cardiomyopathy trial.*

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Correlation of Epicardial Adipose Tissue with Body Composition, Lipids and C-reactive Protein in Asian-Indians

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CHAKRAVARTHY ET AL: ***Correlation of Epicardial Adipose Tissue with Body Composition, Lipids and C-reactive Protein in Asian-Indians: Background:*** Echocardiographic epicardial adipose tissue (EEAT) is an indicator of visceral fat in the body and is also well known as a risk factor of cardiovascular diseases. EEAT thickness (EEATT) and its association with risk of diseases is influenced by age, gender and ethnicity. There is limited literature on EEATT values and associated risk factors in Asian-Indian population. The objective of the study was to study the correlation of EEATT with body fat percentage, visceral fat levels, lipid profile and fasting blood sugar levels in Asian-Indian population. ***Methodology:*** 195 overweight Asian-Indian individuals with body mass index between 25 to 35 and with no known medical conditions voluntarily agreed to participate in the study. The preliminary screening of the participants in this cross-sectional study included body composition assessment and blood test. All the participants also underwent 2D Echocardiography to measure EEATT in parasternal view. The EEATT values were correlated with body weight, body mass index, visceral fat levels, body fat percentage, waist circumference, fasting blood sugar values and blood lipids. The results were analysed using Descriptive statistics and Pearson's correlation test. ***Results:*** EEATT showed a positive correlation with body weight (r=0.47, p=<0.005), body mass index (r=0.52, p=<0.005), waist circumference(r=0.72, p=<0.005), total body fat percentage (r=0.46, p=<0.005), visceral fat levels (r=0.77, p=<0.005), fasting blood sugar levels (r=0.35, p=<0.005), total cholesterol(r=0.29, p=<0.005), Low Density Lipoprotein Cholesterol (r=0.33, p=<0.005), Triglycerides (r=0.31, p=<0.005) and high sensitive C-reactive protein (r=0.47, p=<0.005) ***Conclusion:*** Epicardial adipose tissue thickness measured by echocardiography, a reliable indicator of visceral fat and a marker of cardiovascular diseases showed good correlation with indicators of abdominal adiposity and visceral fat measured by Bio-impedance analysis in Asian- Indian population. The significant association with metabolic parameters and C-reactive protein indicate that epicardial adipose tissue is a reliable marker for cardiovascular diseases in overweight Asian-Indian population. *(J HK Coll Cardiol 2018;26:5-10)*

Asian-Indians, Echocardiography, Epicardial adipose tissue, Overweight, Metabolic parameters

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摘要

背景：超聲心動圖心外膜脂肪組織（EEAT）是身體內臟脂肪的指標，也是心血管疾病的危險因素。EEAT的厚度與疾病風險的關係受年齡、性別和種族的影響。亞洲印度人的EEAT厚度值及危險相關因素的文獻有限。本研究的目的在研究亞洲印度人超聲心動圖心外膜脂肪組織厚度（EEATT）與體脂肪百分比、內臟脂肪水平、血脂狀態和空腹血糖水平的關連性。**方法：**195名超重、身體質量指數在25至35之間且沒有已知醫療問題的亞洲印度人自願性參加這項研究。在這個橫斷面研究中，參與者的初步篩選包括身體成份評估和血液測試。所有受試者均需接受二維超聲心動圖測量胸骨旁心外膜脂肪組織厚度（EEATT）。EEATT 值與體重、身體質量指數、內臟脂肪水平、體脂率、腰圍、空腹血糖值和血脂肪相關。研究結果以描述統計學及皮爾森相關系數進行分析。**結果：**EEATT 呈現與體重正相關（r=0.47，p=<0.005），身體質量指數（r=0.52，p=<0.005），腰圍（r=0.72，p=<0.005），體脂肪百分率（r=0.46，p=<0.005），內臟脂肪水平（r=0.77，p=<0.005），空腹血糖水平（r=0.35，p=<0.005），總膽固醇（r=0.29，p=<0.005），LDL膽固醇（r=0.33，p=<0.005），三酸甘油酯（r=0.31，p=<0.005）及高敏感度C-反應蛋白（r=0.47，p=<0.005）。**結論：**以超聲心動圖測量心外膜脂肪組織（EAT）厚度是一種可靠的內臟脂肪指標和心血管疾病標示，與亞洲印度人生物阻抗分析測量的腹部脂肪和內臟脂肪的指標有很好的相關性。與代謝參數和C-反應蛋白的顯著相關性表明，EAT是超重亞洲印度人心血管疾病的可靠標記。

關鍵詞：心外膜脂肪組織、超聲心動圖、超重、代謝參數、亞洲印度人

Introduction

Epicardial adipose tissue (EAT) is the visceral fat deposited between the heart and pericardium. The increased epicardial adipose tissue thickness (EATT) is associated with increased risk of cardiovascular and metabolic diseases.[1] It was used as a therapeutic target in studies involving pharmacological, surgical, dietary and exercise interventions.[2,3] The clinical importance of this regional adiposity as an indicator of visceral adipose tissue (VAT) in overweight and obese human population was explained in earlier studies.[4] The risk of cardiovascular diseases was also found to be high in non-obese individuals with increased EATT.[5]

Echocardiographic estimation of EAT thickness (EEATT) is a reliable method for estimating the VAT and was correlated with anthropometric parameters.[6] The body mass index (BMI) and waist circumference are not always accurate in estimating the visceral fat and its associated risk for cardiovascular diseases. Bio-impedance analysis can more reliably estimate the total body fat percentage and visceral fat levels.[7] EAT is known to be a storage depot for excess lipids and known to release proinflammatory substances such as C-reactive protein.[8] High sensitive C-reactive protein can be reliably measured in a blood test and it is proved be an independent marker for cardiovascular diseases.[9] The earlier studies demonstrated the association of EAT with several inflammatory markers and metabolic parameters.[10] However, most of the studies on EEATT were mostly limited to European and Caucasian populations.[11]

According to the earlier studies, EEATT values depend upon the age, gender and ethnicity.[12] There is a need for research studies to establish a relationship between EEATT and metabolic parameters in different ethnic populations. The high-risk values of EEATT indicating the risk of cardiovascular diseases for Asian Indian population is not known presently. The increase in prevalence of abdominal adiposity and metabolic diseases have been attributed to increased risk of cardiovascular diseases in Indian population. There is also growing interest in early detection and risk stratification of overweight individuals by estimating the visceral fat in the body. The objective of our study was to correlate EEATT with body fat percentage and visceral fat levels measured using Bioelectrical Impedance Analyser (BIA), lipid profile and fasting blood sugar levels in overweight and obese Asian-Indians.

Methodology

195 overweight and obese Asian-Indian individuals with a mean (SD) weight of 80.66±12.12 kilos and a mean body mass index (BMI) of 29.20±2.71 kg/m^2 were included as part of the cross-sectional study. The participants were screened for cardiovascular and

metabolic diseases. The study did not include the participants with any known medical conditions. Ninety men and 105 women were included in the study, with ages ranging between 20 to 45 years. The institutional research and ethical committee approvals were obtained before the commencement of the study. All the participants signed the written informed consent before the pre-participation screening. The height of the subjects was measured using a wall tape which was calibrated to 0.1 cm when the participant stands with shoes removed. The body weight was measured using an electronic weighing scale (Model DS-215 series, Essae- Teraoka limited -2003) without footwear but light clothing, adjusted to the nearest 0.1 kg. BMI was calculated using the standard equation and was expressed in kg/m^2. Waist circumference (WC) was measured in centimetres as per the guidelines of National Institute of Health (NIH). The WC was measured after normal expiration using an inch tape placed between the lower rib margin and the iliac crest, while the subjects were standing with their both heels held together. The specific risk categorization recommended by NIH for South-Asians was used for interpretation. Four electrodes Bio Impedance Analyser (HBF- 362 Omron Karada Scan) with digital display system was used to record the total body fat percentage and visceral fat levels. The participants refrained from consuming food or water for at least one hour prior to the body fat measurements. The participants underwent a blood test after fasting for 10-12 hours. Total cholesterol (TC), Low Density Lipoprotein Cholesterol (LDL-C), High Density Lipoprotein Cholesterol (HDL-C), Triglycerides (TG), fasting blood sugar levels (FBS) and measurement of high sensitive C-reactive protein (HS-CRP) (Immunoturbidimetric method) were performed. The blood lipid values were interpreted according to the guidelines of National Cholesterol Education Program - ATP III guidelines given in 2002. All the participants also underwent a trans-thoracic two-dimensional M-mode echocardiogram (Philips iE 33). The measurements were taken by an experienced sonologist in standard parasternal and apical views while the participant is in the left lateral decubitus position. The measurements were taken perpendicularly on the free wall of the right ventricle at end systole in three to ten cardiac cycles as described by Iacobellis et al. The images were stored in the device for accurate measurement (Figures 1 & 2).

The images with poor window and undetectable epicardial adipose tissue were not recorded for further measurement. The epicardial fat measurements of 8 participants was undetectable and the data of these individuals was not included in the final analysis. The anthropometric values and body composition were

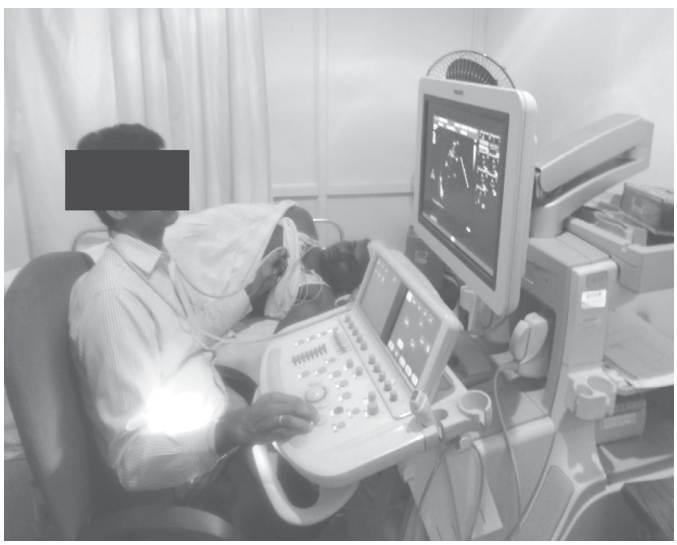

Figure 1. *Sonographer measuring EEATT.*

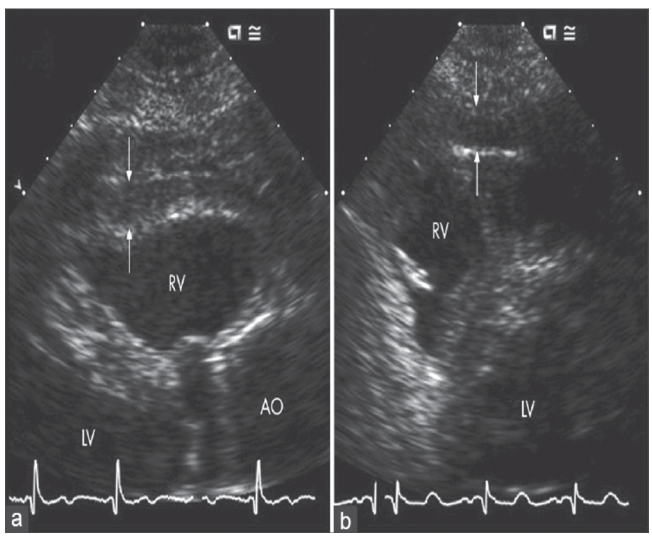

Figure 2. *Measurement of EEATT with Echocardiography (Echo free space indicated).*

compared between two different age groups of same gender using an independent t-test. A Pearson's correlation coefficient was used to study the correlation between EEATT and cardiometabolic parameters. HS-CRP values were normally distributed. Mann Whitney U test was used to study the correlation between EEATT and HS-CRP values. The level of significance was set at p value <0.05.

Results

The subgroup analysis was done to compare the effect of age and gender. EEATT values were higher in males compared to females of the same age group (Table 1). EEATT values were significantly higher in females of age between 20-30 years compared to males of the same age. However, there was no significant difference between males and females of age between 30-45 years (Table 2). EEATT showed a positive significant correlation with body weight (r=0.47, p= <0.005), body mass index (r=0.52, p=<0.005), waist circumference (r=0.72, p=<0.005), total body fat percentage(r=0.46, p=<0.005), visceral fat levels (r=0.77, p=<0.005), fasting blood sugar levels(r=0.35, p=<0.005), total cholesterol (r=0.29, p=<0.005), LDL cholesterol (r=0.33, p=<0.005), Triglycerides(r=0.31, p=<0.005) and HS-CRP (r=0.47, p=<0.005) (Table 3).

Discussion

Epicardial adipose tissue, which is considered as a true visceral fat was also found to be higher in males

Table 1. Participant characteristics

Variable	Females (n=105)	Males (n=90)	p
EEATT (mm)	2.92±1.16	3.31±1.19	0.02
Weight (kg)	75.04±9.88	84.72±10.47	<0.001
BMI (kg/m^2)	29.02±2.57	29.21±2.57	0.36
WC (cms)	93.59±6.98	96.24±6.21	0.005
Body fat %	32.95±4.79	30.39±4.50	<0.001
Visceral fat	11.94±3.94	13.23±3.25	<0.001

EEATT: echocardiographic epicardial adipose tissue thickness, BMI: body mass index, WC: waist circumference

Table 2. Comparison of EEATT values between males and females

EATT (mm)	20-30 years age group	30-45 years age group
Female	2.46±0.99 (n=60)	3.50±1.11 (n=45)
Male	3.06±1.22 (n=50)	3.57±1.12 (n=40)
P value	0.009	0.77

EEATT: echocardiographic epicardial adipose tissue thickness

Table 3. Correlation of EEATT with baseline parameters of anthropometrics, blood lipids, fasting blood sugar levels, peak VO_2 peak values and HS-CRP

Variable	Mean ± SD/ Median (IQR)	Correlation coefficient	p value
EEATT (mm)	3.14±1.17		
Weight (kg)	80.66±12.12	0.47	<0.001
BMI (kg/m^2)	29.20±2.71	0.52	<0.001
WC (cms)	94.82±7.23	0.72	<0.001
Body fat %	31.85±4.64	0.46	<0.001
Visceral fat	12.84±3.62	0.77	<0.001
FBS (mg/dl)	96.82±7.55	0.35	<0.001
TC (mg/dl)	187.26±25.31	0.29	<0.001
HDL (mg/dl)	40.50±6.07	0.007	0.92
LDL (mg/dl)	118.29±25.96	0.33	<0.001
TG (mg/dl)	106.27±26.65	0.31	<0.001
HSCRP (mg/L)	3.15 (1.80, 5.22)	0.47	<0.001

EEATT: echocardiographic epicardial adipose tissue thickness, BMI: body mass index, WC: waist circumference, FBS: fasting blood sugar, TC: total cholesterol, HDL: high density lipoprotein, LDL: low density lipoprotein, TG: triglycerides, HS-CRP: high sensitive C- reactive protein

as compared to females. The influence of age and gender on deposition of EAT is not well understood, and the literature is mostly limited to that derived from cadaver studies.[13,14] There is a lack of clear evidence on the gender differences; despite it was much clearer that age acts as an influencing factor on EATT. As reported in the past, EATT was found to have a direct relationship with BMI at baseline; however, the influence of age and gender in different ethnic groups is yet to be investigated. As echocardiography has been found to be a reliable method for measuring epicardial adipose tissue, the findings in our study indicate that increased epicardial adipose tissue thickness in Indian males may well be considered a cardiovascular disease risk factor at a much younger age.

Waist circumference and visceral fat levels measured by BIA and EEATT were all found to be higher in males when compared to females. The total body fat percentage was higher in females compared to males as anticipated and the normal reference ranges for the total body fat percentage was higher in females. EEATT was found to show a good correlation with waist circumference and visceral fat levels as measured using BIA. It also showed a moderate correlation with weight, BMI and body fat percentage. All these findings in our study were similar to those reported in Caucasian and European populations.[15,16] EEATT values showed moderate correlation with BMI supporting the evidence that the amount of VAT is not directly related to BMI and quantification of VAT is a better indicator of poorer health status. EEATT showed good correlation with WC and visceral fat levels measured by BIA, supporting the evidence that EEATT is a simple and easy method to quantify VAT alongside being a good indicator of central obesity.

EEATT values have been found to be higher in obese population with dyslipidaemia and hypertension in various ethnic groups. Nevertheless, we found that EEATT values showed moderate positive correlation with FBS, TC, LDL and TG. The majority of the participants in our study did not have abnormal lipid profile, despite being obese and having an increased amount of visceral fat. This could be attributed to the relatively younger age group who participated in our study. HS-CRP values were found to show moderate correlation with EEATT and it is a well-known fact that increased visceral fat is associated with inflammation in the body. CRP levels have been found to increase with increased visceral fat as reported in previous studies.[17,18] The other factors leading to increase in the inflammation were controlled during the study and those subjects with diseases involved with high grade inflammation were not included in this study. Despite the visceral fat depots are well known as lipids and excess glucose storing depots, there was no association found between fasting sugar levels and EEATT.

Our study did not include the normal weight and morbid obese individuals. The relationship between EEATT and metabolic parameters can be studied by categorization of EEATT values in future studies. Future research may also focus on sensitivity and specificity of EEATT measurements in visceral fat monitoring and high-quality research trials are required to establish the clinical applicability of EEATT in obesity management.

Conclusion

Epicardial adipose tissue thickness measured using echocardiography has been found to show significant positive correlation with anthropometric parameters and lipid profile in Asian-Indian overweight individuals.

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ABSTRACTS

1.

POSITION STATEMENT: PRE-PARTICIPATION CARDIOVASCULAR EVALUATION FOR ATHLETIC PARTICIPANTS TO PREVENT SUDDEN DEATH

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Sport-related sudden cardiac death (SCD) is not rare, it counts for 1.21/100,000 person-year and 1.9/100,000 person-year among general population and athletes respectively. The risk of sport-related SCD is not limited to competitive athlete but to leisure sport as well. Hypertrophic cardiomyopathy is the most common cause of SCD in young competitive athlete. Cycling is the type of sport that attributable to SCD at the most. Dynamic exercise results in higher increase of VO2, heart rate, lung perfusion, stroke volume, and blood pressure as compare to static exercise. Twelve element recommendations of AHA in pre-participation screening of competitive athlete mainly based on personal and family medical history, and physical examination. There is pro and cons on routine ECG examination during pre-participation screening. However, as ECG largely available and inexpensive, it would preferable to have routine ECG. Some common ECG changes in well-trained human must be recognized to avoid unnecessary screen out of potential athletes. Corrado et al, showed that pre-participation screening decrease SCD by 89% in young competitive athletes (p, 0.001). So, pre-participation screening is needed to identify cardiac diseases clinically silent that may be associated with cardiac arrest/sudden cardiac death in relation with exercise training, competitive or even leisure sport participation.

2.

AHA / ACC / HRS 2017 GUIDELINE: MANAGEMENT OF PATIENTS VENTRICULAR TACHYCARDIA AND PREVENTION OF SUDDEN CARDIAC DEATH

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Background: Practice guidelines provide recommendations to clinicians dealing with patients who have or are at risk of developing cardiovascular disease. Guidelines have been developed by organisations in different parts of the world which have impact on regional practice but collaboration between organisations has also led to development of practice guidelines that have global impact. These guidelines, which are based on systematic methods to evaluate and classify evidence, provide a cornerstone for quality cardiovascular care.

Aim: The purpose of this review is to look at these most recent practice guidelines approved for publication by the ACC, the AHA and the HRS; and endorsed by the HFSA. These guidelines focus on practice in the USA but do also have global significance. The guidelines are comprehensive and cannot fully be covered in a short time frame so we will focus on new recommendations and highlights and look at the relevance in the APHRS region and context.

Guideline Overview: The AHA/ACC Task Force on Clinical Practice Guidelines have presented an updated and comprehensive guideline for ventricular arrhythmia and sudden cardiac death. This guideline heralds the introduction of an evolved format of presenting guideline recommendations and associated text called the "modular knowledge chunk format". The evidence review committee have provided up to date recommendations on all aspects of ventricular arrhythmia, from ventricular ectopics through ventricular tachycardia to sudden cardiac death, in a clear and concise manner with all references provided. The new format is easy to follow and makes for quick reading and provides excellent flow diagrams for clinical application. The guideline in addition sought to answer two issues that have not previously been covered in guidelines. The first is the question of what to do with asymptomatic Brugada patients and what is the relevance of programmed ventricular stimulation and other arrhythmia endpoints. The second issue addressed is the use of primary prophylactic ICD implantation in older patients and those with significant comorbidities.

Clinical Implementation: This updated guideline on ventricular arrhythmia and sudden cardiac death has provided some fresh insights and new recommendations. There are excellent, user friendly flow charts and recommendations on all aspects from diagnosis through to medication, device and ablation therapies. This is a must read for all clinicians working in the field involving such patients and will act as a valuable reference point.

ABSTRACTS

3.

MANAGEMENT OF ELECTRICAL STORM IN PATIENTS WITH J WAVE SYNDROME

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Early repolarization (ER) is manifested as J wave elevation on ECG and known as a sign of good health and people with ER are usually very healthy, until they die suddenly. It still remains to be determined who are at risk of sudden cardiac death in people showing J wave elevation. J wave syndrome includes Brugada syndrome (BS) and ER syndrome (ERS) and there is an overlap between BS and ERS in genetic, clinical, electrophysiological, and pharmacological characteristics. In ERS, J waves are seen in inferior (II, III, aVF) or lateral leads (V4, V5, V6), while in BS they are best seen in right precordial leads (V1-V3). The appearance or accentuation of J wave is now recognized to predispose to the development of arrhythmogenesis when associated with other cardiac disorders, such as ischemia, heart failure, and hypothermia. The J wave might predict prognosis of cardiac events in various heart diseases, and the appearance of a new J wave during acute ischemia seems to be a messenger of VF. Disappearance of J wave after antiarrhythmic drugs (AADs) is predicting its response and prevention of ventricular fibrillation (VF) or ventricular tachycardia (VT), in contrast, its augmentation preceded VF/VT. Notching of the terminal portion of the QRS complex was the predominant morphology associated with a risk of VF. The proposed mechanism of VF and VT storms is faster Ito current in the epicardium than in the endocardium resulting in electrical gradient that forms the substrate for phase 2 re-entry. Prevention of Ito current with quinidine supports this mechanism. Morphological features of benign variety of J wave syndrome and malignant/proarrythmic variety have now been fairly well characterized. Prominent J wave often observed in hypothermic patients (<32°C), known as Osborn wave, camel-hump sign or late delta wave, and positive deflections occurred at the J point, of which amplitude inversely related to body temperature. Individuals resuscitated from VF definitely need an implantable cardiac defibrillator (ICD) but in others there is no consensus regarding therapy. Role of electrophysiology study to provoke VT/VF is not yet well defined. Radiofrequency ablation (RFCA) of epicardial substrate in right ventricle in BS is known as one of effective therapy, especially in patients refractory to AADs or electrical storm. However, role of RFCA in ERS is not yet established, despite the fact that low- voltage fractionated electrogram activity and high-frequency late potentials are observed in the LV of patients with ERS. I shall discuss some interesting cases of ERS presented with electrical storm and treated with epicardial ablation, targeted discrete electrical potentials of the left ventricle provoked by cold saline instillation into pericardial sac or intravenous isoproterenol.

4.

CONSENSUS DOCUMENT: STROKE PREVENTION IN AF

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Atrial fibrillation (AF) is the most common sustained arrhythmia, causing a 2-fold increase in mortality and a 5-fold increase in stroke. The Asian population is rapidly aging, and in 2050, the estimated population with AF will reach 72 million, of whom 2.9 million may suffer from AF-associated stroke. Therefore, stroke prevention in AF is an urgent issue in Asia. Many innovative advances in the management of AF-associated stroke have emerged recently, including new scoring systems for predicting stroke and bleeding risks, the development of non-vitamin K antagonist oral anticoagulants (NOACs), knowledge of their special benefits in Asians, and new techniques. The Asia Pacific Heart Rhythm Society (APHRS) aimed to update the available information, and appointed the Practice Guideline sub-committee to write a consensus statement regarding stroke prevention in AF. The Practice Guidelines sub-committee members comprehensively reviewed updated information on stroke prevention in AF, emphasizing data on NOACs from the Asia Pacific region, and summarized them in this 2017 Consensus of the Asia Pacific Heart Rhythm Society on Stroke Prevention in AF. This consensus includes details of the updated recommendations, along with their background and rationale, focusing on data from the Asia Pacific region. We hope this consensus can be a practical tool for cardiologists, neurologists, geriatricians, and general practitioners in this region. We fully realize that there are gaps, unaddressed questions, and many areas of uncertainty and debate in the current knowledge of AF, and the physician's decision remains the most important factor in the management of AF.

5.

MAPPING AND ABLATION OF ATRIAL TACHYARRHYTHMIAS AFTER AF ABLATION

HN Pak
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Aims: Although electrically reconnected pulmonary veins (PV) are the main mechanism of atrial fibrillation (AF) recurrence, PV isolation (PVI) is well-preserved in certain patients who undergo a repeat procedure. We explored the association between PV reconnection and clinical outcomes after a second ablation.
Methods: This observational cohort study included 143 patients (79.0% male, 56.1±10.0years old, 65.0% paroxysmal AF) who underwent a second procedure. PVI was well-maintained in 52 patients (PVP^- group, 36.4%), although the remaining 91 patients showed PV reconnection (PVP^+ group). After confirming PVI, we mapped non-PV triggers and conducted trigger ablation or additional linear ablation at redo-procedures.
Results: The proportion of females was higher (p=0.030), and redo-ablation timing after the *de novo* procedure was later (p=0.039) in the PVP^- group than in the PVP^+ group. Additional linear ablations were more likely to be performed in the PVP^- group (90.4% vs. 61.5%, p<0.001). During the 18.4±10.2 month follow-up after the redo-ablation, the PVP^+ group showed a lower clinical recurrence rate than the PVP^- group (log-rank p=0.011). The number of reconnected PVs was independently associated with a lower recurrence of AF after the redo-ablation in the total study population (HR 0.56, 95% CI 0.34-0.95, p=0.032), particularly for patients with paroxysmal AF (HR 0.41, 95% CI 0.19-0.87, p=0.021).
Conclusions: Among patients who underwent redo-AF ablation, those with more PV reconnections showed better clinical outcomes than those with fewer PV reconnections. The mechanism of AF recurrence might be different in patients with lower numbers of PV reconnections during redo-procedures.

ABSTRACTS

6.

SUBSTRATE MODIFICATION AFTER CPVI FOR THE TREATMENT OF NON-PAROXYSMAL ATRIAL FIBRILLATION

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Laboratory studies, histology studies, image studies and the clinical studies all prove the positive correlation between atrial fibrillation and atrial fibrosis from different perspectives. Atrial fibrosis, by separating myocardial cell coupling, diminishing conduction velocity and promoting anisotropic conduction, produce the substrate to sustain atrial fibrillation (AF). These fibrotic areas can be translated into signal abnormalities (low voltage and complex electrgram), and be depicted by electroanatomic high density map. Ablation targeting these areas after circumferential pulmonary vein isolation as the additional substrate modification strategy has proved its beneficial results. However, the unified methodology regarding the scar definition, the mapping rhythm (AF or sinus rhythm) and the modification endpoint is yet to be negotiated. Large-scale clinical trials, long-term follow-up results are needed to prove its contribution to the overall success rate of AF ablation.

7.

LUNCHEON SYMPOSIUM: ANTICOAGULATION IN HIGH RISK POPULATION: CLINICAL DATA, DOSING INSTRUCTIONS AND DAILY PRACTICE

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Atrial fibrillation (AF) is the most common abnormal cardiac arrhythmia in clinical practice, is associated with increased morbidity and mortality, and increases with older age, hypertension, diabetes mellitus, and heart failure. Of note, the presence of these medical conditions are independently associated with increased risk of stroke. The introduction of non-vitamin K antagonist oral anticoagulants (NOACs) has been a major advance in stroke prevention in patients with AF. Given that, patients have more comorbidities are often more susceptible to bleeding, which makes decisions on anticoagulation challenging in this vulnerable population. The objective of this lecture is to present a concise overview of the management of AF, with reference to the latest evidence-based approach from various clinical data as well as the international AF management guideline. Further, this lecture would also discuss the practical consideration, especially in dosing regimen which physicians might come across in their daily practice.

8.

CONSENSUS STATEMENT: CIED LEAD MANAGEMENT AND EXTRACTION

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Pacemakers, defibrillators and Cardiac Resynchronization Therapy cardiovascular implantable electronic devices (CIED) including leads are now increasingly complex and used longer due to better survival of patients. The rapidly aging population together with the increased implantation of devices in the Asia Pacific region will result in an increasing need for management of complications associated with these device therapies. With time, a small proportion of devices may develop complications such as lead failures or infection which will necessitate the extraction and reimplantation of these devices. As the procedure of lead extraction can be complicated by a small risk of mortality, it is important that the indication for lead extraction should be carefully selected. Previous guidelines were published almost a decade ago and this had been updated by the recently published 2017 HRS expert consensus statement on cardiovascular implantable electronic device lead management and extraction. The document discusses in detail the diagnostic approach to suspected lead failure and lead recalls or advisories. The compelling indication for lead extraction is CIED infection. Preprocedure transesophageal echocardiography is recommended in patients with suspected systemic CIED infection to evaluate the absence or size, character, and potential embolic risk of identified vegetations. Complete device and lead removal is recommended in all patients with definite CIED system infection. Appropriate antibiotic therapy based on the cultures and sensitivity will be needed. Other indications for extraction of nonfunctional leads and other indications are discussed. For these indications, a careful discussion between the patient and the doctor on the risk benefit of lead extraction versus abandonment should be discussed. Importantly there is a need for lead extraction centres in the Asia Pacific region due to the increased need for these services. The document suggests optimal periprocedural management and extraction tools to be used. It also suggests optimal facilities, equipment and training of personnel involved in lead extraction.

ABSTRACTS

9.

REMOTE MONITORING OF PATIENTS WITH CIED

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Advances in technology have allowed the remote transmission of data from cardiac implantable electronic devices (CIED). Remote access to device diagnostics has been shown to improve patient safety in comparison to ambulatory conventional monitoring due to earlier detection of arrhythmias or device malfunction. It has also significantly reduced the number of in-office visits, workload of healthcare providers and healthcare costs to patients. In addition, patient compliance to scheduled remote monitoring evaluation is superior compared to in-office checks. Home monitoring is relatively new in Southeast Asia, with pickup rates increasing over recent years. We report our experience with home monitoring and describe patient compliance to scheduled remote monitoring transmissions as well as physician, patient and healthcare workers' experiences with remote monitoring. In Singapore, distance from CIED monitoring centres is much less of a barrier in comparison to larger countries. Hence, our study was also an examination of patients' opinions regarding remote monitoring in a situation where geographical distance is less of a barrier toward office device monitoring.

10.

CIED INFECTION CONTROL

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Infection of cardiac implantable electronic device (CIED) has the following presentations: (1) local inflammatory changes of the generator-pocket site, (2) cutaneous erosion with percutaneous exposure of generator and/or leads, (3) right-sided or left-sided endocarditis and (4) pyrexia of unknown origin. However, fever and other signs of systemic toxicity are frequently absent. Patients may merely present with vague symptoms like malaise, fatigue, anorexia and decrease in functional capacity. The incidence of CIED infection ranges from 0.6 to 3.6% and it increases with the complexity of CIED procedures. More importantly, the standardized adjusted mortality at one year reported in one study for patients with CIED infection ranges from 27-35% depending on the complexity of CIED implantation. Risk factors of CIED infection can be categorized into patient (diabetes, heart failure, renal dysfunction and the use of long-term oral anticoagulation and steroid increase risk of CIED infection), procedural (device replacement, multiple implantable leads, transvenous temporary pacing, early re-intervention and fever within 24 hours before implantation increase risk of CIED infection), physician (low level of experience increase risk of CIED infection) and microbiological factors (Staphylococcus aureus bacteraemia increases risk of CIED infection). In general, complete device and lead removal is recommended for CIED infection by the guidelines and expert opinion. However, there have been successful case reports on adoption of a conservative approach without extracting the leads in patients who are frail elderly, with multiple comorbidities and limited life expectancy and the risk of lead extraction is high. Blood cultures and transesophageal echocardiography are important investigations in managing CIED infection. In addition, 1-6 weeks of antibiotic therapy is recommended depending on the clinical settings. Re-implantation of new device is in general recommended to be performed 3-14 days after the blood culture has become negative. On the other hand, contralateral side to the site of infection has been advocated conventionally. However, with the emergence new technology of subcutaneous implantable cardioverter-defibrillator and leadless cardiac pacemaker, for which, intravenous lead implantation becomes unnecessary, data on the role of these devices in the management of CIED infection is eagerly awaited. Prevention of CIED infection is of crucial importance. Intravenous cefazolin compared with placebo given immediately before the procedure has been shown to reduce the risk of CIED infection. Chlorhexidine-alcohol compared with Povidone-iodine has been shown to reduce the risk of surgical site infection. In general, it is believed that reducing pocket hematoma can decrease the risk of CIED infection. Data has been accumulating on the potential of an absorbable antibiotic envelope to reduce CIED infection. A multicentre, large-scale randomized-controlled study (WRAP-IT) on the use of absorbable antibiotic envelope in on-going and the results of which may impact clinical practice on prevention of CIED infection.

ABSTRACTS

11.

CONSENSUS DOCUMENT: DEVICE-DETECTED ATRIAL TACHYARRHYTHMIAS

CP Lau
Queen Mary Hospital, the University of Hong Kong, Hong Kong SAR

Atrial fibrillation (AF) frequently develops in patients with implanted cardiac electronic devices (CIEDs), ranging from 26-68%. Detection of AF using CIEDs enables early diagnosis of AF and oral anticoagulant therapy (OAC) for stroke prevention. This consensus document developed by the European Heart Rhythm Association in 2017 and endorsed by the Asian Pacific Heart Rhythm Society addresses the definition, epidemiology, clinical implications and recommendation for OAC in these patients with device-detected subclinical AF. Atrial high rate events (AHRE) are defined as atrial events over 190 bpm detected by the atrial lead of a CIED. When AHRE over 6 minutes are detected in an asymptomatic patient without a prior history of AF, such events are termed subclinical AF (SCAF). ECG recorded (either with conventional 12-lead or rhythm strip ECG or inserted cardiac monitor) without prior AF symptoms or diagnosis are termed silent or asymptomatic AF. A diagnosis of silent AF is often made when an AF related complication such as stroke or heart failure occurs. AHRE >5-6 minutes occur in about 20% of patients in the first year after pacemaker implantation. Only 17-21% of these are correlated with symptoms. The patient risk profiles and outcome of symptomatic vs asymptomatic AHRE are similar. In the ASSERT study, SCAF occurred in 10.1% of patients within 3 months of device implant in hypertensive subjects over 65 years. **The consensus document therefore recommends review the presence of AHRE and stored electrograms in CIEDs, with judicious programming to achieve appropriate AHRE detection.** Several studies have examined the natural history of AHREs in pacemaker and ICD recipents. SCAF is a predictor of future clinical AF. In the MOST and ASSERT study, clinical AF occurred at an odds ratio (OR) of 5.9 and 5.8 in patients with SCAF compared to those who did not. SCAF is also a predictor of future thromboembolic events (TE), with OR ranging from 2.2 to 5.3. Two factors appear to determine the occurrence of TE: the duration of SCAF and the underlying risk for stroke based on the CHA_2DS_2-VASc score. The duration of SCAF that significantly increased TE risk was >5.5 h in the TREND and >17.7 h in the ASSERT study with an average CHADS2 score of about 2 in both studies. **Thus the consensus document recommends OAC when SCAF occurs > 5.5 h in patients with CHA_2DAS_2-VASc score ≥2.** Interestingly, there is no good correlation between the onset of SCAF with subsequent TE. In the TRENDs study, only less than 1/3 of patients with TE event had one or more episodes of SCAF within 1 month of the event. A lack of temporal relationship was also observed in the ASSERT study. Initiation of, and discontinuation of, OAC (mainly warfarin) in a therapeutic trial of TE prophylaxis is based on SCAF failed to achieve significance. Thus SCAF may represent an early marker (and perpetuator) of an underlying atrial disease that lead to TE events. The risk factors for TE in AF, the CHA_2DS_2-VASc score plays a significant role in the presence of AHRE. Botto et al relates the TE risk in 568 patients with a prior history of AF with SCAF. AHRE >24h increases TE risk if CHA_2DS_2-VASc **≥**1, and AHRE **≥**5 mins will increase stroke risk if CHA_2DS_2-VASc **≥**2. In the population without prior AF, the absolute risk for TE is significantly lower compared to those in the clinical AF, but nevertheless much higher than those patients without SCAF. For instance, at a CHA_2DS_2-VASc score of 2.0 in the ASSERT study, when SCAF was detected, the TE risk was 1.29% vs 0.7% compared to those without, but still lower than the quoted 4% annual risk in the general population with clinical AF. Based on these evidences, the consensus document recommends the following:

1. Assessment of patient's stroke risk using the CHA_2DS_2-VASc score is recommended
2. No antithrombotic therapy for any patients with CHA_2DS_2-VASc score of 0 in males or 1 in females, irrespective of AHRE, is recommended
3. For patients with two additional CHA_2DS_2-VASc risk factors (i.e. ≥2 in males, ≥3 in females),OAC is recommended for AF burden >5.5h/day (if there are no contraindications). Lower duration may merit OAC if multiple risk factors are present.
4. For effective stroke prevention in patients with CHA_2DS_2-VASc score ≥2, oral anticoagulation, whether with well controlled vitamin K antagonist (VKA) with a time in therapeutic range >70%, or with a non-VKA oral anticoagulant (NOAC, either dabigatran, rivaroxaban, apixaban or edoxaban) is recommended

ABSTRACTS

12.

LEADLESS PACEMAKER

KLF Lee
Specialist in Cardiology, Hong Kong SAR

Pacemaker technology has developed tremendously in the past decades. It has evolved from a bulky external device to a totally implantable system. Recently, it has undergone further miniaturization as a single component device that is implanted directly inside the right ventricle without attachment to a pacing lead. A conventional pacing system composes of one or more transvenous leads for sensing and pacing, and a subcutaneously implanted pulse generator. These components are also responsible for most of the risks and complications associated with pacemaker implantation. To name a few, those include pneumothorax, hemothorax, pocket hematoma, lead dislodgement acutely, and lead fracture, pocket erosion, system infection, and potential need for extraction chronically. Currently available leadless pacemakers are self-contained right ventricular single chamber rate responsive pacing devices that can be implanted with specially designed delivery catheters and secured by unique anchoring systems using a femoral percutaneous approach. Clinical studies of leadless pacemakers have demonstrated that they can be implanted successfully with little complications. There remain a number of issues to be addressed, for example, long term safety, device retrieval, and end of service strategy. Although long term follow-up and outcome data are needed before the role of leadless pacing can be fully established, such technology appears to be the future direction of development. There are ongoing efforts and research to expand the utilization of leadless technology to dual chamber pacing, integration with implantable cardioverter-defibrillator for anti-tachycardia pacing, and left ventricular endocardial pacing for cardiac resynchronization therapy.

13.

CONSENSUS STATEMENT: OPTIMAL ICD PROGRAMMING AND TESTING

S Zhang
Arrhythmia Center, State Key Laboratory of Cardiovascular Disease, Fuwai Hospital, National Center for Cardiovascular Diseases, Chinese Academy of Medical Sciences and Peking Union Medical College, China

Implantable cardioverter-defibrillator (ICD) therapy is clearly an effective therapy for selected patients in definable populations. The benefits and risks of ICD therapy are directly impacted by programming and surgical decisions. This flexibility is both a great strength and a weakness, for which there has been no prior official discussion or guidance. The [2015 HRS/EHRA/APHRS/SOLAECE expert consensus statement on optimal implantable cardioverter-defibrillator programming and testing] is the first consensus of the 4 continental electrophysiology societies that there are 4 important clinical issues for which there are sufficient ICD clinical and trial data to provide evidence-based expert guidance. The consensus systematically describes the greater than 80% (83%-100%, mean 96%) required consensus achieved for each recommendation by official balloting in regard to the programming of (1) bradycardia mode and rate, (2) tachycardia detection, (3) tachycardia therapy, and (4) the intraprocedural testing of defibrillation efficacy. The consensus fills the gap of ICD/CRT-D programming, and gives a comprehensive and systematic guidance for the standardized programming. The consensus is just a start, we look forward to having more sufficient data to guide ICD/CRT-D programming.

14.

His-BUNDLE PACING: WHERE WE ARE?

JYS Chan
Prince of Wales Hospital, Hong Kong SAR

Studies have shown right ventricular pacing induced dyssynchrony can have deleterious effect in susceptible individuals. Depolarization of the ventricles through the His-Purkinje system induces normal synchronous activation and therefore avoids dyssynchrony induced by right ventricular pacing. Investigators have shown permanent His-bundle pacing is associated with improvement in exercise capacity, preserved ventricular synchrony and left ventricular ejection fraction compared to right ventricular pacing. It has also been demonstrated that His-bundle pacing can significantly shorten the QRS duration and even "normalized" the conduction defect in patient with heart failure and bundle branch block suggesting there presence of different conduction property along longitudinal level of the bundle branch conduction system. His-bundle pacing, hence is an attractive alternative to cardiac resynchronization therapy for patient with conduction delay and heart failure.

15.

CRT RESPONSE: CONSIDERATIONS AND STRATEGIES

S Johar
RIPAS Hospital, Brunei

Cardiac resynchronisation therapy (CRT) has become a mainstream treatment for the management of patients with congestive cardiac failure. The standard indications for CRT include LV systolic dysfunction (LVEF ≤35%), prolonged QRS duration (≥120 ms) and heart failure symptoms despite optimal medical therapy. However approximately one-third of patients do not derive symptomatic benefit. The factors involved in the lack of benefit revolve around patient selection, patient-specific LV lead placement, optimal programming of the device and follow-up care. The lecture will review these issues and discuss methods to potentially improve response rates.

ABSTRACTS

16.

VENTRICULAR ARRHYTHMIAS AFTER IMPLANTATION OF LEFT VENTRICULAR ASSIST DEVICES

K Fan
Grantham Hospital, Hong Kong SAR

Mechanical ventricular assist devices (VADs) have been shown to improve outcomes in patients with advanced heart failure as bridge to heart transplantation (BTT) and as destination therapy (DT). Complications including device malfunction, infection, organ dysfunction, bleeding, arrhythmias, and cerebrovascular events. Ventricular arrhythmias (VA) are common among patients with VADs accounting for 25-40% and are associated with worse outcomes. There are wide variety of signs and symptoms upon presentation mainly driven by the fact that the right ventricle (RV) is not supported by the device. Deterioration of RV function can result in palpitations, decompensated heart failure, syncope or sudden cardiac death. A common presenting sign of VAs is decrease in VAD flow. The mechanisms responsible for VAs can be divided into five main categories: mechanical dysfunction, increased left ventricular end-diastolic pressure, ischemia, metabolic/drugs and scar related reentry tachycardia. Determination of the mechanism of VA is essential to ensure the greatest likelihood of successful treatment. Management of VAs included conservative management (such as optimization of intravascular volume status and VAD speed adjustment), medical therapy with antiarrhythmic agents, implantable cardioverter defibrillators and catheter ablations.

Hong Kong College of Cardiology

Twenty-Sixth Annual Scientific Congress

15 - 17 June 2018
Sheraton Hong Kong Hotel and Towers
Hong Kong

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Scientific Programme

Friday, 15 June 2018

0800	Tang Terrace, 3/F	Registration	
0900-1030	**Ching Room, 4/F**	**Free Paper Session** Hypertension and Hyperlipidemia Percutaneous Coronary Intervention	
	Ming II Room, 4/F	Heart Failure	
1030-1100	Sung Terrace, 4/F	Coffee Break & Visit Exhibits	
1100-1300	**Ching Room, 4/F**	**Free Paper Session** Electrophysiological Study and Cardiac Arrhythmia Structural Heart Disease Intervention	
	Ming II Room, 4/F	Cardiac Imaging Case Report Session	
1300-1430	Oyster Bar, 18/F	Lunch	
1430-1630	**Ching Room, 4/F**	**Free Paper Session** Coronary Artery Disease Cardiac Surgery Congenital Heart Disease	
	Ming II Room, 4/F	Miscellaneous	
1630-1700	Sung Terrace, 3/F	Coffee Break & Visit Exhibits	
1700-1800	**Ballroom C, 3/F**	**Best Paper Oral Presentation**	
1800-1930	**Ballroom C, 3/F**	**Cardiology Expert Forum**	
		Back to Basics	Dominic Leung (Australia)
		LAAO: An Important Alternative Choice for PCI Patients with Atrial Fibrillation	Ben He (PR China)
		Role of IVUS in Management of No Flow during PCI	Kam-tim Chan (Hong Kong)
		CTO PCI after CABG	Wei-min Li (PR China)
		Update on Research and Developments in LAAO Procedure	Ya-wei Xu (PR China)
1940-2110	**Ballroom A&B, 3/F**	**Welcome Dinner**	

Saturday, 16 June 2018

0800 Tang Terrace, 3/F Registration

0830-1230 **Ballroom C, 3/F** **Joined Symposium – Cross-straits Medicine Exchange Association / Hong Kong College of Cardiology**
Guideline and Practice: Clinical Case Based Conference (GAP-CCBC)
(Presentation in English or Putonghua)

A Case of Myocarditis with Immune Checkpoint Blockade Fuwai Hospital, Chinese Academy of Medical Sciences 中國醫學科學院阜外醫院	Rui Fu (PR China) 伏蕊
Atrial Fibrillation Complicated with Stroke and Hemorrhagic Transformation Taipei Veterans General Hospital, National Yang-Ming University 臺北榮民總醫院	Chin-chou Huang (Taiwan) 黃金洲
Step by Step PCI Strategy for A Case with High-risk Anatomy and Complex Profiles Bejing Chao-Yang Hospital 首都醫科大學附屬北京朝陽醫院心臟中心	Yu Liu (PR China) 劉宇
TAVI in Rheumatic Aortic Stenosis : The Invisible "Calcium" Queen Elizabeth Hospital 伊利沙伯醫院	Vincent NH Luk (Hong Kong) 陸毅康
A Case of Fever and Space Occupying Lesion of Right Ventricle Guangdong General Hospital 廣東省人民醫院	Jia Qiu (PR China) 丘嘉
A Case of Amyloid Cardiomyopathy Shanghai Tenth People's Hospital 上海市第十人民醫院	Yang Su (PR China) 蘇楊
Reflection Triggered by A Case of Subacute Stent Thrombosis Fuwai Hospital, Chinese Academy of Medical Sciences 中國醫學科學院阜外醫院	Jing-jia Wang (PR China) 汪京嘉
TAVR for Patients with Valvular Aortic Stenosis but Without Valve Calcification Heart Centre, Cheng Hsin General Hospital 振興醫療財團法人振興醫院	Yung-tsai Lee (Taiwan) 李永在
One Primary PCI of LM with Multiple Bifurcations Hebei Yanda Hospital 河北燕達醫院	Zhen-lin Wu (PR China) 武振林
Transcatheter Valve-in-valve for Failed Aortic and Mitral Bioprostheses: One THV or Two? Heart Centre, Cheng Hsin General Hospital 振興醫療財團法人振興醫院	Kuen-Chih Huang (Taiwan) 黃冠智
Recurrent Cardiac Tamponade from Right Atrium Angiosarcoma Centro Hospitalar Conde de Sao Januario 仁伯爵綜合醫院	Edmundo Patricio Lopes Lao (Macau) 劉百球
Less Invasive Left Ventricular Reconstruction to A Patient with Large Ventricular Aneurysm After Acute Myocardial Infarction Xiamen Cardiovascular Hospital Xiamen University 廈門大學附屬心血管病醫院	Yan-er Yao (PR China) 姚彥爾

0930-1200	**Ballroom A&B, 3/F**	**Symposium for Allied Cardiovascular Health Professionals 2018 : Learning from "Mistakes" in Cardiac Catheterization Laboratory and Coronary Care Unit**	
		Common "Mistakes" Observed in Cardiac Catheterization Laboratory – from Nurse Perspective	Fong-hing Tong (Hong Kong)
		Important "Mistakes" Happened in Cardiac Catheterization Laboratory – from Cardiologist Perspective	Shing-fung Chui (Hong Kong)
		"Mistakes" Observed in Coronary Care Unit and Cardiac Ward	Kam-wai Lai (Hong Kong)
		How to Avoid "Mistakes" in Cardiac Catheterization Laboratory and Coronary Care Unit	Kwok-keung Chan (Hong Kong)
1245-1345	**Ballroom, 3/F**	**Sanofi Lunch Symposium** (Lunch will be provided)	
		The Latest Update of PCSK9 Inhibitors in the Field of Acute Coronary Syndrome (ACS)	David CW Siu (Hong Kong)
		Cholesterol Never Sleeps: Experience Sharing from Cardiologist Perspective	Vincent OH Kwok (Hong Kong)
1400-1430	**Ballroom, 3/F**	**26th ASC Opening Ceremony**	
		Guest-of-Honor: Dr. Constance Hon-yee CHAN, JP, Director of Health, Department of Health, The Government of the Hong Kong Special Administrative Region	
1430-1530	**Ballroom, 3/F**	**AstraZeneca Symposium**	
		Dual Anti-platelet Therapy for Secondary Prevention – The Dawn of New Era	Vincent OH Kwok (Hong Kong)
		Practical Usage of Novel Treatment: From Clinical to Real-Life	TBC
1530-1630	**Ballroom, 3/F**	**Astellas Pharma Symposium**	
		Redefining LUTS Management in Elderly Patients with CVD: Can We Do Better?	Tony NH Chan (Hong Kong)
		The Complexity of LUTS, CVD and Comorbidities	Lawrence KS Wong (Hong Kong)
1630-1900	**Ballroom, 3/F**	**Plenary Lectures**	
		Novel Cardioprotective Inodilator	Chung-seung Chiang (Hong Kong)
		Latest Advancement in Lipid Management: From Trial to Clinical Practice	David CW Siu (Hong Kong)
		Medical Treatment of Stable Angina: A Tailored Therapeutic Approach	Athanasios Manolis (Greece)
		Better Management in CHF – The Role of Aquaretics	Wei-yi Mai (PR China)
		Optimizing Cardio Protection Strategy in CAD and CHF Management	Brian Tomlinson (Hong Kong)
1915-2015	**Ballroom C, 3/F**	**Hong Kong Heart Foundation Lectures**	
		Non-Inferior Trials in Cardiology: A Case of Not Bad Because It Is Not Too Bad	Dominic Leung (Australia)
2015-2145	**Ballroom A&B, 3/F**	**Dinner**	

**Coffee will be served at 10:30 - 11:00 & 17:00 - 18:30 at 4/F of Sung Terrace.*

Sunday, 17 June 2018

0800	Tang Terrace, 3/F	Registration	
0830-1030	**Ballroom C, 3/F**	**PCI Cases Discussion** **Prize Presentation**	
1030-1100	Tang Terrace, 4/F	Coffee Break & Visit Exhibits	
1100-1200	**Ballroom C, 3/F**	**Atrial Fibrillation Symposium**	
		A Deadly Combination: Heart Failure and Atrial Fibrillation	Hung-fat Tse (Hong Kong)
		AF Ablation: Benefits Beyond Symptom Control? Lessons from CASTLE-AF and CABANA Trial	Jeffrey WH Fung (Hong Kong)
1200-1400	**Ballroom C, 3/F**	**Plenary Lectures**	
		Women in Cardiology Forum	
		- My Most Memorable Bifurcation Case	Jaclyn Chan (Hong Kong)
		- How Could I Stent Complex LM Bifurcation Case Precisely	Ling-ling Cheung (Hong Kong)
		- Micra Implantation and Future Development	Kathy LF Lee (Hong Kong)
		The COMBO Benefit for Complex Lesions and Under Complex Settings	Vincent NH Luk (Hong Kong)
		Local Experience with Using ARNI in Heart Failure Patients	David CW Siu (Hong Kong)
		Understand Latest Best in Class DES Safety & Daily Clinical Application	
		- Xience Stent: Insight from Pathology and OCT	Kazuyuki Yahagi (Japan)
		- Traversing a Rocky Tunnel	Jaclyn Chan (Hong Kong)
1400-1530	Ballroom A&B, 3/F	Lunch	
1530-1720	**Ballroom C, 3/F**	**Joint European Society of Cardiology / Hong Kong College of Cardiology / Macau Cardiology Association Symposium**	
		Multimodality Imaging in Valvular Heart Disease	Victoria Delgado (The Netherlands)
		Leadless Pacing by Micra	Chung-seung Chiang (Hong Kong)
		PCI Experience in Post-CABG Patient	U-po Lam (Macau)
		Updates of Enhanced External Counterpulsation on Cardiovascular Protection	Gui-fu Wu (PR China)
		The Strategy of Lipid Lowering in High Risk ASCVD Patients	Min-ji Charng (Taiwan)
		Is It the Prime Time to Extend the Indication of TAVR to Younger Patients?	Wei-hsian Yin (Taiwan)
1720-1745	Sung Terrace, 4/F	Coffee Break & Visit Exhibits	
1745-1915	**Ching Room, 4/F**	**Heart Rhythm Symposium**	
		Current Concepts on Diagnostic Approach for Syncope	Cathy TF Lam (Hong Kong)
		ECG Interpretation in Syncopal Patients	Jojo SH Hai (Hong Kong)
		How to Manage Unexplained Syncope in Structural Heart Diseases or Inherited Arrhythmic Syndromes?	Jacky K Chan (Hong Kong)
		What are the Treatment Options for Reflex Syncope?	Ming-ho Wong (Hong Kong)
1915-2045	**Sung Room, 4/F**	**Farewell Dinner**	

Paediatric Cardiology Programme

Friday, 15 June 2018

1730-1830	**Ching Room, 4/F**	**Free Paper Session** **Paediatric Cardiology I**
1830-1940	**Ching Room, 4/F**	**Free Paper Session** **Paediatric Cardiology II**

Saturday, 16 June 2018

0830-0835	**Ching Room, 4/F**	**Welcome Address**	
0835-1030	**Ching Room, 4/F**	**Paediatric Cardiology Symposium I**	
		Update on Paediatric Heart Transplantation : Patient Selection, Management and Outcomes	Robert Weintraub (Australia)
		Ventricular Assist Device (VAD) as a Bridge to Manage Advanced Paediatric Heart Failure	Timmy WK Au (Hong Kong)
		Overview of Paediatric Heart Transplantation in Hong Kong	Kin-shing Lun (Hong Kong)
		Overview of Adult Congenital Heart Transplants	Katherine YY Fan (Hong Kong)
		Using Pulse Oxemitry and Cardiac Auscultation to Screen for Neonatal Congenital Heart Disease	Guo-ying Huang (PR China)
1030-1100	Sung Terrace, 4/F	Coffee Break & Visit Exhibits	
1100-1230	**Ching Room, 4/F**	**Free Paper Session** **Paediatric Cardiology III**	
1245-1345	Sung Terrace, 4/F	Coffee Break & Visit Exhibits	
1830-1940	Ballroom C, 3/F	Lunch	
1400-1430	**Ballroom C, 3/F**	**Opening Ceremony**	
1430-1625	**Ching Room, 4/F**	**Paediatric Cardiology Symposium II**	
		Diagnosis and Management of Paediatric Cardiomyopathies	Robert Weintraub (Australia)
		Perimembranous Ventricular Septal Defect Closure: Device and Technology	Zhi-wei Zhang (PR China)
		Establishment of Early Prediction Score System of Intravenous Immunoglobulin Unresponsive Patients with Kawasaki Disease and Verification Study in Shanghai, China	Fang Liu (PR China)
		The ALARA Concept in Practice of Pediatric Interventional Procedure of Congenital Heart Disease	Lin Wu (PR China)
		The Study of Heart Blocks on Transcatheter Closure of Ventricular Septal Defect: A Single-center Experience on More Than 1000 Cases	Wei Ji (PR China)
1625-1750	**Ching Room, 4/F**	**Free Paper Session** **Paediatric Cardiology IV**	

**Coffee will be served at 10:30 - 11:00 & 17:00 - 18:30 at 4/F of Sung Terrace.*

ABSTRACTS

Abstracts for Free Paper Session:

HYPERTENSION AND HYPERLIPIDEMIA

49

Using Network Meta-Analysis to Determine the Level of Systolic Blood Pressure with the Best Outcomes

Y Fei, MF Tsoi, BMY Cheung
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Purpose: Lowering systolic blood pressure (SBP) to <120 mmHg has been reported to reduce cardiovascular events and mortality. We therefore study the relationship between achieved SBP and outcomes using network meta-analysis in order to determine the optimal target SBP.
Methods: We searched for randomised controlled trials comparing different SBP targets that reported cardiovascular events and mortality. The mean SBP attained was classified into five groups (110-119, 120-129, 130-139, 140-149 and 150-159 mmHg). Data were analysed using R.
Results: We included 14 trials involving 44015 patients over 50 years old. Controlling SBP to 120-129 mmHg significantly reduced major adverse cardiovascular events (MACE) and stroke when compared to 130-139 mmHg (OR 0.84, 95% CI 0.73-0.96 and 0.83, 0.69-0.99), 140-149 mmHg (0.74, 0.60-0.90 and 0.73, 0.55-0.97), and 150-159 mmHg (0.41, 0.30-0.57 and 0.43, 0.26-0.71), respectively. Stroke was further reduced with more intensive lowering to <120 mmHg (0.58, 0.38-0.87, 0.51, 0.32-0.81, and 0.30, 0.16-0.56, respectively). In contrast, SBP ≥150 mmHg significantly increased cardiovascular mortality and myocardial infarction compared to 120-129 mmHg (2.18, 1.32-3.59 and 1.73, 1.06-2.82) and 130-139 mmHg (1.71, 1.11-2.61 and 1.53, 1.01-2.32). The relationship between SBP and all-cause mortality was not significant.
Conclusions: Lowering SBP to <130 mmHg reduces MACE and stroke. Further reduction to <120 mmHg can be an option to reduce stroke if the treatment is tolerated. The long-term SBP should not exceed 150 mmHg because of increased risk of cardiovascular events and mortality.

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Prognostic Nutritional Index is a Powerful Predictor of Prognosis in Patients with Critical Limb Ischemia Underwent Endovascular Treatment

WK Chi, WM Chan, BPY Yan
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Background and Introduction: Patients with critical limb ischemia (CLI) have poor overall and limb prognosis. Prognostic nutritional index (PNI) is one of the established independent prognostic factors in various cancers, heart failure and procedure outcomes. Although it is simple to use, the association between the PNI and the overall and limb prognosis of patients with CLI following endovascular therapy (EVT) has not been explored.
Purpose: To evaluate the impact of PNI on the 12-month clinical outcomes of EVT in CLI patients.
Methods: In a prospective registry from January 2009 and October 2016, consecutive 270 patients with CLI who underwent EVT at a single tertiary referral hospital in Hong Kong were analyzed. Patients were stratified into 3 groups with according to the percentiles of PNI. PNI was calculated as 10 × serum albumin (g/dL) + 0.005 × total lymphocyte count (per mm^3). Primary endpoint was amputation free survival (AFS) and secondary endpoint was amputation (AMP) at 12-months. Multivariate Cox proportional hazards regression analyses were performed.
Results: The mean PNI values of the 3 resulted tertile groups (>45.5, 37.6-45.5, ≤37.5) were 50.4, 42.2, 32.8 respectively with significant group difference (P<0.001). For tertile analysis on the primary endpoint, hazard ratios (HRs) of CLI patients in middle and low PNI tertile group were 2.53 (95% CI 1.16-5.49) and 3.80 (95% CI 1.75-8.28) with control of other risk factors including age>80, non-ambulatory status and end-stage renal failure (all P<0.05). In addition, the HR of having PNI ≤37.5 was the highest among all identified significant risk factors. For the secondary endpoint, low PNI (≤37.5) caused significant high HR (6.13, P=0.004) in univariate analysis, but its determining role was diminished and failed to reach significance level in multivariate model.
Conclusions: The PNI was independently associated with mortality and major amputation after EVT in patients with CLI and its contributing association outweighed all identified risk factors.

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Six Months Outcome of Provisional vs Double Stent Strategy for True Bifurcation Lesion Using Transradial Approach: Single Centre, Single Operator Study in Bangladesh

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Objectives: Coronary bifurcation lesions are frequent in everyday practice and account for up to 20% of all PCIs. The question relating to a one or two stent strategy for bifurcation lesions has been a subject of many debates over recent years. Double stent technique is associated with a lower procedural success rates & a higher rate of long term adverse cardiac events such as stent restenosis and thrombosis.
Methods & Results: 80 patients with true bifurcation lesions according to Medina classification were included in this single-centre study and randomly assigned to one (n=40) or two (n=40) stent strategy group. The lesion type of 1,1,1 was the most common type seen in both groups (p=0.94). Both the groups were similar in terms of patient and lesion characteristics. PCIs were performed (90% via TAP technique & rest via DK crush or minicrush) according to standard routine through transradial approach using 6F guiding catheter. The most common site of treated bifurcation lesions in both groups was the junction of LAD/DG branches followed by LCX/OM branches. Cross over from one-stent to two stent strategy was none. The endpoints were cardiac death, MI, stent thrombosis & TLR during 6 months. For the bifurcation lesions, comparing routine two-stent strategy with a provisional strategy have shown comparable efficacy outcomes (TVR rates) between the two treatments strategies at 6 month follow up. The provisional strategy resulted in lower rates of periprocedural MI, less contrast use, lower X-ray doses & shorter procedural times.
Conclusions: Though limited due to low number of participants, this study gave results that in case of true bifurcation lesion, double stent strategy was non-inferior to provisional stent strategy.

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PCI to CTO Lesion through Transradial Approach Using 5Fr vs 6Fr Guiding Catheter

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Aims: Treating CTOs by antegrade approach needs skill and appropriate devices. Guide catheter is an important factor for success. 5 F guide catheter for treating CTO is an alternate choice for diabetic population with narrow caliber radial artery.
Methods and Results: In an absolute radial center like ours, PCI to CTO lesion for last 1 year since July 2015 to June 2016 were evaluated retrospectively by antegrade approach through transradial access. Total 147 CTO lesion was attempted by this period of time. Using 5 F or 6 F guide catheter was operator's choice.
Conclusions: Out of 147 CTOs in diabetic patients, 66 (45%) was by 5 F guide catheter and 81 (55%) was by 6 F guide catheter. Success rate in both group was almost similar (63.6% vs 65.4%, p=0.82). Smaller profile balloon support was needed in both groups in similar number (66.7% vs 69.1%, p=0.75). Workhorse CTO guide wire in our lab was thin hydrophilic PT2 (Boston) and used in similar percentage (94% vs 89%, p=0.28). Only in 5 cases each, micro catheter was used. CTO of LAD was more in 5 F group (45.5% vs 34.6%). CTO lesion of RCA was 35% vs 40%. Contrast volume is lower in 5F group though not statistically significant (152 vs 165 ml, p=0.26). Fluoroscopy time was similar in both groups. Backup support of guide catheter is an important prerequisite for PCI to CTO. "Active back up support" by 5 F guide catheter is better in our experience especially for left system. Other than using bulky devices like IVUS catheter and rotablation, 5 F guide catheter can be feasible comfortable choice for CTO PCI.

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Percutaneous Coronary Interventions with Bioresorbable Vascular Scaffolds in Hong Kong: A Registry Based Study

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Purpose: Bioresorbable Vascular Scaffolds (BVS) had emerged as a therapeutic alternative to traditional drug eluting stents in percutaneous coronary interventions. We sort to evaluate the short and long term outcomes of this therapy in a real world, all-comers registry in the local population of Hong Kong.
Method: From 2014 to 2017, all patients who had a percutaneous coronary intervention with a BVS in our hospital were included in this study. The primary endpoint was a composite endpoint of all cause mortality and 1-year binary restenosis rate of the target vessel as assessed by an elective CT or invasive coronary angiogram.
Results: A total of 170 patients with an average age of 60.4±10.6 were included in this study, including 134 males (79%). An average of 1.32 BVS were implanted per patient. The indication for revascularization was symptomatic stable coronary artery disease in 150 patients (82.4%). In 152 patients (89%), coronary reassessment with CT or invasive coronary angiogram was performed after a median of 13.0 months (interquartile range 10.1-16.9 months). The primary endpoint developed in 14 patients (6.9%), including 2 mortalities. After one year, major adverse cardiovascular events developed in 11 patients (6.1%), including 2 mortalities (1.1%), 3 non-fatal myocardial infracts (1.7%) and 6 target vessel revascularizations (3.3%). Upon clinical follow up for a median of 38.4 months (interquartile range 26.9-44.7 months), major adverse cardiovascular events developed in 22 patients (12.2%) including 6 mortalities (3.3%), 6 non-fatal myocardial infracts (3.3%) and 11 target vessel revascularizations (6.1%). The first major adverse cardiovascular event developed at a median of 16.0 months (interquartile range 6.0-16.0 months) after index procedure.
Conclusion: Target vessel restenosis and major adverse cardiovascular events develop in a significant portion of patients who received BVS in a local population largely comprising of patients with stable coronary disease. There is no apparent plateau of adverse event development upon long term follow up. Interventional cardiologists should remain vigilant when introducing newer technologies into clinical practices.

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Systemic Review and Meta-Analysis on the Relationship between Coronary Chronic Total Occlusion and Cardiovascular Outcomes

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Objectives: Chronic coronary artery total occlusion (CTO) is a significant problem in patients with ischemic heart disease. However, the extent to which it predisposes affected individuals to ventricular tachycardia/fibrillation (VT/VF) and whether these arrhythmic events could be prevented by revascularization are unclear. Therefore, a systematic review and meta-analysis was conducted to examine the relationship between CTO status and the occurrence of VT/VF or appropriate implantable cardioverter-defibrillator (ICD) therapy.
Methods: PubMed and Embase databases were searched until 16th November 2017, identifying 137 studies.
Results: Seventeen studies involving 54594 subjects (mean age 61±21 years old, 81% male) with a mean follow-up duration of 43±31 months were included. The presence of CTO was associated with a significant increase in the risk of VT/VF or appropriate ICD therapy (adjusted hazard ratio [HR]: 1.99, 95% confidence interval [CI]: 1.53-2.59, P<0.0001; I2=3%) but not in cardiac mortality (adjusted HR: 2.59, 95% CI: 0.64-10.59, P=0.18; I2=86%) or in all-cause mortality (adjusted HR: 1.70, 95% CI: 0.84-3.46, P=0.14; I2=64%). Compared to patients with non-infarct-related CTOs, those with infarct-related CTOs have a higher risk of VT/VF or appropriate ICD therapy (adjusted HR: 2.47, 95% CI: 1.76-3.46, P<0.0001; I2=14%), cardiac mortality (adjusted HR: 2.73, 95% CI: 1.02-7.30, P<0.05; I2=79%) and higher all-cause mortality (adjusted HR: 1.69, 95% CI: 1.19-2.40; P <0.01; I2=40%). Non-revascularization of CTOs tended to confer increased risk of all-cause mortality compared to successful revascularization (unadjusted HR: 1.52, 95% CI: 0.96-2.43; I2=76%) although statistical significance was not reached (P=0.08).
Conclusions: The presence of CTO is associated with significant increases in the risk of VT/VF or appropriate ICD therapy. Infarct-related CTOs have a higher risk of VT/VF or appropriate ICD therapy and higher all-cause mortality. ICD implantation may serve a role in CTO patients, yet more studies are needed for further risk stratification in CTO patients.

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Clinical Outcome of Complete versus Culprit Only Revascularization in STEMI (Non-Cardiogenic Shock): A Single Centre Experience

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Introduction: Multiple vessel disease in STEMI is not uncommon, approximately half of STEMI patient presented with multiple vessel disease. In the setting of STEMI and multiple vessel disease without cardiogenic shock, it is unclear whether complete or culprit only revascularization achieve better clinical outcome. Several trials, such as PRAMI, The CvLPRIT study, DANAMI-3 PRIMULTI, have shown mortality benefit favoring complete revascularization. Yet in a lack of strong clinical evidence and large scale randomized control trial (RCT), the answer remains debatable.
Objective: To evaluate whether complete or culprit only revascularization in STEMI (non-cardiogenic shock) achieve better clinical outcome in Queen Elizabeth Hospital
Method: A retrospective review of patient with STEMI and multiple vessel disease (defined as angiographic stenosis >70%) without cardiogenic shock in Queen Elizabeth Hospital was studied in the period of 1/2013 to 5/2017. The end-point follow-up was up to 12 months. Primary outcome was major adverse cardiac event (MACE), comprising all-cause mortality, recurrent myocardial infraction, heart failure, ventricular arrhythmia. Secondary outcome was subgroup analysis of complete revascularization group, in which revascularization in index procedure and in index admission were compared. The outcome variable was analyzed by time-to-first event survival analysis, Cox proportional hazard models was used to estimate hazard ratios and 95% confidence interval, and Kaplan-Meier curve was potted for MACE rate and compared by log-rank test. Data was analyzed by software SPSS.
Result: A total number of 93 patients were included in the study. In culprit only group, 13 out of 58 patients developed MACE (25.7%) while in complete revascularization group, 9 out of 35 patients had MACE (22.4%) (Hazard ratio: 0.802; 95% confidence interval 0.343 to 1.877; p = 0.611). In subgroup analysis of complete revascularization group, 22 out of 35 patient in index admission group (62.8%) had MACE while 13 out of 35 patient in index procedure group (37.2%) developed MACE (hazard ratio: 5.539; 95% confidence 0.692 to 44.349; p = 0.107).
Conclusion: There is no significant difference in MACE in complete revascularization and culprit only group in STEMI patient and multiple vessel disease (non-cardiogenic shock). There is also no significant difference in MACE in revascularization in index procedure group and in index admission group. In view of heterogeneity of study design in different trials and absence of solid clinical evidence, further study is needed to determine the optimal strategy for revascularization in patient with STEMI and multiple vessel disease (non-cardiogenic shock).

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Comparison of FFR and IVUS MLA in p-mLAD Intermediate Lesion

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Purpose: The aim of this study was to determine the new proximal to mid left anterior descending artery (p-mLAD) intravascular ultrasound (IVUS) area cutoff of intermediate lesions to predict fractional flow reserve (FFR) 0.8 or less which signified haemodynamically significant lesion and served as a guidance for percutaneous coronary intervention (PCI) with outcome benefit.

Methods: A retrospective study was performed in patients who had coronary angiogram between October 2013 and October 2016. Data were extracted from clinical and procedure records. The cutoff point of p-m LAD intravascular ultrasound minimal lumen area (IVUS MLA) was determined with reference to fractional flow reserve (FFR) 0.8 using receiver operating characteristic (ROC) curves.

Results: Sixty-three patients were identified. Thirty Three patients (52%) had a FFR value of 0.8 or less. The reference vessel diameter was 3.1+/-0.5 mm and lesion length was 18.3+/-7.6 mm. The optimal p-mLAD IVUS area cutoff was 3.5 mm^2 using receiver-operating characteristics curve. The ROC area under curve (AUC) was 83%. The sensitivity and specificity was 80% and 72% respectively.

Conclusions: In the cohort, p-mLAD IVUS MLA of 3.5 mm^2 was shown to be a good cutoff point to predict FFR 0.8 or less for guiding PCI.

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Clinical Heart Failure Pathway Effectively Improves Heart Failure Readmissions

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Background: The burden of congestive heart failure (CHF) in the modern society of Hong Kong is increasing annually. Patients would benefit from a standardized guideline oriented inpatient hospital care. Here, we sought to assess the effectiveness of implementation of a clinical heart failure pathway by evaluating the use of heart failure medications, length of stay, rate of readmission in patients with congestive heart failure.
Methods: Heart failure pathway was implemented in Pok Oi Hospital since December 2015. We retrospectively studied a total of 185 patients (mean age 66.5) with diagnosis of congestive heart failure in a community hospital between January 2015 and December 2016. Patients were divided into two groups, 93 patients who were mainly managed by the general medical team and 92 patients who were recruited into the pathway, all reviewed by the cardiac team with suggested management. We conducted detailed reviews to determine and compare the use of evidence based heart failure medications, risk factors control status, length of stay and rate of readmission.
Results: Baseline characteristics of the two groups were similar. There were significantly more heart failure medications prescribed including angiotensin converting enzyme inhibitor or angiotensin receptor blocker (ACEI / ARB), betablocker, aldactone, digoxin and warfarin after patients were recruited into the pathway. And lower rate of readmissions was observed after the launch of heart failure pathway with 22% vs 11% in 30-day readmission (p=0.03) and 45% vs 30% in 6-month readmission (p=0.04) for those not enrolled and enrolled respectively.
Conclusion: Use of heart failure pathway in the local hospital setting was associated with an increase in use of heart failure medications as well as reduction in heart failure readmission.

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Atrial Flow Regulator (AFR) - A Novel Device for Patients with Heart Failure: The First Case Report in Hong Kong

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Background: Heart failure with preserved ejection fraction (HFPEF) is a commonly encounter cardiac disease for which no treatment has yet been shown to improve symptoms effectively. The pathophysiology of HFPEF is complex but characterized by elevated left atrial pressure, especially during exertion, which might be a key therapeutic target. Atrial flow regulator (AFR) is a novel device-based therapy with a mechanical approach to reducing left atrial pressure in HFPEF.
Method and Result: We report the first case report of AFR implantation in a 89-year-old man with HFPEF. He has history of hypertension, hyperlipidemia, vitamin B12 deficiency, adrenal insufficiency, traumatic subdural hematoma with good recovery, ischemic heart disease with percutaneous coronary intervention years ago, second degree heart block with permanent pacemaker implanted. He admitted repeatedly many times in the past two years (6 and 12 episodes of hospitalization in 2016 and 2017 respectively) due to heart failure symptoms. There was no feature of acute coronary syndrome at each episode. ECG showed sinus rhythm and pacemaker rhythm without ischemic features. Those heart failure symptoms could be controlled after medication, but readmitted again shortly after discharge. He claimed to have good drug compliance and good fluid restriction at home. Oxygen saturation was around 96-98% at rest in air. Echocardiogram showed left ventricular hypertrophy with normal left ventricular function, EF 70%, feature of abnormal relaxation filling pattern in diastole, no regional wall motion abnormality normal right ventricular (RV) size and systolic function, mild aortic regurgitation, mild mitral regurgitation, mild tricuspid regurgitation, no pericardial effusion. The 6-minute walk test distance was 73.7 meters. Right heart catheterization was performed with stepwise oximetry and hemodynamics. The patient's mean right atrial (RA) pressure was 9 mmHg, pulmonary arterial (PA) pressure was 36/13 (22) with systemic blood pressure of 153/88 mmHg. Oximetry in room air included superior vena cava 57%, RA 54%, RV 47%, PA 48%, and aorta 100%. Under transesophageal echocardiographic guidance, a transseptal puncture was performed, and the mean left atrial (LA) pressure was 16 mmHg. A 0.035-inch extra-stiff guidewire was introduced into the left upper pulmonary vein. A 12x40 mm balloon was dilated the transseptal puncture site at 6atm, and a 12Fr ASD device delivery system was advanced into LA. A 8 mm AFR device was deployed at single attempt. Post device mean LA pressure and oximetry were 11 mmHg and 96.2% respectively. The procedure was uncomplicated. After the AFR implantation, there was no more hospitalization due to heart failure symptoms, and the patient reported symptomatic improvement at the latest clinic follow-up. The follow-up 6-minute walk test distance was 101.4 meters.
Conclusion: We reported the successful use of an atrial flow regulator, a novel implantable atrial communication device, in a medically optimized 89-year-old male of HEPEF with repeated admissions. There was immediate hemodynamic and symptomatic improvement following the procedure in our patient. We demonstrated this novel mechanical approach to reducing left atrial pressure in HFPEF is safe and feasible. However, further long-term multi-center clinical trials are required to evaluate its long-term outcome.

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Multi-Modality Cardiac Image Assessment for Transcatheter Ventricular Restoration in Ischemic Heart Failure Patients with Apical Aneurysm

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The prognosis of patients with ischemic heart failure (IHF) due to previous anteroapical myocardial infarction (MI) is poor despite the optimal medical therapy. Larger scar burdens are associated with higher risk of heart dysfunction and ventricular arrhythmia. Surgical ventricle restoration (SVR) was focused in reducing the ventricular volume and eliminating anteroapical regional wall motion abnormality. The randomized Surgical Treatment for Ischemic Heart Failure (STICH) trial showed that no additional benefit in survival or quality of life of IHF patients taking addition SVR to CABG over CABG alone. Recently, two transcatheter restoration devices, REVIVENT (Bioventrix, Inc., CA) and PARACHUTE (CardioKinetix, Inc., CA) have been developed for less invasive, off-pump ventricular restoration, as alternative to surgical approach. Small series study had demonstrated its short-term feasibility, safety and efficacy in the IHF patients with apical aneurysm. Nevertheless, it is still challenging to select appropriate patients receiving these therapies due to diversiform scar distribution, ventricular geometry in IHF patients with apical aneurysm. The high frequency of thrombo-embolic events and Nitinol struts fracture in the IHF patients implanted PARACHUTE raised concern about the safety and durability during long-term follow up. Multi-modality cardiac image evaluation, including echocardiogram, cardiac CT and cardiac magnetic resonance, has emerged as a prime player in the clinical selection and follow-up of IHF patients for different procedures. PARACHUTE is an umbrella-shaped nitinol frame covered with ePTFE membrane delivered to the apical aneurysm by a 14/16 Fr transfemoral catheter, whereas REVIVENT is a hybrid procedure to oppose the scarred lateral LV wall to the septal scar with serial paired anchors placed through epicardial transmural catheters, excluding non-viable portions of the chamber. We compared the indications and contraindications of these two transcatheter devices, then presented 2 cases to show the important role of multi-modality cardiac image assessment in screening the candidates for transcatheter ventricular restoration in IHF patients with apical aneurysm.

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Safety and Efficacy of Percutaneous Ventricular Partitioning in Ischemic Heart Failure Patients with Apical Aneurysm

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Objective: To evaluate the safety and efficacy of percutaneous ventricular partitioning (PVP) using the Parachute system in ischemic heart failure patients with apical aneurysm.
Methods: Safety defined as the successful delivery and deployment of the ventricular partitioning device (VPD) implant, as well as every 3-month functional, clinical, and hemodynamic effectiveness were followed-up.
Results: Nineteen patients (aging 68.1±8.2 years) suffered from left ventricular aneurysm and heart failure patients caused by anterior myocardial infarction were enrolled. Ventricular partitioning device implantation was successful in 18/19 (83%) patients. In one patient, the VPD wasn't implanted for the unsatisfactory landing. By 252±170 days follow-up, there was no cardiac deaths or HF hospitalization. New York Heart Association symptom class (2.72±0.6 vs 1.78±0.38, P<0.01) and 6 min walk test (462±96 vs 484±87, P<0.01) were improved 3 months after PVP. Left ventricle end-diastolic volume index and end-systolic volume index were reduced from 137.4±19.1 and 89.7±22.3 mL/m^2 preimplant to 125.6±18.5 and 78.8± 20.7 mL/m^2 (end-diastolic volume index, P=0.0056; end-systolic volume index, P=0.0019) with unchanged left ventricle ejection fraction (34.7±7.8 vs 37.3±6.5, P>0.05).
Conclusions: Our preliminary experience on PVP using Parachute system demonstrates its feasibility and safety, and that VPD implantation improves LV hemodynamic and functional capacity in short term following the procedure.

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The Safety and Efficacy of Epicardial Ventricular Restoration in Patients with Antero-Septal Scar and Dilated Ischemic Cardiomyopathy

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Objective: To evaluate the safety and efficacy of epicardial ventricular restoration (EVR) using REVIVENT system in patients with antero-septal scar and dilated ischemic cardiomyopathy.

Methods: Ten ischemic heart patients with antero-septal scar underwent operation. The scarred lateral LV wall was apposed to the septal scar with serial paired anchors placed through epicardial transmural, excluding non-viable portions of the chamber. Left ventricular hemodynamic assessments as well as left ventricular ejection fraction, left ventricular end-systolic/diastolic volume (LVEDV/LVESV) and their index (LVEDVI/LVESVI) were measured by the cardiac magnetic resonance (CMR).

Results: Ten ischemic heart failure patients with antero-septal scar, aged 55.2±13.9 years, received a hybrid epicardial ventricular restoration. Cardiac MR a month after the procedure showed an elevation of LVEF from 27.8±4.6% to 37.5±11.4% (+35%, p<0.01), LVESV was significantly reduced from 149.9±61.6 ml to 109.9±58.0 ml (-26.7%, p<0.01), LVESVI was significantly reduced from 84.8±36.7 ml to 63.0±34.2 ml/m^2 (-25.7%, p<0.01); LVEDV was significantly reduced from 203.0±64.0 ml to 167.9±58.2 ml (-17.3%, p<0.01), LVESV was significantly reduced from 114.5±37.8 ml to 96.2±35.2 ml/m^2 (-16.0%, p<0.01), cardiac output (CO) increased from 4.0±1.5 L/min to 4.8±1.2 L/min +20.0%, p=0.034), cardiac index (CI) increased from 2.2±0.7 L/(min*m^2) to 2.7±0.7 L/(min*m^2)(+22.4%, p=0.023).

Conclusions: Our preliminary experience on EVR using REVIVENT system demonstrates that significantly increased the LVEF, CO and CI, decreases the LVEDV/LVESV and their index a month following the procedure, its feasibility and safety need further evaluation in the future.

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Paradigm SHIFT in Heart Failure Management: Ivabradine to Reduce Recurrent Hospitalization in Real-Life Practice

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Objectives: Heart failure with reduced ejection fraction (HFrEF) is marked by progressive deterioration, reduced quality of life, high mortality and morbidity. Frequent readmission is common among heart failure population. According to Hospital Authority Statistical Report, heart failure is the leading cause of admission in Cardiology. In-patient care contributed more than 70% of medical cost in heart failure management. In SHIFT trial, ivabradine has been proven to decrease hospital admissions for worsening heart failure. This retrospective analysis aims to evaluate the effect of heart-rate reduction by the selective sinus-node inhibitor ivabradine on clinical outcomes among HFrEF patients in real-life clinical situation.

Methods: Patient who has been diagnosed of heart failure of reduced ejection fraction, left ventricular ejection fraction <35% diagnosed by echocardiography, sinus rhythm with heart rate >70 bpm and started ivabradine would be recruited into the study. Those patients who could not tolerate betablocker would be excluded. The primary endpoint was hospital admission for worsening heart failure. Secondary endpoint was the change in functional class.

Results: Clinical data of 50 patients have been extracted from clinical management system (CMS). The baseline demographics and clinical outcomes before and after the use of ivabradine were analyzed. The average age of patient was 60+/-8 and 70% of them were male. At baseline, the average ejection fraction 28+/-5% and 16% of patients were belonged to NYHA class III to IV status. The mean blood pressure was 123/72 mmHg and mean heart rate was 84.9 bpm. Seventy-two percent of patients have been started on guideline directed medical therapy with the combination of betablocker and angiotensin converting enzyme inhibitor (or angiotensin receptor blocker) +/- mineralocorticoid receptor antagonist. Eleven of them (i.e. 22%) have been hospitalized due to heart failure in recent three months. Median follow-up was 8.7 months. Eighty-four percent of patients were taking ivabradine 5mg bd while rest of the them were on 2.5 mg bd. Post-treatment phase, the average ejection fraction 30+/-6% (NS) remained similar to baseline. The blood pressure was static with mean BP 117/67 mmHg (NS) but mean heart rate has been decreased to 74.1 bpm, p=0.0016. As for the primary endpoint, recurrent heart failure hospitalization has been reduced to 3 episodes only with OR 0.22 (95% CI: 0.1-0.58), p=0.002. The proportion of patients in NYHA class III to IV has significantly dropped to 6% with OR 0.34 (95% CI: 0.12-0.9), P=0.029. Four percent of patients complained of mild dizziness but none of them experience phosphenes.

Conclusion: Our results echo the finding in Shift Trial, heart-rate reduction with ivabradine has significantly improved the clinical outcomes of heart failure.

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Atorvastatin and Folic Acid Improve Cardiac Function and Inhibit Ventricular Remodeling in Chronic Heart Failure Patients with Hyperhomocysteinemia

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Purpose: The present study aims to investigate the effect of atorvastatin and folic acid combined on the cardiac function and ventricular remodeling in chronic heart failure (CHF) patients with hyperhomocysteinemia (HHcy).
Methods: Elderly CHF patients with HHcy (n=248) were divided into the routine group, routine + atorvastatin group, routine + folic acid group and routine + atorvastatin + folic acid group, 62 cases each group. All patients underwent 4-week treatment. The low density lipoprotein choleste- rol (LDL-C), high density lipoprotein cholesterol (HDL-C), cholesterol (CHOL) and triglyceride (TG) levels were measured by automatic biochemical analyzer. Serum homocysteine (Hcy) level was detected using enzymatic cycling methods, and N-Terminal pro Brain Natriuretic Peptide (NT-proBNP) level was detected by ELISA. The cardiac function indexes, including left ventricular posterior wall thickness (LVPWT), left ventricular end-diastolic dimension (LVEDD), inter- ventricular septal thickness (IVST), left ventricular ejection fraction (LVEF), and left ventricular early diastolic peak flow velocity / atrial systolic peak flow velocity (E/A) ratio were evaluated. The 6-minute walk test was performed to measure the 6-minute walk distance (6 MWD).
Results: After treatment, the 6MWD increased, the serum Hcy and NT-proBNP levels decreased and the cardiac function was improved compared with before treatment, which was the most sig- nificant in the routine + atorvastatin + folic acid group, followed by the routine + atorvastatin group, then the routine + folic acid group and lastly the routine group.
Conclusion: The results indicated that combination of atorvastatin and folic acid improves the cardiac function and inhibits ventricular remodeling of elderly CHF patients with HHcy.

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Preventive Role of Beta Blockers and Renin-Angiotensin Inhibitors in Anthracycline-induced Cardiotoxicity among Adult Cancer Patients: A Meta-Analysis

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Background: Anthracyclines are among the most effective cytotoxic chemotherapy agents in cancer treatment. However, it is associated with an increased risk of developing heart failure associated complications. Beta blockers (BB) and Renin-angiotensin inhibitors (RAI) have been shown in studies to prevent development of anthracycline-induced cardiotoxicity. This study aims to review existing evidence on the effectiveness of these agents in the prevention of anthracycline-induced cardiotoxicity.
Methods: Systematic search using SCOPUS, MEDLINE, EMBASE, Clinical Key, and Cochrane Central Register of Controlled Trials databases was done until 9 February 2018. Selection criteria were: 1) randomized controlled trials, 2) adult cancer patients with normal ejection fraction and without heart failure symptoms undergoing anthracycline-based therapy, 3) RAI and/or BB as prophylaxis versus placebo, 4) cardiac events and left ventricular ejection fraction (LVEF) reduction as outcomes. The quality of each study was evaluated by at least two reviewers. Review Manager 5.3 was utilized to perform analysis.
Results: We identified 6 trials involving 485 patients showing that initiation of RAI and/or BB is associated with a statistically significant preservation of left ventricular ejection fraction (LVEF) [mean difference (MD): 4.27% (95% CI 1.88, 6.65; p=0.0005; I2=90%)] among cancer patients treated with anthracyclines. Similar benefit was seen in the RAI arm [MD: 1.72% (95% CI 0.64, 2.80; p=0.002; I2=0%)]. A trend towards benefit in preserving LVEF was seen in the BB arm [MD: 5.24% (95% CI -1.92, 12.41; p=0.15); I2=95%]. Preplanned analysis of cardiac events defined as cardiac mortality or heart failure showed an RR of 0.27 [(95% CI 0.09, 0.77), p=0.01, I2=0%] in favor of BB and/or RAI.
Conclusion: BB and/or RAI can be used to prevent anthracycline-induced cardiotoxicity. Initiation of BB and/or RAI has been shown to preserve LVEF and reduced cardiac events among cancer patients receiving anthracyclines. However, significant heterogeneity signifies need for further studies.

ABSTRACTS

Abstracts for Free Paper Session:

ELECTROPHYSIOLOGICAL STUDY AND CARDIAC ARRHYTHMIA

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Risk of New-Onset Atrial Fibrillation among Heart, Kidney and Liver Transplant Recipients: Insights from a National Cohort Study

WS Hu
China Medical University Hospital, Taiwan

Objective: To explore the incidence of atrial fibrillation (AF) in various populations of patients with organ transplantation (OT).
Methods: We use a large national data set from Taiwan to investigate the incidence of AF after OT. Frequency matching method was used to match controls: OT patients 4:1. Kaplan-Meier analyses with the use of the Aalen-Johansen estimator was employed for estimating the cumulative incidences of new-onset AF. The Fine-Gray competing risks model was also performed to analyze the risk of AF for the OT cohort compared with the non-OT cohort.
Results: 6955 OT patients and 27820 controls were included in this study. OT did lead to a 3.92-fold risk for AF (95% confidence interval (CI) =2.07-4.62], especially in the subgroup of female gender [adjusted subhazard ratio (aSHR)=6.66, 95% CI =3.85-11.5], age ≤49 years (aSHR=8.19, 95% CI =3.99-16.8) and without comorbidity (aSHR=4.61, 95% CI =2.71-7.87). Moreover, liver recipients tend to be more likely to develop new-onset AF among those OT patients (aSHR=4.07, 95% CI =2.63-6.30) as compared to the controls.
Conclusions: OT patients have a higher risk for AF. The association identified in this study might alert and provide clinicians for becoming more sensitive to the AF risk among organ recipients, especially those received liver transplantation.

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A Nationwide Cohort Study of the Role of CHADS2 Score in Predicting Lower Extremity Amputation and Death among Patients with Peripheral Arterial Occlusive Disease

WS Hu
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Objectives: The current study aimed to explore whether the CHADS2 score was predictive of lower extremity amputation (LEA) and death in people with peripheral arterial occlusive disease (PAOD).
Methods: This nationwide cohort came from Taiwan, with 16888 PAOD patients, from 2000 through 2011, extracted from the Longitudinal Health Insurance Database 2000. Cox proportional hazard regression models were employed to identify the LEA and mortality risk according to CHADS2 score. The discriminatory properties of the score in predicting the outcomes were quantified by the area under the receiver operating characteristic curve (AUROC) and the Cox C-index.
Results: The AUROC of the CHADS2 score in predicting LEA and death were 0.75 (95% CI=0.73-0.77) and 0.70 (95% CI=0.69-0.71), respectively. The CHADS2 score had an acceptable stratification capacity for LEA (C-index=0.79) and death (C-index=0.76) based on Cox-regression analysis.
Conclusions: This study correlates the CHADS2 score with risk of developing LEA and death in patients with PAOD. The acceptable discriminative power of the score diversifies its predictive role in this population.

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Acute Critical Illness and Risk of Incident Atrial Fibrillation: Novel Findings from a Nationwide Cohort with Propensity Matching and Competing Risk Analysis

WS Hu
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Objective: This investigation aimed at assessing the issue of incident atrial fibrillation (AF) associated with acute critical illness.
Methods: The study came from Taiwan and used that nation's Longitudinal Health Insurance Database 2000. Using propensity score matching, multivariable adjustment and competing risk methods, the correlations between the new-onset AF and critical illness (septicemia/septic shock, acute myocardial infarction (AMI), hemorrhagic stroke and ischemic stroke) were investigated.
Results: This study consisted of 46470 patients in the critical illness cohort, 618998 persons in the general population cohort. Additionally, 37060 critically ill patients were matched with 37060 control patients based on propensity score methods. Compared with general population cohort, patients with septicemia/septic shock were 3.12-fold more likely to develop AF (95% confidence interval (CI)=2.88-3.39), followed by patients with ischemic stroke (adjusted hazard ratio(aHR)=1.96, 95% CI=1.80-2.14), patients with AMI (aHR=1.62, 95% CI=1.32-2.00) and patients with hemorrhagic stroke (aHR=1.46, 95% CI=1.13-1.88). In addition, after controlling for all the confounding factors and the competing risk of death, the critical illness cohort still exhibited a significantly higher risk of AF than the general population cohort (adjusted subhazard HR [aSHR]=2.66, 95% CI = 2.49-2.84).
Conclusions: Our study is the first to concern the association of incident AF associated with different specified critical illness with robust statistical approach. Patients with septicemia/septic shock were at the highest risk of developing new-onset AF among these critically ill patients.

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Outcome of Patients with Left Ventricular Systolic Dysfunction and Low Rate of Defibrillator Implantation

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Purpose: Patients with left ventricular systolic dysfunction (LVSD) in our locality has low rate of implantable cardioverter-defibrillator (ICD) or cardiac resynchronization therapy defibrillator (CRT-D) implantation for primary prevention of sudden cardiac death (SCD). We aim to study the clinical outcome of these patients.

Methods: Patients with newly diagnosed LVSD between 2013 and 2014 with left ventricular ejection fraction (LVEF) ≤40% were recruited. The primary endpoint was a composite of all-cause mortality, congestive heart failure (CHF) hospitalization, myocardial infarction (MI), coronary revascularization (CR) and ventricular arrhythmia (VA).

Results: A total of 128 LVSD patients (96 males) were followed up for 43.6±7.3 months. The mean age was 71±4 years old. Ischemic cardiomyopathy was identified in 52% of patients, among whom 61% had received CR. The mean QRS duration was 102±36 ms. The mean LVEF was 32±8%. Forty-five (35%) patients died. Primary composite end point was reached in 83 (65%) of patients. Confirmed cardiac death was identified in 4 patients. Majority of patients died from non-cardiac causes, mostly from pneumonia (N=15). Only 1 and 3 patients received CRT-D and ICD implantation for primary prevention of SCD respectively. Only one patient received ICD shock. Prior history of CHF [OR 2.9 (95% CI 1.1-7.5); p=0.032] and under-utilization of beta-blockers [OR 4.8 (95% CI 1.8-1.3); p=0.002] were the strongest independent predictors of primary endpoint, while LVEF per se did not predict arrhythmic death or primary endpoint.

Conclusions: In our cohort of geriatric patients, the rate of ICD/CRTD implantation (3%) and incidence of documented VA was low. Most patients died from non-cardiac causes. Left ventricular ejection fraction was not a sensitive or specific marker for predicting arrhythmic death in our cohort. Further studies are warranted to identify more specific predictors of arrhythmic death in LVSD patients to guide ICD/CRTD implantation.

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Promotion of Oral Anticoagulation in Patients with Atrial Fibrillation: Viewing Absolute Benefits Reported in the IMPACT-AF Trial

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Background: Oral anticoagulant (OAC) underutilisation in patients with atrial fibrillation (AF) is widely recognised. The IMPACT-AF trial was a prospective, international, cluster-randomized, controlled trial of multifaceted educational interventions that reported on a strategy to overcome this problem. Nevertheless, the value of such resource-intensive efforts to induce more AF patients to use OACs must be appreciated in absolute as well as relative terms.

Methods: From the published results of the IMPACT-AF trial, we derived the apparent 6-month and 1-year unadjusted: i) Odds Ratios, and ii) absolute success rates expressed as Number Needed to Target (NNTar) to achieve one success - for promoting OAC use compared to usual care. These two parameters and their 95% CIs were determined for all recruited patients as well as those not using OACs at baseline (380 & 389, respectively). All calculations entailed previously reported algorithms to derive relative risk (RR) and number needed to treat (NNT).

Results: Corresponding parameters for respective intervention group patients starting oral OACs among those not taking them at baseline as well as among all patients are shown in the table.

		Odds Ratio (95% CI)	NNTar (95% CI)
Patients not taking OACs at baseline	After 6 months	2.4 (1.8 to 3.2)	4.1 (3.2 to 5.5)
	After 1 year	2.6 (2.0 to 3.5)	3.4 (2.8 to 4.3)
All recruited IMPACT-AF trial patients	After 6 months	1.2 (1.1 to 1.3)	8.6 (6.5 to 12.7)
	After 1 year	1.2 (1.1 to 1.3)	8.0 (6.2 to 11.3)

Conclusions: After 1 year of ongoing educational interventions, the NNTar values for inducing OAC use appear impressive compared to NNT/year values (63-256) encountered in several iconic statin treatment trials. Decisions to deploy such resource-intensive interventions must nevertheless depend on local resource implications and priorities, together with locally anticipated hard end-point benefits from embolic event prevention and safety.

ABSTRACTS

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Transcriptomic and Proteomic Studies Identify Pathways Involved in Atrial Fibrillation

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Purpose: Atrial fibrillation is one of the most common arrhythmia encountered in the clinical practice. Electrical and structural remodeling processes are contributors to the self-perpetuating nature of atrial fbrillation (AF). However, their correlation has not been clarifed. In this study, we aimed to investigate the possible pathogenic mechanism of AF associated with heart valve disease in mRNA and protein levels.
Methods: Patients were divided into AF group (n=36, AF >6 months before surgery) and sinus rhythm (SR) group (n=26, without history of AF). Human atrial tissues were analyzed using a combined transcriptomic and proteomic approach. Differentially expressed genes / proteins were identified and validated by quantitative RT-PCR and Western Blot. Immunofluorescence, electron microscopy, and immunohistochemistry were used to analyze the bioinformatics of pathways regarding biological process, cell component, and molecular function.
Results: An up-regulation in chloride intracellular channel (CLIC) 1, 4, 5 were revealed. Combined with the results from immunohistochemistry and electron microscope analysis, the distribution of type IV collagen and effects of fibrosis on myocyte membrane indicated the possible interaction between CLIC and type IV collagen, confirmed by protein structure prediction and co-immunoprecipitation. Moreover, partial genes / proteins in PPAR signal pathway were enriched from omics data.
Conclusion: The chloride channels as a potential electrical remodeling factor are closely linked to the development of AF in rheumatic heart valve disease. Further, PPAR signaling pathway plays a key role in the prevalence of AF. The findings from the present study in atrial remodeling, electrical changes, and abnormality of energy metabolism may provide a new insight for the mechanism of development of AF.

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Contact-Free, High-Throughput Screening of Atrial Fibrillation by a Digital Camera Using Facial Pulsatile Photoplethysmographic Signals: Proof of Concept Study

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Purpose: The best method of atrial fibrillation (AF) screening is not established. Our group has validated a novel method of AF detection using the Cardiio Rhythm (Cardiio Inc., Cambridge, USA) mobile application to analyze photoplethysmographic (PPG) signals from the face without physical contact by extracting subtle beat - to - beat variations of skin color that reflect the cardiac pulsatile signal using an iPhone camera with 95% accuracy. We aimed to test the feasibility of AF detection from multi-facial PPG signals video recordings using a digital single lens reflex (DSLR) camera.
Methods: We recruited 5 patients with permanent AF and 5 with sinus rhythm (SR) confirmed on 12-lead ECG. We screened 5 patients at a time seating in a row facing a DSLR (50D, Cannon, Japan) on a tripod 150 cm away. At least 1 minute video recording of 5 faces was captured in 5 combinations by varying the number of AF (from 1 to 5) and SR (from 4 to 0) patients. Facial PPG signals for each patient were extracted, split into 17 second segments and analyzed for heart rate regularity by the Cardiio Deep Rhythm algorithm to discriminate AF from SR, ectopic beat or noise. Pulse irregularity in >50% PPG signal segments for each patient was considered a positive AF screening result.
Results: A total of 25 facial PPG signals were analyzed. All 15 patients (100%) with AF were correctly identified regardless of seating position. One of 10 patients (10%) with SR was falsely determined to have AF. The Cardiio Deep Rhythm facial PPG analysis demonstrated high sensitivity of 100% (95% Confidence Interval (CI) 0.80 to 1.00) and specificity 90% (95% CI 0.60 to 0.98).
Conclusions: In this proof-of concept study, simultaneous detection of pulsatile facial PPG signals in up to 5 patients for AF screening is feasible with high sensitivity and specificity. The convenience of high-throughput AF detection has potential for large-scale AF screening.

ABSTRACTS

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Ablation Ventricular Arrhythmia from LV Summit

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Ablation ventricular arrhythmia from left ventricule (LV) summit Idiopathic ventricular arrhythmia (VA) from the outflow tract is a common clinical disease. Radiofrequency ablation for VA is a cornerstone and widely accepted treatment strategy other than medication. However, ablation of VA originated at LV submit is still a challenge. Difficulty to successful elimination of VA may be related to poor energy penetration to intramural or epicardial origin. I present and demonstrate a case that how to approach and eliminate this kind of VA.

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Transcatheter Structural Heart Disease Intervention: Performance Review in a Tertiary Hospital in Hong Kong in 2017

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Background: Structural heart disease (SHD) interventions represent a broad category of percutaneous treatments for patients with both congenital heart disease and acquired heart disease involving structural and functional abnormalities of heart valves, cardiac chambers and the proximal great vessels. The rapidly increasing volume of patients undergoing SHD interventions in the past decade is not only happening in those well developed countries and cities, but also in our locality.
Purpose: To review and share our experience and performance of transcatheter SHD intervention in one tertiary hospital in Hong Kong. To compare those performances from 2015 to 2017.
Methods: A retrospectively review of all patients underwent transcatheter SHD intervention between January to December 2017 at one of the tertiary hospital in Hong Kong was performed. Patients' demographics, clinical characteristics, operative procedures, postoperative complications and outcome were recorded and analyzed. Types of complication were classified as major and minor, with reference to the definition from VARC-2 consensus document.
Results: In 2017, there were 166 procedures of transcatheter SHD intervention performed in 155 patients. The average age was 71 years old (range 26-93), and 52% are male. There were 78 cases (47%) of left atrial appendage occlusion (LAAO), 30 cases (18%) of transcatheter aortic valve implantation (TAVI), 14 cases (9%) of atrial septal defect (ASD) closure, 12 cases (8%) of percutaneous transcatheter mitral commissurotomy, 7 cases (5%) of patent foreman ovale (PFO) closure, 6 cases (4%) of coronary arterial fistula occlusion, 5 cases (3%) of percutaneous mitral valve repair by MitraClip; and the remaining cases 14 (8.4%) included percutaneous tricuspid valve repair by MitraClip (x3), paravalvular leakage closure (x3), ventricular septal defect closure (x2), patent ductus arteriosus closure (x1), balloon aortic valvuloplasty (x1), percutaneous alcohol septal ablation (x1), atrial flow regulator (x1), coarctation stenting (x1), and balloon occlusive test (x1). The procedural successful rate was 98.1%; Major and minor complication rates were 3.9% and 7.7% respectively. The 30-day mortality was 2% (n=2). Eight patients received two concomitant procedures in the same setting, including 4 cases of TAVI with LAAO, and 4 cases of LAAO with either ASD/PFO closure. The successful and complication rate of these concomitant procedures were similar to those isolated procedures.
Conclusion: Compared to previous results of percutaneous SHD interventions in one tertiary hospital from 2015 to 2017, there were progressive more procedures performed in 2018; while the overall procedural successful rate was similar, there was less complication rate observed. By gaining more experiences, concomitant complex SHD intervention is feasible and safe.

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Left Atrial Appendage Occlusion (LAAO) under Local Anaesthesis (LA) and Intracardiac Echocardiograhy (ICE) Guidance: A Case Series of 17 Patients in a Tertiary Hospital in Hong Kong

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Background: Transesophageal echocardiography (TEE) is the standard imaging tool for procedural guidance of percutaneous transcatheter left atrial appendage occlusion (LAAO), but it requires support under general anesthesia (GA) or monitoring anesthesia care (MAC). By using intracardiac echocardiography (ICE) guidance, LAAO can be performed under local anaesthesia (LA), which might improve the procedure logistics and reduce the turnover time in the catheter laboratory.
Purpose and Methods: A retrospectively review of all patients underwent LAAO under ICE guidance at one tertiary hospital in Hong Kong was performed in order to review its efficacy and safety. Patients' demographics, clinical characteristics, operative procedures, postoperative complications and outcome were recorded and analyzed. Study outcomes including technical and procedural success rate, and complication rate were defined according to the 2016 Munich Consensus Document on LAAO.
Results: A total of 17 patients underwent LAAO with ICE guidance (mean age 73 years; 58.8% males), and all were performed under LA. Majority of the patients received Amulet device (n=15), while the remaining two had LAmbre device. The mean CHA2DS2-VASc and HASBLED scores were 4.5 and 2.8 respectively. The mean procedural and fluoroscopic time were 95.8 and 21.5 minutes respectively. All procedures were performed under LA. Procedure success rate was 100% without any complication (death, device embolization, cardiac tamponade, systemtic embolism, and stroke). The average length of hospitalization was 1.4 (range 1-2) days after the procedure. All except one patient received aspirin and clopidogrel for 6 months after procedure, and followed by lifeling aspirin. Up to 6 months post procedure, there was no any case of stroke or TIA, systemic embolism, and death. Among all follow-up TEE examination, there was no any significant peri-device leak observed, but there was one case of thrombus over the device found in that patient who just received single antiplatelet after LAAO.
Conclusions: In this cohort of case series in one teritary hospital of Hong Kong, ICE guided LAAO and local anesthesia could give a high success rate and low complication rate as similar to TEE guided procedure. The duration of procedure was longer during the initial phase of the learning curve, but increased experience may shorten the procedure time. Moreover, ICE guided procedure could reduce the turnover time the cardiac catheter laboratory, and also could avoid the patients from general aesthesia, endotracehl intubation and post-anestheisa care.

ABSTRACTS

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Percutaneous Tricuspid Valve Repair by MitraClip System: The First Case Series in Hong Kong

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Background: Tricuspid valve (TV) disease has been relatively neglected despite the known association between severe tricuspid regurigation (TR) and mortality. Patients with severe TR are often managed medically for years before TV repair or replacement. Few patients undergo isolated tricuspid surgery, which remains associated with high in-hospital mortality rates, particularly in patients with prior left-sided valve surgery. Recently, transcatheter treatment of TR with the MitraClip system was shown to be safe and feasible in those preselected patients.
Purpose and Methods: A retrospectively review of all patients underwent TV repair by MitraClip at one tertiary hospital in Hong Kong was performed in order to review its safety and feasibility. Patients' demographics, clinical characteristics, operative procedures and complication, preoperative and postoperative echocardiographic parameters were recorded and analyzed. Procedural safety was defined as periprocedural adverse events such as death, myocardial infarction, stroke, or cardiac tamponade. Procedural feasibility was defined as successful implantation of one or more MitraClip devices and reduction of TR by at least one grade.
Results: Five patients (mean age 74.4 years, male 40%) with symptomatic severe TR on optimal medical treatment were considered unsuitable for open-heart operation in the Heart Team, and underwent percutaneous TV repair by the MitraClip system for compassionate use between June 2017 to March 2018. All procedures were performed via right femoral venous assess and under guidance by transesophageal echography and general anaesthesia. The mean procedural and fluoroscopic time were 214 and 70 minutes respectively. The mean number of clips implanted was 2.2 per patient (range: one to three clips). Most clips (n=10) were placed at the antero-septal commissure, and the remaining two were placed at the postero-septal commissure. After the procedure, TR was reduced by at least one grade in all five patients. No intraprocedural deaths, clip detachment, cardiac tamponade, emergency surgery, stroke, myocardial infarction or major vascular complications occurred. Reductions in effective regurgitant orifice area (0.83±0.47 cm^2 vs 0.48±0.24 cm^2; p=0.04), vena contracta width (1.23±0.13cm vs 0.74± 0.22 cm; p=0.003) and regurgitant volume (54±32 ml/beat vs 34±21 ml/beat; p=0.05) were observed.
Conclusions: In this small case series, percutaneous TV repair by the MitraClip system for severe TR seems to be safe and feasible. Long procedural time was observed and expected in the initial phase of learning curve in manipulating this commonly used MitraClip system over the new position. Echocardiographic and anatomic criteria of TV are not yet defined well, therefore further research is required to review which patients could benefit from this novel technique. Further study with longer follow up period should be arranged to check whether these improvement in echographic parameters could translate into clinical improvement in long-term.

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Effect of Chronic Kidney Disease on Left Atrial Appendage Occlusion Outcomes: A Single-Centre Retrospective Analysis

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Objectives: We aim to study the impact of chronic kidney disease (CKD) on the outcomes of left atrial appendage occlusion using the registry data of a university affiliated tertiary centre.
Background: The presence of CKD paradoxically increases both risk of thromboembolism and bleeding in patients with non-valvular atrial fibrillation (NVAF).
Methods: Consecutive patients who underwent LAAO using Watchman or Amplatzer Cardiac Plug (ACP)/Amulet devices from June 2009 to August 2017 at Prince of Wales Hospital, Hong Kong were retrospectively analyzed and compared based on the presence or absence of CKD (eGFR cutoff of 60 ml/min using CKD-EPI equation). Study outcomes included device success rate and complication rate (defined according to the 2016 Munich Consensus Document), annual risk of stroke or transient ischemic attack (TIA), annual risk of major bleeding and event free survivals.
Results: A total of 196 patients underwent LAAO (mean age 72±8 years; 65.3% males), 36.2% had CKD and 4.6% had severe renal impairment (eGFR <30 ml/min). The mean CHA2DS2-VASc (5.09±1.51 vs 3.69±1.43, p<0.001) and HASBLED (3.39±0.91 vs 2.68±0.98, p<0.001) scores were significantly higher in patients with CKD. The device success rates were similar (97.2% vs 97.6%, p=1.0) in the two groups. The observed annual stroke/TIA risks and major bleeding risks were significantly lower than the estimated risks based on CHA2DS2-VASc and HAS-BLED scores respectively (annual stroke risks: 0.77% vs 6.99% in CKD patients, 1.53% vs 4.51% in non-CKD patients, 1.32% vs 5.40% in overall; annual major bleeding risk: 1.55% vs 5.89% in CKD patients, 1.22% vs 3.76% in non-CKD patients, 1.32% vs 4.53% in overall; all P<0.05). CKD patients received a larger stroke risk reduction (reduction of 88.9% vs 66.1%, p<0.001) and a similar major bleeding risk reduction (reduction of 73.7% vs 67.4%, p=0.19) than non-CKD patients. Despite a higher mortality rate during follow-up (13.0% vs 7.4%, p=0.03), CKD patients had similar stroke/TIA-free, major bleeding-free and MAE-free survivals (all p=NS). However, CKD patients had a significantly higher rate of peri-procedural complications (12.6% vs 3.2%, p=0.016) and cardiac tamponade (8.5% vs 0.8%, p=0.01) during LAAO.
Conclusions: The presence of CKD did not affect the efficacy of LAAO in reduction of stroke/TIA and major bleeding in patients with NVAF. However, LAAO in CKD patients is associated with a higher risk of peri-procedural complications, especially cardiac tamponade. This finding and its exact mechanism requires further analysis.

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Different Left Atrial Appendage Occlusion Devices for Stroke Prevention in Chinese Patients with Non-Valvular Atrial Fibrillation: A Single-Center Eight-Year Experience with Amplatzer Cardiac Plug/Amulet and Watchman Devices

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Background: Watchman and Amplatzer Cardiac Plug (ACP)/Amulet devices are the most commonly used devices for left atrial appendage occlusion (LAAO). Long-term data comparing the two devices are lacking in Chinese population.
Methods: Consecutive patients who underwent LAAO from June 2009 to August 2017 at Prince of Wales Hospital, Hong Kong were retrospectively analyzed and compared by type of device used. The main outcomes of the study included procedural (cath lab door-in/door-out time) and fluoroscopy time, device success and complication rate (defined according to 2016 Munich Consensus Document), annual risk of stroke/transient ischemic attack (TIA) and major bleeding.
Results: A total of 196 LAAO were performed, 100 using Watchman and 96 using ACP/Amulet. The mean follow-up duration was 31.0±27.6 months. The mean CHADS2-VASc and HAS-BLED scores were 4.2±1.6 vs 4.2±1.7 (p=0.71) and 3.0±1.0 vs 2.8±1.0 (p=0.15). Watchman implantation took significantly shorter procedural (73.9±26.5 vs 89.0±36.1 minutes, p=0.002) and fluoroscopy time (13.5±8.3 vs 17.5±7.6 minutes, p<0.001). The device success rate (97% vs 97.9%, p=1.0) and device related complication rate (4% vs 6.3%, p=0.53) were similar. At follow-up echocardiogram, the rate of device related thrombus was similar (4.3% vs 3.4%, p=1.0) and there was only 1 case of >5 mm peri-device leak in Amulet. There were no significant differences in long-term death, stroke and major bleeding rates between devices (all p=NS). Both devices showed significant lower observed annual stroke risk compared to estimated risk based on CHA2DS2-VASc score (0.97% vs 5.34% in Watchman, 1.61% vs 5.47% in ACP/Amulet, 1.32% vs 5.40% in overall, all p<0.05). In particular, Watchman had a larger risk reduction than ACP/Amulet (reduction of 81.9% vs 70.6%, p=0.01). The overall observed major bleeding risk was reduced by 41.9% compared to estimated risk based on HAS-BLED score (p=0.05).
Conclusion: In this single-centre Chinese cohort, LAAO with Watchman and ACP/Amulet had similar device success rate, complication rate and device related thrombus rate. Watchman device showed a larger stroke risk reduction and similar bleeding risk reduction than ACP/Amulet device.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC IMAGING

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Left Ventricular Noncompaction in an Adult Patient with Chronic Kidney Disease: An Isolated Cardiomyopathy or Epiphenomenon?

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Background: Isolated left ventricular noncompaction (LVNC) is a rare, genetic yet unclassified cardiomyopathy. Available literature describing its occurrence in patients with chronic kidney disease is quite limited and mostly culled from case reports. We describe the vital role of echocardiography in diagnosing LVNC in a setting of an already identifiable cause of cardiomyopathy, discuss the limitations of the available diagnostic criteria and consequently, its implication on management and prognosis among predisposed patients.
The Case: We report a case of a 57 year old male admitted for increasing dyspnea, presenting with heart failure symptoms, cardiomegaly on chest X-ray and left chamber enlargement on electrocardiogram. On 2D transthoracic echocardiography (TTE), a dilated left ventricle with segmental wall motion abnormalities were seen. Prominent trabeculations along the left ventricular apex and free wall were present, with noncompacted (NC) layer to compacted (C) layer ratio of 2.44. Color Doppler flow were also demonstrated along the deep intertrabecular recesses continuous with left ventricular cavity. Diagnosis of LVNC cardiomyopathy was initially made, however, given its occurrence with an increased cardiac preload state, such pattern was deemed more of an epiphenomenon. Nevertheless, management was geared towards relief of heart failure symptoms, emphasizing to patient the importance of compliance to medications, as his risk for cardiac complications cannot be overemphasized.
Conclusion: To our knowledge, this is the first reported case in our country of a left ventricular noncompaction in a patient of with chronic kidney disease. Despite the lack of a universally accepted and well validated diagnostic criteria for LVNC, its diagnosis, as an isolated disease entity or merely an "acquired" or anatomic variant still remains controversial. As such, correlation of clinical history and imaging modality, such as echocardiography, is of utmost importance for proper patient care and management.

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Compressed Sensing Cine CMR: Assessment of Cardiac Function in a Single Breath-Hold

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Background: The assessment of left ventricular ejection fraction (LVEF) as a marker for cardiac function is the cornerstone of management in patients with heart disease. The accurate and reproducible measurement of LVEF is vital as this is one of the strongest predictors for clinical outcome. Standard cine cardiac MR (CMR) has hence been well established as the de facto standard for the assessment of LVEF.
Aim: CMR accelerated by compressed sensing (CS) is a recent development to improve patient compliance, enable cine acquisition of the entire left ventricle in a single breath-hold, and result in a shorter examination time. The authors aimed to validate CS cine CMR with reference to standard cine acquisition in the assessment of LVEF and evaluate its application for clinical practice.
Methods: A prospective study was performed, including 30 consecutive adult patients with various cardiac conditions. All patients included in this study were clinically scheduled for standard cine CMR, where CS cine CMR was additionally included.
Results: We primarily analyzed image acquisition time, end-diastolic volume, end-systolic volume and measured LVEF. Good agreement on LV functional assessment was noted between the 2 imaging acquisition techniques. Shorter imaging acquisition time was noted for CS cine MR.
Conclusions: CS cine CMR is a viable alternative and may replace the multi-breath-hold standard cine CMR in the assessment of LVEF. This faster and accurate technique will result in improved workflow and reduced waiting times for patients. As CS cine CMR is inherently insensitive to respiratory motion, it is also valuable in patients with impaired breath-hold capacity, where imaging may not be possible in conventional methods requiring long breath holding.

ABSTRACTS

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Quantification of Stent Creep by Three-Dimensional Transesophageal Echocardiography in Patients Undergoing Transcatheter Aortic Valve-In-Valve Implantation for Failed Bioprostheses

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Aim: Transcatheter aortic valve-in-valve implantation (aVIV) has been used to treat bioprosthetic failure due to "stent creep", defined as inward flexion or bending of stent posts. We sought to develop a quantitative three-dimensional transesophageal echocardiography (3D-TEE) geometric analysis of the failed bioprostheses to determine the incidence of stent creep in patients underwent aVIV and its contribution to hemodynamics of those valves.
Methods: We retrospectively examined the 3D-TEE of 20 consecutive patients (aged 75.1±11.3 years; M/F = 11/9) underwent aVIV for failed bioprostheses. Modes of bioprosthesis failure were stenosis [n=8(40%)], regurgitation [n=8 (40%)], and combined [n=4(20%)]. The degree of stent creep was assessed by calculating the triangular area obtained by projecting the apex of stent posts on a reconstructed plane. This measured area was divided by that of the regular triangle defined by the base of stent posts to calculate a ratio designated the "stent creep ratio" (SCR). Seven newly implanted bioprostheses from patients underwent surgical aortic valve replacement served as controls.
Results: The mean SCR was significantly lower in failed prostheses than that of controls (0.82±0.16 vs. 0.96±0.05, P=0.02). The SCR was negatively correlated with the peak trans-aortic pressure gradient (r=-0.62, P<0.01). The best cut-point of SCR=0.8 associated with aortic peak velocity >4 m/s (AUC=0.81, sensitivity=0.79, specificity=0.83). Patients in the stenosis and combined group had lower SCR (0.76±0.16) in comparison with the regurgitation group (0.89±0.12) (P=0.07). 10 of the 20 (50%) patients underwent aVIV had a SCR <0.8. Thirteen of the 20 patients had pre- and post aVIV 3D-TEE, and the SCR can be corrected satisfactorily from 0.78± 0.14 to 1.05±0.20 (P<0.01).
Conclusions: SCR measured by 3D-TEE is feasible for identification and quantitative evaluation of stent creep. Stent creep is a commonly seen and important mode of structural deterioration in surgical bioprostheses, which can be treated by aVIV.

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Impact of Obesity on Longitudinal Changes to Cardiac Structure and Function in Patients with Type 2 Diabetes Mellitus

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Aims: The natural progression of left ventricular (LV) remodeling in patients with type 2 diabetes mellitus (T2DM) has not been evaluated by prospective studies. The aim of this study was to evaluate the impact of obesity on longitudinal cardiac structural and functional changes in patients with T2DM.
Methods and Results: This study comprised 274 patients with T2DM (mean age, 62.2±11.4 years; male, 51.5%). Patients were divided into three groups according to their baseline body mass index (BMI): normal weight (BMI <23 kg/m^2), overweight (BMI between 23 to 27.5 kg/m^2) or obese (BMI 27.5 kg/m^2). Echocardiographic parameters including LV geometry, systolic and diastolic function were measured at baseline and follow-up. The median follow-up was 24 months (from 12 to 48 months). The prevalence of normal weight, overweight and obesity in these patients was 22.3%, 44.9% and 32.8%, respectively. The entire cohort showed a significant increase in LV wall thickness, LV mass index (LVMi) and prevalence of concentric hypertrophy (19.6% to 27.3%). Further, systolic function and diastolic function had deteriorated at follow-up assessment. Importantly, obesity at baseline predicted a greater longitudinal increase in LVMi and decrease in LV ejection fraction compared with overweight and normal weight patients. Multivariable adjusted linear regression also demonstrated that baseline BMI predicted longitudinal change to LVMi (β=0.206, P=0.001) and LV ejection fraction (β=-0.155, P=0.008).
Conclusions: Being obese at baseline was associated with greater longitudinal increase in LV mass index and greater deterioration in LV systolic function.

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Impaired Right Ventricular Systolic Deformation in Pulmonary Hypertension Associated with Outcomes: A Three-Dimensional Speckle Tracking Echocardiography Study

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Purpose: Right ventricular (RV) dysfunction is a strong predictor of adverse clinical outcomes in patients with pulmonary hypertension (PH). The purposes of our study were to comprehensively assess RV function in patients with PH using 3D-STE and investigate whether 3D-STE parameters was associated with clinical outcomes.
Methods: 60 patients with PH and 25 normal controls were studied by both two-dimensional echocardiography and 3D-STE. RV regional and global longitudinal strain (LS), circumferential strain (CS), radial strain (RS) were calculated by 3D-STE. RV end diastolic volume, end systolic volume and ejection fraction (EF) were obtained from cardiac magnetic resonance (CMR) imaging. Exercise capacity was evaluated by 6-minute walking test.
Results: Patients with moderate and severe PH had increased RVEDV and RVESV, and decreased RVEF using CMR imaging compared with controls; our findings revealed that LS showed significant reduction in mild PH patients; whereas CS and RS were decreased in moderate and severe PH patients. Patients with severe PH exhibited reduced RV LS, RS and CS compared with patients with mild PH. RV LS, CS and RS were correlated with CMR-derived RVEF (r=0.770; r=0.612; r=0.566, respectively), and 6-min walking distance (r=0.673; r=0.438; r=0.465, respectively). RV LS and CS were related to pulmonary vascular resistance (r=-0.678; r=-0.601, respectively) and pulmonary artery systolic pressure (r=-0.544; r=-0.408, respectively). Only LS improved 6 months after medical treatment. RV LS (hazard ratio [HR]: 1.186; 95% confidence interval [CI]: 1.017 to 1.383; p=0.029) and RVEF (HR: 0.878; 95% CI: 0.779 to 0.989; p=0.033) were independent predictors of unfavorable clinical outcomes.
Conclusion: Patients with PH show decreased 3D-STE parameters that have better correlations with CMR-derived RVEF, hemodynamic parameters and exercise capacity than conventional echocardiographic indices, and provide prognostic information.

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Right Ventricular Three-Dimensional Speckle-Tracking Strain Predicts Outcome in Patients with Left Heart Failure

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Purpose: Right ventricular (RV) dysfunction is increasingly recognized in patients with left heart failure and is reported to be associated with poor prognosis. The aim of this study was to investigate the changes of RV function in left heart failure by three-dimensional speckle tracking echocardiography (3D-STE) and investigate the prognostic value of RV 3D-STE-derived strain.
Methods: 155 patients with left heart failure and 32 healthy subjects were included in this study. One hundred and fifty-five patients included 44 heart failure patients with preserved ejection fraction(HFpEF, LVEF ≥50%), 38 heart failure patients with mid-range ejection fraction(HFmrEF, LVEF 40-49%) and 73 heart failure patients with reduced ejection fraction(HFrEF, LVEF <40%). RV end diastolic volume index, end systolic volume index, ejection fraction (EF) and RV longitudinal strain of free wall were determined by 3D-STE.
Results: RV end diastolic volume index and end systolic volume index were increased, whereas RV longitudinal strain of free wall and RVEF were reduced in patients with heart failure. Furthermore, patients with HFpEF, HFmrEF and HFrEF yielded a gradual decrease in RVEF and RV longitudinal strain, and a gradual increase in RV volume with worsening LVEF. During the conventional two-dimensional and 3D-STE parameters, only RV longitudinal strain differentiate patients with HFpEF from normal controls (P<0.05). Multivariate analysis revealed that RVFWS-3D, rather than RVEF or left ventricular EF, independently predicted poor outcome (hazard ratio=1.409; 95% confidence interval, 1.128-1.759; P=0.002).
Conclusion: 3D-STE-derived RV longitudinal strain may be a sensitive parameter for RV function assessment in patients with heart failure and is associated with clinical outcomes.

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A Study of 117 Cases of Pericardial Effusion

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Objective: To explore the common causes of pericardial effusion and study the diagnostic and therapeutic role of pericardiocentesis.
Method: Data were retrieved from Clinical Diagnosis and Reporting System (CDARS) from Oct 2015 to Apr 2017 having a diagnosis coding of pericardial effusion or cardiac tamponade, or procedure of pericardiocentesis. Patients aged more than 18 with first episode of pericardial effusion >1cm or requiring drainage were included. Acute aortic syndrome, iatrogenic or post-operative effusion were excluded. Epidemiological factors, cause of pericardial effusion, 30-day, 90-day and 1-year mortality, 1-year recurrence rate were analyzed.
Result: 117 Cases were included in the study period. 20.5% of the patients were in tamponade (n=24). Pericardiocentesis was performed in 33.3% (n=39) of the cases, and was diagnostic in 7 of them (17.9%). The commonest diagnosis was lung carcinoma (36.8% n=43), followed by idiopathic (17.9% n=21), breast cancer (12.8% n=15) and other malignancies (7.7% n=9). Seventy Cases were malignancy associated pericardial effusion. Pericardiocentesis had a positive cytology yield of 66.7%. 30-day, 90-day and 1 year-mortality were 20% (n=14), 41.4% (n= 29) and 72.9% (n=51). After multivariate analysis, male (OR 6.17 CI 1.26-30.2 p=0.025) and lung cancer (OR 32.1 CI 2.49-413.6 p=0.08) were associated with higher 30-day mortality. Pericardiocentesis or pericardial window creation did not affect 30-day, 90-day, 1-year mortality or 1-year recurrence rate.
Conclusion: Malignancy, especially lung cancer is the commonest cause of pericardial effusion. The diagnostic role of pericardiocentesis is limited. The prognosis of malignancy associated pericardial effusion is poor, with 30-day, 90-day and 1-year mortality of 20%, 41.4% and 72.9% respectively. Male and lung carcinoma were independent risk factors of 30-day mortality, while pericardial drainage does not affect short or long term mortality in this study. Further study is required to delineate the best drainage strategy for malignancy associated pericardial effusion.

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CASE REPORT SESSION

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A Snake's Head in the Heart: Metastatic Uterine Leiomyosarcoma Extending from the Ovarian Vein to the Inferior Vena Cava and the Right Atrium

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Background: Uterine leiomyosarcomas are rare tumors, and secondary cardiac metastasis is even rarer. We present a case of metastatic uterine leiomyosarcoma presenting as tumor thrombus extending from the ovarian vein to the inferior vena cava and right atrium.
Case: This is the case of a 47-year-old female who complained of vaginal bleeding, diagnosed to have a uterine mass, probably myoma versus fibrosarcoma, and was then advised surgery. Pertinent physical findings include prominent neck veins, a grade 3/6 apical systolic murmur, and a hypogastric nontender mass. Electrocardiogram and chest radiograph were normal. A 2-dimensional echocardiogram showed a solid mass extending to the right atrium from the inferior vena cava, tumor vs. thrombus was considered. Chest and abdominal CT Scan showed an abdominopelvic mass with aggressive features, likely uterine in origin, with bilateral ovarian vein, inferior vena cava and right atrial extension or thrombus. Anticoagulation was delayed due to the presence of vaginal spotting. Anemia was managed by transfusion of packed red cells. Embolization of the uterine artery was performed to help reduce vascularity of the tumor and lessen intraoperative bleeding. An ultrasound-guided biopsy on the abdominopelvic mass was also done which revealed high-grade spindle cell neoplasm, likely uterine leiomyosarcoma. Patient opted to be discharged, and was advised follow-up for surgical planning.
Conclusion: Here is a very rare case of metastatic uterine leiomyosarcoma presenting as a tumor thrombus extending from the ovarian vein into the inferior vena cava, taking a very long course to the right atrium. The combination of the different modalities such as echocardiography and computed tomography, coupled with the clinical manifestations of the patient, can be utilized for the diagnosis and management of such complex case.

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Aortic Non-Coronary Cusp Prolapse in a Young Male with Unrepaired Sub-Aortic Ventricular Septal Defect

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Background: Aortic regurgitation (AR) is one of the important complications of unrepaired ventricular septal defect (VSD). Aortic valve prolapse precedes the development of AR. The prevalence of aortic valve prolapse in VSD is 12%. Among those with sub-aortic VSD, the right coronary cusp is commonly involved and the non-coronary cusp is involved only in 1% of cases. In the Philippines, there have been no published reports of aortic valve prolapse among VSD patients.
Case: We present a 20-year-old male who came in due to dyspnea. He was diagnosed with VSD perinatally. He was born pre-term and had recurrent pneumonia until he was two years old. The patient had good functional capacity with no signs of clubbing or cyanosis until he 18 years old when he first noticed a decrease in his functional capacity. On physical examination, he had widened pulse pressure (>40 mmHg) and there were peripheral signs of aortic regurgitation. Cardiac examination revealed a dynamic left precordium with a grade 3/6 aortic regurgitation murmur and a grade 4/6 VSD murmur. Subsequent work-up showed left ventricular hypertrophy on ECG and multi-chamber cardiac enlargement on chest radiograph. His transthoracic 2d-echo showed a perimembranous (sub-aortic) ventricular septal defect with a Qp:Qs of 1.5 and prolapse of the non-coronary cusp of the aortic valve with severe aortic regurgitation.
Discussion: The aortic cusp adjacent to the VSD is drawn into the VSD jet during systole. The increase in velocity of blood through the defect adversely affects the adjacent cusp and leads into cusp prolapse. Once prolapse progresses the cusp is dragged farther into the left ventricle preventing the valve to appose during diastole leading to aortic regurgitation. The right coronary cusp is more commonly prolapsed than the non-coronary cusp. Open surgical closure of the VSD with aortic valve replacement is indicated to alleviate the heart failure symptoms.

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CASE REPORT SESSION

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A Rare Case of Pericardial Decompression Syndrome in a Female Patient with Suspected Malignant Pericardial Effusion

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Background: Pericardial decompression syndrome is a rare, under-reported and potentially fatal complication of pericardial drainage. The overall incidence is approximately 5%. It is characterized by paradoxical hemodynamic deterioration with some degree of ventricular dysfunction following pericardial drainage. The onset ranges from immediate to as long as 48 hours post drainage. It has a high in-hospital mortality rate.
Case: We present a case of a 51-year-old female admitted due to progressive dyspnea of 2-month duration. On presentation, she was hemodynamically stable but with noted prominent neck veins and muffled heart sounds. ECG showed low voltage QRS complexes and chest X-ray showed enlarged cardiac shadow. On 2d-echo there was a massive pericardial effusion in tamponade physiology. Immediate surgical drainage was done but intra-operatively there was depressed cardiac contractility with associated refractory hypotension necessitating inotropic support. Post-operative 2d-echo showed right ventricular and left ventricular systolic dysfunction. She was admitted in the ICU for 48 hours and was later weaned off inotropic support on the 3rd day. A repeat 2d-echo showed marked improvement in RV and LV systolic function. There was no recurrence of hypotension and dyspnea. She was then discharged improved on the 5th hospital day.
Discussion: The pathophysiology of paradoxical ventricular dysfunction is still not very clear. The simplest mechanism is that sudden removal of compressing pericardial fluid causes increased venous return with expansion of the right ventricle at the expense of the left ventricle leading to acute heart failure. Surgical drainage is more associated with mortality due to more rapid expansion of the chambers after decompression. There are no published studies to propose preventive measures and treatment remains supportive. There has been only one published case reported here in our country. We report this case of a patient who successfully recovered from pericardial decompression syndrome.

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First ECMO-Supported Primary Percutaneous Coronary Intervention in Private Practice in Hong Kong

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Introduction: Early ECMO-supported primary PCI in STEMI with profound cardiogenic shock is a life-saving startegy. However, arranging ECMO-supported PCI service is difficult in private practice. We reported a case of ECMO-supported primary PCI in STEMI in private practice in Hong Kong.
Case Description: Patient is a 60 year old manual work. He was intermittent exertion all chest pain for three months. On the day of admission, he reported severe intermittent chest pain at rest and ECG showed maximal 2 mm ST depression from V2-V6... Urgent PCI was arranged. Just before being admitted to the cath lab, patient developed acute pulmonary edema and ST elevation myocardial infarcation. He was incubated and transferred to the cath lab immediately. Coronary angiogram showed total occlusion of the left circumflex artery (LCX). There is subtotal occlusion of the ostial left anterior descending artery (LAD) and focal ~70% stenosis of the proximal right coronary artery (RCA). Both the distal LAD and RCA showed diffuse disease. The LAD and RCA was stented while the LCX cannot successfully opened by the guidewire. Immediate post PCI echocardiogram showed poor left ventricular function with left ventricular ejection less than 30%. There is no significant valvular lesion and no pericardial effusion. Intra-aortic balloon pump was inserted but poor augmentation due to tachycardia. Patient remained anuric despite high dose inotropes. ECMO was started. Patient regain consciousness on the next day and weaned off ECMO on day 5 post coronary intervention. He discharge subsequently and followed up four weeks after myocardial infarction in stable condition.
Conclusion: ECMO is useful in percutaneous transluminal coronary intervention with an acceptable 30-day prognosis. Team-approach is mandatory in order to obtain good clinical outcome.

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Scanning Pacemaker Patient with 3.0T MRI Using B1+RMS to Limit Maximum Patient RF Exposure

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Introduction: Traditional MRI labelling of device is using specific absorption rate (SAR). B1+RMS is more precise radiofrequency (RF) exposure metric than SAR and independent of MRI scanner manufacturer-specific approaches to SAR estimation.
Case Description: Patient is a 73 year old female who has Medronic Advisa SR MRI A3SR01 pacemaker implanted 25 weeks before admission. She underwent MRI scan of the cervical and lumbosacral spine for sudden onset of lower limb weakness. Pre-MRI scanning showed there is V pacing 89%. Pacing threshold was 0.625V@0.40 ms and R wave was 12.5 mV. The pacemaker was switched to SureScan Mode before the scanning. The B1+RMS for the MRI sequence was 1.96 uT. The patient remained stable and reported no symptom during the procedure. Post scanning the pacemaker was re-interrogated and showed no change in sensing and pacing threshold. It was programmed back to the original pacing mode and pacing parameters.
Conclusion: Using B1+RMS allow patient with SureScan device have broader access to MRI with improved diagnostic imaging.

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CORONARY ARTERY DISEASE

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Daily Temperature Variation and Hospital Admissions for Acute Myocardial Infarction in Queen Mary Hospital Hong Kong

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Purpose: Cold weather is associated with increased in heart attacks and large daily temperature fluctuation is also implicated as trigger for acute myocardial infarction (AMI). We sought to investigate the relationship between daily temperature variation and hospitalization of acute ST elevation myocardial infarction (STEMI) and non-ST elevation myocardial infarction (NSTEMI) in Queen Mary Hospital.
Methods: This was an observational study using a hospital-based AMI registry. Daily temperature data from 2006 to 2010 were retrieved from Hong Kong Observatory and patients admitted with diagnosis of STEMI and NSTEMI in the same period were analyzed.
Results: 1,348 patient were recruited into analysis. The mean age was 71.6±13.8, 44.7% were smokers, 58.5% patients had hypertension and 36.1% patients has diabetes. The daily temperature variation (ΔT) was defined by daily temperature maximum minus temperature minimum. The daily number of AMI admissions were 0.72, 0.72, 0.71, 0.84 and 1.0 when ΔT was 0-2.5°C (Group 1), 2.5-5.0°C (Group 2), 5.0-7.5°C (Group 3), 7.5-10.0°C (Group 4) and >10.0°C (Group 5) respectively (Group 5 vs Group 1-4, $p<0.05$).
Conclusions: Large temperature variation correlates with higher number of AMI admissions in Hong Kong.

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Association of Air Pollution and Hospital Admissions for Acute Myocardial Infarction in Queen Mary Hospital Hong Kong

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Purpose: Air pollution is implicated as a trigger of acute myocardial infarction (AMI). We sought to investigate the relationship between ambient airbourne particulate matter (PM) concentration and hospitalization of acute ST elevation myocardial infarction (STEMI) and non-ST elevation myocardial infarction (NSTEMI) in Queen Mary Hospital.
Methods: This was an observational study using a hospital-based AMI registry. Daily air pollution data PM ≤10 μm (PM10) from 2006 to 2010 were retrieved from Environmental Protection Department and patients admitted with diagnosis of STEMI and NSTEMI in the same period were analyzed.
Results: 1,348 patient were recruited into analysis. The mean age was 71.6±13.8, 44.7% were smokers, 58.5% patients had hypertension and 36.1% patients has diabetes. The median PM10 was 45 ug/m^3 (IQR 26-68 ug/m^3). The daily number of AMI admissions were 0.57, 0.75, 0.74 and 0.88 in 1st, 2nd, 3rd and 4th quartiles of PM10 respectively ($p<0.001$).
Conclusions: A correlation exists between the number of daily AMI admissions and PM10 levels on the same day.

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Prevalence of Coronary Anomalies and Their Outcome in a Single Center in Hong Kong in an Adult Population Undergoing Multidector-Row Computed Tomography

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Purpose: Coronary anomalies are rare congenital abnormalities. Its prevalence and variations are now better realized with the advances of coronary CT angiography (CTA). While most of these anomalies run a benign course, some of them may carry a significant risk of adverse cardiac outcomes such as sudden cardiac death. The objective of this study is to investigate the prevalence of anomalous origin of coronary arteries and their clinical outcome in adult patients in a single center in Hong Kong.
Methods: The angiographic data of 10,098 consecutive patients undergoing 64- or 128-multidetector computed tomography from September 2013 to March 2018 were analyzed retrospectively.
Results: Among the 10,098 patients, there were 61 males and 37 females with their age ranged from 26-83 years (mean=53.6 years). Ninety-eight (0.97%) patients have anomalous origins of their coronary arteries and 89 (90.8%) of them have a right dominant system. The anomalies were: anomalous origin of the right coronary artery (RCA) from left coronary sinus (80, 81.6%), left circumflex coronary artery arising from the right sinus of Valsalva or rudimentary/absent left circumflex artery (LCX) (super-dominant RCA) (12, 12.2%), aberrant origin of left main artery from posterior cusp (2, 2%), anomalous origin of RCA from left anterior descending artery (2, 2%), anomalous origin of left main artery from right coronary sinus (1, 1%) and extension of distal LCX as RCA (1, 1%). One patient has resuscitated sudden cardiac death during a marathon run (anomalous origin of RCA without any coronary stenosis). Another patient has received coronary artery bypass surgery for documented myocardial ischemia of the coronary anomaly. Eight patients had coronary angioplasty to their non-anomaly-related sites. One patient has Type A aortic dissection with open repair done. One patient has aortic valve replacement for severe aortic stenosis. One patient has cardiac amyloidosis. Two patients died in the studied period, one from unrelated cerebrovascular accident and one from unrelated carcinoma of lung.
Conclusion: The prevalence of anomalous origin of coronary arteries as studied by CTA in a single center in Hong Kong was 0.97%. Resuscitated sudden cardiac death was noted in one patient and myocardial ischemia was documented in another patient, in keeping with the known potential risk of coronary anomalies. A better understanding of the prevalence and clinical outcome of coronary anomalies will facilitate our care to patients with these problems.

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CORONARY ARTERY DISEASE

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Efficacy and Safety of Prasugrel and Ticagrelor versus Clopidogrel in Patients with Acute Coronary Syndrome – A Meta-Analysis

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Purpose: Newer P2Y12 inhibitors have greater potency compared with clopidogrel. However, their efficacy and safety in patients with (acute coronary syndrome) ACS are not well-studied.
Methods: We searched MEDLINE and EMBASE to identify randomised controlled trials (RCTs) comparing newer P2Y12 inhibitors with clopidogrel, in combination with aspirin. The primary outcome was major adverse cardiovascular events (MACE), a composite of cardiovascular death, myocardial infarction and stroke. Secondary outcomes were the components of MACE, all-cause mortality, stent thrombosis, and Thrombolysis In Myocardial Infarction (TIMI) major and minor bleeding. Statistical analysis was performed using RevMan.
Results: Ten RCTs were included. Prasugrel and ticagrelor significantly decreased the risk of MACE (OR=0.89; 95% CI=0.81-0.99, OR=0.85; 95% CI=0.76-0.95, respectively) and stent thrombosis (OR=0.59; 95% CI=0.38-0.93, OR=0.61; 95% CI=0.46-0.87, respectively). Ticagrelor, in addition, significantly reduced cardiovascular mortality (OR=0.83; 95% CI= 0.70-0.99) and all-cause mortality (OR=0.82; 95% CI=0.70-0.97). Neither prasugrel nor ticagrelor significantly increased the risk of TIMI major bleeding but ticagrelor increased TIMI minor bleeding (OR=1.48; 95% CI=1.25-1.76).
Conclusion: Compared with clopidogrel, prasugrel and ticagrelor reduce MACE and stent thrombosis. Ticagrelor also reduces mortality, although at the expense of increased risk of minor bleeding. These results provide the evidence to justify recommending the newer drugs over clopidogrel in ACS patients.

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Real-World Use of Angiotensin-Converting Enzyme Inhibitors/ Angiotensin Receptor Blockers/β-blocks in Patients before Acute Myocardial Infarction Occurs: Patient Characteristics and Hospital Follow-Up

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Background: Current guidelines recommend angiotensin-converting- enzyme inhibitors (ACEI) or angiotensin-receptor blockers (ARB) or β-blockers (β-B) for secondary prevention in patients after an acute myocardial infarction (AMI). However, there is limited data to evaluate ACEI/ARB/β-B used before AMI on major adverse cardiovascular events (MACE), in China patients.
Objectives: This study sought to investigate whether ACEI/ARB/β-B (AAβ) treatment prior to AMI is associated with better hospital outcomes at the onset of AMI.
Methods: A total of 2705 patients were selected from the Cardiovascular Center Beijing Friendship Hospital Database Bank (CBD Bank), and divided into two groups on the basis of admission prescription: AAβ (n=872) or no-AAβ (n=1833). The study was also designed using propensity-score matching (226 patients in the AAβ vs. 452 patients in the no-AAβ group). The primary outcome was a composite of cardiac death and heart function and infarct size during hospitalization follow-up.
Results: The mean follow-up period was about 8 days in MACE. The Cox model showed the two groups had similar risk of cardiac death. The in-hospital mortality was 3.36% (3.33% of AAβ users and 3.38% of nonusers, p=0.94). In adjusted analysis, there was still no difference in in-hospital mortality between the two groups (3.54% vs 2.88%, p=0.64). However, the AAβ group was associated with better heart function and smaller infarct size than the no-AAβ group.
Conclusions: The in-hospital mortality was similar between AAβ and no-AAβ groups. Treatment with AAβ before AMI was associated with improved heart function and smaller infarct size.

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Relation between Adherence to Guideline-Directed Medical Therapy and Survival in Non-ST Elevation Myocardial Infarction at a Tertiary Centre

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Non-ST elevation myocardial infarction accounts for roughly half of all patients admitted for acute coronary syndrome in Asian data. From worldwide registry data such as the SWEDHEART registry, the 1-year mortality rate has improved in the pass years from around 26% in 1995 to 15% in 2011. The improved survival reflects improved adherence to guidelines such as prescription of guideline-directed medical therapy and timely invasive approach and revascularization. At a single tertiary centre, Queen Mary Hospital, Hong Kong, we have recruited 500 patients prospectively with the diagnosis of Non-ST elevation, and 100 patients retrospectively. Patients' baseline demographics such as comorbidities including hypertension, diabetes, chronic kidney disease, history of myocardial infarction and stroke were recorded. The GRACE score, which has been validated to predict outcomes in NSTEMI, was determined for each patient. Survival and rehospitalization for major adverse cardiovascular and cerebrovascular outcomes were recorded, and Kaplan-Meier survival analysis and multivariate regression analysis with Cox Hazard model were used. After adjustment for the GRACE score, we found that survival was proportional to the number of class of drugs in guideline-directed medical therapy prescribed on discharge. Patients with inpatient PCI done also has better survival then those with planned readmission for PCI ($P<0.001$).

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Time Taken from Presentation to Hospital to the Administration of P2y12 Inhibitor: Implication on Work Efficiency Improvement and Relation to Patient Outcome

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Patient outcome in ST-elevation myocardial infarction depends on timely treatment. The door-to-balloon time is well-validated to predict outcomes. In Non-ST elevation myocardial infarction, the recommended time to intervention is within 72 hours for intermediate risk patients and within 24 hours for high risk patient. In acute pulmonary embolism, early anticoagulation has been shown to be associated with better survival. More recently, decreased in-hospital mortality has been demonstrated with timely administration of furosemide. We would like to know whether timely administration of P2y12 inhibitor in non-ST elevation myocardial infarction would have any impact on survival and rehospitalization for major adverse cardiovascular event. We retrospectively evaluated 500 patients with Non-ST elevation myocardial infarction for the time interval between patient's arrival to the Accidents and Emergency department and the administration of P2y12 inhibitor. Multivariate regression analysis with Cox hazard model was used, with adjustment to the GRACE score, which has impact on survival. After adjustment, we found no statistically significant difference in patients with P2y12 inhibitor administered within 8 hours of hospitalization versus those administered 8-16 hours and those administered beyond 24 hours. Subgroup analysis of patients with or without in-hospital percutaneous coronary intervention showed similar result. However, we have noticed significant delay and room for improvement for time of administration of medication. Despite the use of high-sensitivity troponin, diagnosis and treatment is often delayed, especially when the presenting symptom is atypical. Current guidelines recommend repeating high-sensitivity troponin 3-6 hours after the first set. The time to administration to P2y12 inhibitor, together with the time to the first and second set of troponin were analysed to determine work efficiency of an institution. The mean time to administration of P2y12 inhibitor was 7.4 hours to and the median time to second set of troponin was 6.4 hours. Delay was most significant on Mondays and the least on Wednesday, more significant when patients were admitted at night or at noon time, and similar between work days and holidays.

ABSTRACTS

Abstracts for Free Paper Session:

CORONARY ARTERY DISEASE

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The Impact of Air Pollution ($PM_{2.5}$) on Atherogenesis in China: A Report from CATHAY Study

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Background: Air pollution (AP) has emerged as an imminent global health hazard of the 21st century, in mainland China in particular. AP has been associated with prevalence of cardiovascular diseases, stroke and respiratory disorders.

Aim: To establish a clinical model of AP-related accelerated atherogenesis as a potential surrogate target for atherosclerosis (coronary artery disease and stroke) prevention.

Subject and Methods: 1656 Han adults (mean age 46.0+11.2 years, male 47%) in Hong Kong, Macau, Pun Yu, Yu County (coal mine in Shanxi), and 3-Gorges (Yangtze River) were studied in 1996-2007. Cardiovascular risk profiles (smoking, body mass index BMI, waist hip ratio WHR, blood pressure SBP/DBP, LDL-cholesterol LDL-C, triglycerides TG, and fasting glucose) were evaluated. $PM_{2.5}$ parameters were computed from satellite atmospheric-chemical model and carotid intima-media thickness (IMT) as atherosclerosis surrogate predictive of cardiovascular and stroke outcomes, were measured by high resolution B-mode ultrasound, using an automatic edge-detection software package (CV=0.995). Multiple linear regression was performed.

Results: Their health parameters (age, gender, BMI, WHR and glucose) were similar in lowest and highest $PM_{2.5}$ tertile groups. SBP, DBP, and TG were higher and LDL-C was lower in top AP tertile. Carotid IMT was significantly thicker (0.68+0.13 mm vs 0.63 mm+0.15 mm, P<0.0001) in top $PM_{2.5}$ exposure tertile compared with lowest tertile.

	Lowest AP Tertile (N=552)	Top AP Tertile (N=552)	P-Values (Bonferroni adjustment)
$PM_{2.5}$ ($\mu g/m^3$)	42.9+4.9	83.8+9.7	<0.0001 (<0.001)
Age (yrs)	48.0+12.5	46.8+10.2	0.334 (>0.9)
Male (%)	48+0.5	41+0.5	0.027 (0.27)
SBP (mmHg)	119.1+17.8	123.4+16.5	<0.0001 (<0.001)
DBP (mmHg)	75.2+10.2	79.6+10.8	<0.0001 (<0.001)
BMI	23.2+3.4	23.7+3.3	0.016 (0.16)
WHR	0.85+0.06	0.86+0.07	0.027 (0.27)
LDL-C (mmol/l)	3.2±1.0	2.5±0.8	<0.0001 (<0.001)
TG (mmol/l)	1.19±0.76	1.50±1.50	<0.0001 (<0.001)
Glucose (mmol/l)	5.39±1.24	5.55±1.03	0.021 (0.21)
Carotid IMT (mm)	0.63±0.15	0.68±0.13	<0.0001

On multiple regression of the whole cohort, $PM_{2.5}$ was significantly related to carotid IMT (beta=0.251, P<0.0001) independent of age (beta=0.465, P<0.0001), male gender (beta=0.129, p=0.003), and LDL-C (beta=0.195, P=0.026), but not to smoking, BMI, WHR, SBP, DBP, TG or fasting glucose, (model R2=0.407, F-value=25.0, P-value <0.0001). These variables account for 40.7% of variation in carotid IMT ($P<2.2x10^{16}$).

Conclusion: AP has an impact on early atherogenic process in China, proposing a target for preventive intervention of atherosclerosis.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC SURGERY

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Ten Years Experiences of Coronary Artery Bypass Grafting with Coronary Endarterectomy from a Single Center

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Objective: Coronary artery bypass grafting (CABG) with coronary endarterectomy (CE) is a surgical option for diffusely calcified coronary arteries to achieve coronary revascularization in targets conventionally ungraftable. This study reviews the 10-year CABG with CE experience of our institute.

Methods: Between January 2008 and March 2018, 1523 patients underwent isolated CABG, including 61 patients (4%) underwent CABG with CE. A total of 180 (mean 2.95 +/- 0.49) grafts with 69 CE targets, all being grafted (56 internal mammary artery [IMA], 124 saphenous vein). The mean age and ejection fraction were 62 +/- 9 year-old and 50.5% +/- 12.0% respectively. Preoperative coronary angiogram, intraoperative graft status, postoperative complication and mortality were retrospectively reviewed.

Results: Three of 61 patients with CE died within 30 days (3.3%), the institutional mortality and expected mortality (including elective and emergency CABG) for isolated CABG during the 10-years was 1.7% (n=26/1523) and 3.9% respectively. The one-year and three-year overall survival was 93% (n=40/43) and 81% (n=22/27). Twelve patients (19%) had recurrence of symptoms or myocardial infarction, coronary angiogram performed for 8 patients involving a total 25 grafts. In the repeated angiograms, all LIMA grafted targets were patent, 5 patients with blocked CE targets. One-year post-operative CT coronary angiogram was arranged and performed in 9 patients, with 93% of patent grafted targets (n=26/28).

Conclusions: We have reported the clinical and radiological outcomes of our cohort of CABG with CE. We have shown an acceptable short and mid-term survival in this group of high risk patients with conventionally ungraftable coronary targets. CABG with CE should be considered a bail-out technique for advanced and chronically occluded coronary artery disease.

ABSTRACTS

Abstracts for Free Paper Session:

CONGENITAL HEART DISEASE

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Prevalence and Determinants of Parental Folic Acid Supplement Use during Periconception and the Outcomes of Congenital Heart Defects: A Prospective Cohort Study in Shanghai, China

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Background and Aims: Studies show parental folic acid (FA) deficiency during periconception is associated with the risk of congenital heart defects (CHDs) in offspring. We investigated the prevalence and explored possible determinants of parental folic acid supplement use during periconception.
Methods: A prospective study was conducted between March 2016 and February 2018, and pregnancy couples at pre-pregnancy examination clinics and early pregnancy women at antenatal care clinics from twenty-one hospitals in Shanghai were enrolled in. Information obtained including socio-demographic and FA use. Participants were categorized as FA users if they had used FA or multivitamin supplement, others were categorized as FA nonusers. Independent variables were analyzed as determinants of FA intake using chi-square statistical test and multinomial logistic regression.
Results: Overall, 25413 participants were enrolled, 13900 were pregnancy planners (paternal/maternal: 5775/8215) from pre-pregnancy physical examination clinics, 11513 were pregnancy women from antenatal care clinics. The prevalence of paternal pregnancy planners FA supplement use was 16.5% (954/5775), maternal pregnancy planners was 41.9% (3443/8215), early pregnancy women was 93.7% (10789/11513). Multivariate logistical regression indicated paternal pregnancy planners FA supplement use was more likely among the population residing in development district (OR=1.36, 95% CI: 1.18, 1.57) and with higher educational level (OR=1.34, 95% CI: 1.16, 1.54). Maternal pregnancy planners was more likely to use FA supplement among the population residing in development district (OR=1.14, 95% CI: 1.03, 1.25), with higher educational level (OR=1.47, 95% CI: 1.34, 1.61). Early pregnancy women was more likely to use FA supplement among the population with higher educational level (OR=1.48, 95% CI: 1.26, 1.73), with abnormal delivery history (OR=1.30, 95% CI: 1.04, 1.63), had a pre- pregnancy examination and consultation before conception (OR=1.60, 95% CI: 1.28, 2.00). So far, 32 CHDs were diagnosed among approximately 5000 delivery outcomes in this prospective cohort study. Multivariate logistical regression indicated the discontinuity of maternal FA supplement use during periconception was associated with CHDs risk in their offspring (OR=0.48, 95% CI: 1.97, 26.53).
Conclusions: Maternal FA supplement use statues was associated with CHDs risk in their offspring. Maternal FA supplement use during periconception is far below the National Health and Family Planning Commission requirements, which indicates education of folic acid supplement knowledge is deeply needed.

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Paternal Alcohol Consumption Interacts with Paternal Environmental Exposures on Congenital Heart Defects

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Objectives: While the teratogenic effects of maternal risk factors have been explored, the paternal contribution to congenital heart defects (CHD) remain largely unknown. We aimed to examine the potential impacts of paternal alcohol consumption and other paternal environmental exposures on CHDs and their interactions.
Study Design and Setting: A population-based case-control study involving 9,452 singleton CHD cases and controls was conducted using the Guangdong Registry of Congenital Heart Disease data (2004-2014). Controls were randomly chosen from singleton newborns without any malformation, and matched to cases by birth hospital, infant sex, gestation age (within 3 months), and residence. Information on parental demographics, behavioral patterns, disease/medication, and environmental exposures (three months before pregnancy) were collected through face-to-face interviews. Conditional logistic regression was used to estimate odds ratios (ORs) and 95% confidence intervals (CIs) of paternal exposures, while controlling for maternal factors.
Results: Paternal alcohol consumption was associated with an increased odd of CHDs [adjusted OR (aOR=2.87), CI: 2.25, 3.65]. Additionally, paternal smoking, industry occupation, organic solvent contact, virus infection and antibiotic use, living in rural areas, low household income, and migrant status were significantly associated with CHD. Significant additive or multiplicative interactions were observed between paternal alcohol consumption and smoking [interaction contrast ratio (ICR=4.72), CI: 0.96, 8.47] on any CHD and septal defects (ICR=2.91, CI=1.39, 6.09). Significant additive interactions were also observed between paternal alcohol consumption, paternal manual labor (ICR=2.79, CI=0.23, 5.35), and low income (ICR=2.04, CI=0.25, 3.82) on septal defects.
Conclusions: Paternal alcohol consumption and multiple paternal risk factors were significantly associated with CHDs. Furthermore, paternal environmental exposures and low socio-demographics modified paternal alcohol consumption-CHD relationship.

ABSTRACTS

Abstracts for Free Paper Session:

CONGENITAL HEART DISEASE

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Cardiac Catheterization and Comprehensive Clinical Evaluation after Bidirectional Glenn Shunt Surgery in 60 Patients with Complex Congenital Heart Disease

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Objective: To evaluate the effectiveness of a cavopulmonary bidirectional shunt (bidirectional Glenn shunt) in patients with complex congenital heart disease (CHD) and patient selection for follow-on treatment.
Method: Sixty patients, 44 male and 16 female, with bidirectional Glenn shunt surgery and cardiac catheterization for CHD were enrolled at our hospital between January 2014 and December 2016. Pre- and post Glenn shunt percutaneous oxygen saturation (SpO_2), 6-minute walk test (6MWT), superior vena cava pressure (SVCP), pulmonary arterial pressure (PAP), pulmonary capillary wedge pressure (PCWP), pulmonary vascular resistance (PVR), small pulmonary vascular resistance (sPVR) were measured. Pre- and post-total cavopulmonary connection (TCPC) SpO_2, and in-hospital complications were monitored. The optimal hemodynamic cutoff values for TCPC patient selection were estimated by receive operating characteristic (ROC) curve analysis.
Results: SpO_2 was significantly increased by bidirectional Glenn shunt surgery (75.42±9.62% to 86.98±7.63%, P<0.001) and from 82.70±5.99% to 95.00± 4.07% in the 47 patients with TCPC. Forty-two patients completed the 6MWT with a mean distance of 362.7±75.0 m and a SpO_2 decrease from 81.80± 7.84% to 67.59±1.82% (P<0.001). The ΔSpO_2 and 6-minute walk distance (6MWD) in the 32 who underwent TCPC and the ten who did not did not reach statistical significance (17.22±13.82% vs. 13.87±8.74%, P=0.08 and 358.88±78.97 m vs. 374.80±62.55 m, P=0.564]. After cardiac catheterization, 47 patients were selected for TCPC. The right pulmonary artery systolic pressure (sRPAP), mean right pulmonary artery pressure (mRPAP), mean left pulmonary artery pressure (mLPAP), PVR, and sPVR were significantly lower in the TCPC group than in the non-TCPC group. The differences in superior vena cava systolic blood pressure (sSVCP), mean superior vena cava pressure (mSVCP), and left pulmonary artery systolic pressure (sLPAP) were not significant. The optimal cutoff values for TCPC were sSVCP ≤20 mmHg (P=0.025), sRPAP ≤22 mmHg (P=0.0001, mRPAP ≤13 mmHg (P=0.003), sLPAP ≤27 mmHg (P=0.03), mLPAP ≤11 mmHg (P=0.01), PVR ≤4.3 Wood U/m^2 (P<0.0001) were significantly associated with TCPC selection, but mSVCP ≤19 mmHg (P=0.06) and sPVR ≤2.0 wood U/m2 (P=0.0531) were not. One patient died because of low cardiac output after TCPC. In-hospital mortality was 2.1%.
Conclusion: The SpO_2 was significantly improved after bidirectional Glenn shunt and TCPC surgery. The 6MWT was an index of activity tolerance prior to TCPC. Hemodynamic values of sSVCP ≤20 mmHg, sRPAP ≤22 mmHg, mRPAP ≤13 mmHg, sLPAP ≤27 mmHg, mLPAP ≤11 mmHg, and PVR ≤4.3 Wood U/m^2 can help identify post Glenn-shunt patients indicated for TCPC.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

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Acute Critical Illness and Cancer Risk: Implications from a Nationwide Population Based Study in Asia

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Objective: The objective of this study was to identify the risk of incident cancer among patients with acute critical illness.
Methods: The study applied the big database from the National Health Research in Taiwan. The risk of incident cancer over a 12-year period in patients with 4 types of newly diagnosed acute critical illness (septicemia/ septic shock, acute myocardial infarction hemorrhagic stroke and ischemic stroke) was investigated using Cox proportional hazards regression model with further controlling for the competing risk of deaths.
Results: This study included 42675 patients in the acute critical illness cohort and 42675 patients in the age- and sex- matched comparison cohort. Correlations between the incidence of cancer and critical illness were found after adjusting for age, sex, comorbidities and further controlling for death [adjusted subhazard ratio (aSHR)=1.69, 95% confidence interval (CI) =1.59-1.79]. Five common incident cancers associated with acute critical illness were hematologic malignancy (aSHR =4.00, 95% CI=3.11-5.14), cancers of brain (aSHR=2.58, 95% CI=1.45-4.59), liver (aSHR =2.17, 95% CI=1.86-2.52), gallbladder (aSHR=1.90, 95% CI=1.30-2.77) and esophagus tumor (aSHR=1.73, 95% CI=1.17-2.55). Among these cancers, septicemia/ septic shock was found to confer a higher risk of incident cancer compared to other subtypes of acute critical illness except for brain tumor.
Conclusions: This research is the first to tackle this clinically relevant issue regarding the types of types of acute critical illness most associated with cancer development with a very large sample size with robust methods. After adjustment for the potential confounding factors and consideration of the competing risk of death, the association between having an acute critical illness and incident cancer was noted.

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The Protective Role of Low-Concentration Alcohol in High-Fructose Induced Adverse Cardiovascular Events in Mice

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Cardiovascular disease remains a worldwide public health issue. As fructose consumption is dramatically increasing, it has been demonstrated that a fructose-rich intake would increase the risk of cardiovascular disease. In addition, emerging evidences suggest that low concentration alcohol intake may exert a protective effect on cardiovascular system. This study aimed to investigate whether low-concentration alcohol consumption would prevent the adverse effects on cardiovascular events induced by high fructose in mice. From the results of hematoxylin-eosin staining, echocardiography, heart weight/body weight ratio and the expression of hypertrophic marker ANP, we found high-fructose result in myocardial hypertrophy and the low-concentration alcohol consumption would prevent the cardiomyocyte hypertrophy from happening. In addition, we observed low-concentration alcohol consumption could inhibit mitochondria swollen induced by high-fructose. The elevated levels of glucose, triglyceride, total cholesterol in high-fructose group were reduced by low concentration alcohol. Low expression levels of SIRT1 and PPAR-γ induced by high-fructose were significantly elevated when fed with low-concentration alcohol. The histone lysine 9 acetylation (acH3K9) level was decreased in PPAR-γ promoter in high-fructose group but elevated when intake with low concentration alcohol. The binding levels of histone deacetylase SIRT1 were increased in the same region in high-fructose group, while the low concentration alcohol can prevent the increased binding levels. Overall, our study indicates that low-concentration alcohol consumption could inhibit high-fructose related myocardial hypertrophy, cardiac mitochondria damaged and disorders of glucoselipid metabolism. Furthermore, these findings also provide new insights into histone acetylation-deacetylation mechanisms of low-concentration alcohol treatment that may contribute to the prevention of cardiovascular disease induced by high-fructose intake.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

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Increase in Cardiovascular Events in Patients Treated with Cholesteryl Ester Transfer Protein Inhibitors Is Associated with rs1967309 Single-Nucleotide Polymorphism in ADCY9 Gene

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Purpose: The AA genotype of the single-nucleotide polymorphism, rs1967309, in the ADCY9 gene was associated with reduction in major adverse cardiovascular events (MACE) by treatment with dalcetrapib, a cholesteryl ester transfer protein (CETP) inhibitor in the dal-OUTCOMES trial. This interaction was not found with evacetrapib, another CETP inhibitor, in the ACCELERATE trial. We performed a meta-analysis to investigate if the cardiovascular benefit or harm of CETP inhibitors is determined by polymorphisms in the ADCY9 gene.
Methods: We searched for trials of CETP inhibitors that included genotyping of trial subjects and reporting of MACE, defined as comprising cardiovascular death, myocardial infarction, stroke, coronary revascularisation, or unstable angina. Random-effects model was used to pool odds ratios (ORs) and 95% confidence intervals (CIs).
Results: Out of 12 trials identified, two trials involving altogether 8700 patients were eligible for inclusion in the meta-analysis. Compared to placebo, CETP inhibition did not reduce MACE in patients with the AA (OR 0.74; 95% CI: 0.52-1.06) or AG genotype (OR 0.96; 95% CI: 0.83-1.12). In contrast, it increased the risk of MACE in patients with the GG genotype (OR 1.24; 95% CI: 1.05-1.48, p=0.01).
Conclusions: Our study suggests a significant association between the ADCY9 SNP rs1967309 and cardiovascular events in patients taking dalcetrapib and evacetrapib. The previously observed benefit of the AA genotype is uncertain, but patients with the GG genotype appear to be harmed by the two CETP inhibitors.

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Histone Deacetylase 2 (HDAC2) was involved in Placental P-glycoprotein Regulation in Vitro and Vivo: A Probable Target for Congenital Heart Disease Prevention

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Introductions: Environmental origins of congenital heart disease (CHD) highlights the pivotal role of heart-placenta connection. P-glycoprotein, expressed in the the syncytiotrophoblast of placenta, is indispensable for fetal protection from deleterious environmental exposures. Histone deacetylase (HDAC) 1/2/3, core epigenetic enzymes for deacetylation modification, were extremely abundant in trophoblast cells. We have recently reported that these three HDACs inhibition induced P-gp expression in placental cells. This study aimed to validate the specific HDAC subtypes regulating placental P-gp expression and function in vitro and vivo, illuminating epigenetic targets for CHD prevention in the context of fetal protection.
Methods: Bewo and JAR cells (human placenta choriocarcinoma) were transfected with HDAC1/2/3 specific siRNA. Real time PCR, Western-Blot, immunofluorescence and fluorescent dye efflux assay were employed for evaluation of placental P-gp expression, localization, and efflux activity following transfection, respectively, identifying the HDAC subtypes regulating placental P-gp in vitro. Subsequently, siRNA for the identified HDAC was intraperitoneally injected to pregnant mice every 48 h from E7.5 to E15.5. Digoxin was administered at 50 μg/kg by gavages 1 h prior to euthanasia at E16.5. Dams were sacrificed, and samples were harvested. Real time PC R, Western-blot and immunohistochemistry were used to determine expressions and localization of HDAC1/2/3 and P-gp in placentas, respectively; digoxin concentration in maternal plasma and fetal-unit were analyzed by enzyme-multiplied immunoassay.
Results: In vitro, reduction of HDAC2 expression induced placental P-gp mRNA and protein production, immunolocalization of P-gp still being mainly on the cell membranes; HDAC2 suppression elevated P-gp efflux activity of its dye fluorescent substrates-DiOC2(3) and Rh 123. In vivo, HDAC2 siRNA increased expression of placental P-gp, without significant alteration in its tissue distribution; digoxin transplacental rate after HDAC2 siRNA injection was significantly decreased without significant alteration in placental weights, fetal weights and maternal plasma digoxin concentrations.
Conclusions: Inhibition of HDAC2 could result in induction of placental P-gp expression and function, which might be a promising target for prevention of CHD on the ground of fetal protection from environmental contributors.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

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Relationship between 22q11.2 Region Variation and Cardiac/Facial Abnormality in Chinese Patients with Congenital Heart Disease

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Purpose: The 22q11.2 deletion syndrome is the most frequent chromosomal microdeletion syndrome and most patients carry a common 3Mb or 1.5Mb deletion in the low copy repeats. Individuals with similar molecular defects showed clinical variability. We aimed to explore the relationship between cardiac/facial abnormality and 22q11.2 deletion in the children with congenital heart disease (CHD).
Methods: Consecutive 450 patients who underwent repair surgery for CHD were enrolled. The chromosomal microdeletion was detected with ligation-dependent probe amplification and capillary electrophoresis methods. Universal Probe Library technology was applied to validate the MLPA results.
Results: Forty patients had either 22q11.2 deletion (34) or amplifications (6). According to the gene analysis, CDC45, TBX1, USP18, RTDR1, ZNF74, and SNAP29 exhibited a higher incidence among the 40 individuals. The most cardiac phenotypes of the 40 patients included ventricular septal defect, atrial septal defect, patent ductus arteriosus, and tetralogy of Fallot. Six patients had right ventricular outflow tract stenosis or pulmonary stenosis. Two patients had double chamber right ventricle and one had double outlet right ventricle. Interestingly, near half of the 40 individuals had pulmonary hypertension. The facial dysmorphia mainly included short philtrum (6 patients), hooded eyes (5), hypertelorism (4), small eyes (2), strabismus (1), bilateral eyebrow asymmetry (1), and elongated face (1). The genotype-phenotype analysis revealed possible correlations between: 1) the deletion of USP18, SNAP29, and CDC45 and short philtrum; 2) the deletion of GP1BB, TBX1-2, and RTDR1 and hooded eyes; and 3) the deletion of SNAP29-5, LZTR1-16 and hypertelorism.
Conclusions: This study revealed the exact 22q11.2 region variations in the CHD patients. The gene abnormalities may be considered as signals to relative clinical manifestations. All these symptoms should be diagnosed early in childhood in order to start early interventions and to help patients in prognosis, treatment, disease management, determining inheritance pattern in the family, and recurrence risk in next pregnancies.

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Alleviation of Coronary Dysfunction in Hyperhomocysteinemia: Reversal of BKCa Channel Inhibition by Tetramethylpyrazine

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Purpose: We recently reported the involvement of ER stress-mediated smooth muscle BKCa channel inhibition in homocysteine-induced coronary dilator dysfunction. In another study, we demonstrated that tetramethylpyrazine, an active ingredient of the Chinese herb Chuanxiong, possesses potent anti-ER stress capacity. The present study aimed to investigate whether tetramethylpyrazine may protect BKCa channel function from homocysteine-induced impairment and whether suppression of ER stress is a mechanism contributing to the protection. Furthermore, we explored the signaling transduction involved in tetramethylpyrazine-conferred protection on BKCa channels.
Methods: BKCa channel-mediated relaxation was studied in porcine small coronary arteries. Expressions of BKCa channel subunits, ER stress molecules, and ubiquitin ligases, as well as BKCa ubiquitination were determined in porcine coronary arterial smooth muscle cells (PCSMCs). Whole-cell BKCa channel currents were recorded.
Results: Both homocysteine and tunicamycin, a chemical ER stress inducer increased the expression of ER stress sensor molecules in PCSMCs. In cells treated with tetramethylpyrazine, homocysteine and tunicamycin-induced ER stress was significantly inhibited. Suppression of ER stress by tetramethylpyrazine preserved the BKCa β1 protein level and restored the BKCa channel current in PCSMCs, along with an improved dilator response of BKCa channels in coronary arteries. Tetramethylpyrazine attenuated the BKCa β1 ubiquitination promoted by homocysteine, in which inhibition of ER stress-induced FoxO3a activation and FoxO3a-mediated upregulation of atrogin-1 and Murf-1 is involved.
Conclusions: Reversal of BKCa channel inhibition via suppression of ER stress-mediated loss of β1 subunits plays a significant role in the protective effect of tetramethylpyrazine against homocysteine on coronary dilator function. Inhibition of FoxO3a-driven ubiquitin ligases upregulation likely underlies the decreased BKCa β1 ubiquitination and the resultant preserved level of BKCa β1. This study provides new mechanistic insights into the cardiovascular benefits of tetramethylpyrazine.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

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Enhanced Gene Transfection to MCF-7 Cells Mediated by Stearic-PEI600 Cationic Nanobubbles

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Objective: The in vitro gene loading capacity and gene carrying efficiency of cationic nanbubbles were measured, and the ability of anti DNA enzyme digestion after cationic nanobubble DNA binding was evaluated. The best acoustic condition of ultrasound combined with cationic nanobubble explosion for MCF-7 cells transfection was explored.
Methods: Microplate reader was used to measure the gene loading capacity of nanobubbles in vitro, Flow cytometric wasused to measure gene efficiency of nanobubbles in vitro, gel electrophoresis experiment was taken to elevate the ability of cationic nanobubble protecting the DNA from digesting by DNAse I, the method of transfection experiment is as follows: It is divided into 6 groups: (1) Simple plasmid group; (2) plasmid + ultrasonic irradiation group; (3) plasmid + nanobubble group; (4) plasmid +cationic nanobubblegroup; (5) plasmid + ultrasonic irradiation+ nanobubble group; (6) plasmid + ultrasonic irradiation + cationic nanobubble group; the transfection efficiency of each group was compared. The expression of green fluorescent protein (EGFP) was observed by fluorescence microscope, and the gene transfection rate was measured by flow cytometry.
Results: Cationic nanbubbles can effectively combine DNA with electrostatic interaction, while reducing DNA enzyme digestion. Cationic nanbubbles can enhance gene transfection efficiency of MCF-7 cells, which is significantly higher than that of normal nanobubble.
Conclusion: The self-made cationic nanofole is a good carrier for carrying genes, which can protect the DNA and can significantly improve the transfection efficiency.

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Mitochondrial Cardiomyopathy Caused by Elevated Reactive Oxygen Species and Dispensible For Postnatal Cardiomyocyte Maturation

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Rationale: Although mitochondrial diseases often cause abnormal myocardial maturation, the mechanisms by which mitochondria influence heart growth and function postnatally are poorly understood.
Objective: To investigate these disease mechanisms, we studied a genetic model of mitochondrial dysfunction caused by inactivation of Tfam (Transcription Factor A, Mitochondrial), a nuclear-encoded gene that is essential for mitochondrial gene transcription and mitochondrial DNA replication.
Methods and Results: Tfam inactivation was accompanied by elevated production of reactive oxygen species (ROS) and reduced cardiomyocyte proliferation. Transcriptional profiling by RNA-seq demonstrated activation of the DNA damage pathway. Pharmacological inhibition of ROS or the DNA damage response pathway restored cardiomyocyte proliferation in cultured fetal cardiomyocytes. Neonatal Tfam inactivation by AAV9-cTnT-Cre caused progressive, lethal dilated cardiomyopathy. Remarkably, postnatal Tfam inactivation and disruption of mitochondrial function did not impair cardiomyocyte maturation. Rather, it elevated ROS production, activated the DNA damage response pathway, and decreased cardiomyocyte proliferation. We identified a transient window during the first postnatal week when inhibition of ROS or the DNA damage response pathway ameliorated the detrimental effect of Tfam inactivation.
Conclusions: Mitochondrial dysfunction caused by Tfam inactivation induced ROS production, activated the DNA damage response, and caused cardiomyocyte cell cycle arrest, ultimately resulting in lethal cardiomyopathy. Normal mitochondrial function was not required for cardiomyocyte maturation. Pharmacological inhibition of ROS or DNA damage response pathways is a potential strategy to prevent cardiac dysfunction caused by some forms of mitochondrial dysfunction.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

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Interpreting the Various Associations of MiRNA Polymorphisms with Susceptibilities of Cardiovascular Diseases: Current Evidence Based on a Systematic Review and Meta-Analysis

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Objective: To interpret the various associations between miRNA polymorphisms and cardiovascular diseases (CVD).
Methods: Literature search has identified relevant studies up to June 2016. A meta-analysis was performed followed the guidelines from the Cochrane review group and the PRISMA statement. Studies were identified by searching the Cochrane Library, EMBASE, PUBMED and WHO clinical trials registry center. A meta-analysis has been done with a fixed/random-effect model using STATA 14.0, which also has been used to estimate the publication bias and meta-regression.
Results and Conclusion: The results from 11 case-control studies were included. Despite inter-study variability, the polymorphisms from miR-146a, miR-499 and miR-196a2 have impacts on cardiovascular disease. The miR-146a G/C makes a contribution to the causing of CVD as recessive genetic model. And the miR-499 G/A raised the risks of cardiomyopathy, however it could still accelerate the procedure of CVD combined with myocardial infraction. At this point, we consider that it could deepen the adverse of outcomes from CAD, but it's hard to draw an association between miR-499 G/A and CAD. At last the miR-196a2 T/C demonstrated a contrary role between development problem and metabolic issues, which protects the development procedure and impairs the metabolism to cause different disease phenotypes.

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Human Umbilical Cord Blood Mesenchymal Stem Cells Conditioned Media Inhibits Hypoxia-Induced Apoptosis in H9c2 Cells by Activation of the Survival Protein Akt - Umbilical Cord Blood Mesenchymal Stem Cells Conditioned Media

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Objective: To study the beneficial role of human umbilical cord blood derived mesenchymal stem cell-conditioned medium (MSC-CM) in hypoxia induced apoptosis in H9c2 cardiomyoblasts, in which the serine/heroine kinases (Akt) pathway would be involved.
Methods: CM was collected by culturing MSCs in serum-free DMEM medium for 24 hours and paracrine factors were analyzed by protein chip. H9c2 cells were divided into the following groups: control group, hypoxia group, MSC-CM intervention group (CM group), MSC-CM + Akt phosphorylation inhibitor (LY294002) group (LY group). Apoptosis of the H9c2 cells was tested with chromatin dye Hoechst 33342 and FITC-conjugated Annexin V apoptosis detection kit by flow cytometer after a hypoxia/serum derivation (H/SD) for 24 h. The apoptosis related proteins were evaluated by Western-blot.
Results: MSC-CM displayed significantly elevated levels of growth factors, anti-inflammatory and anti-apoptosis cytokines. On Ho33342 apoptosis staining, the H9c2 cells morphology displayed a lower proportion of apoptosis in CM group than those in hypoxia group, while apoptosis was increased in LY group; Flow cytometer analysis revealed the apoptosis ratio in CM group was lower than the hypoxia group [(12.34±2.00)% vs (21.73±2.58)%, $p<0.05$], while the LY group was significantly higher [(22.54±3.89)%]. Active casepae-3 expression was increased in hypoxia group than control group ($p<0.05$), but decreased in CM group ($p<0.01$).
Conclusion: Umbilical cord blood derived mesenchymal stem cell-conditioned media secrete multiple paracrine factors that are able to inhibit hypoxia-induced H9c2 cardioyoblasts apoptosis, and in which the activation of Akt phosphorylation is involved to achieve the protective effect.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

1

Retrospect Research of Prevention Thrombosis in Total Cavopulmonary Anastomosis: Single Center Data

J Zheng, ZZ Li
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Objective: For Total cavopulmonary anastomosis (Fontan operation), thrombosis is an important complication. We plan to use our center data comparing the warfarin and aspirin in prevention of thrombosis.
Methods: In our center from February 2004 to December 2016, we perform Fontan procedure in 37 cases. Age from 3.5 years -12 years old, average age 7.32±2.25 years old. Weight 11.5-41 kg, average 23.58±4.25 kg. The group varied according by the two medicine: warfarin group 14 people, 23 people in aspirin group.
Results: Warfarin group immediate after operation 3 day chest drainage 17.33±5.62 ml/kg, aspirin group 19.27±6.49 ml/kg, P=0.633. Warfarin group blood transfusion 15.18±4.73 ml/kg, aspirin group 13.52±3.29 ml/kg, P=0.452. Within 3 years thrombotic events, warfarin 1 case, aspirin 2 cases P=0.867. Two group of the total thrombotic events, warfarin 2 cases aspirin 2 cases, P=0.595. Two group of all cause motality warfarin 2 cases aspirin 3 cases P=0.914.
Conclusion: For juvenile and youth Fontan patients without the atrial fibrillation, whether aspirin or warfarin get approximate the effect of prevention of thrombosis. Antiplatelet therapy looks more proper to be recommended for the patient. To avoid the frequent monitoring INR blood tests as warfarin abuse, the compliance of the patients and their families will be better.

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Analysis of Prognosis and Associated Risk Factors in Pediatric Idiopathic Pulmonary Arterial Hypertension

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Objective: To analysis the prognosis and associated risk factors of pediatric idiopathic pulmonary arterial hypertension.
Method: A total of 119 patients under 18 years of age diagnosed as idiopathic pulmonary arterial hypertension in the Pulmonary Arterial Hypertension Center in Beijing An Zhen Hospital between June 2007 and May 2017 were enrolled in this retrospective study. The clinical information and follow-up data were collected. The endpoints of follow-up were defined as death or undergoing lung transplantation. Kaplan-Meier survival curve was used to assess the survival, and the COX risk regression model was used to analyze the prognostic risk factors.
Result: The mean age at diagnosis was 5.90±4.23 years. For 77.5% patients, the main reason at visit was decreased activity with shortness of breath after exercise. Seventy patients (58.8%) were in baseline NYHA functional class III~IV and 49 patients (41.2%) patients were in NYHA functional class I~II. The mean systolic pulmonary arterial pressure estimated by echocardiography was (90±23) mmHg. Right heart catheterization were performed in 50 patients. Hemodynamic parameters revealed that the mean pulmonary artery pressure was (66±19) mmHg (1 mmHg=0.133 kPa). Mean average right atrium pressure was (8.5±3.4) mmHg. Mean pulmonary vascular resistance index was (17±9) Wood • m^2 and the mean cardiac index was 3.38±1.25 L/m^2. One hundred patients (84.0%) received targeted therapy in which 55 patients (46%) were on monotherapy, 40 patients (33.6%) were on dual therapy and 5 patients (4%) were on triple therapy. The mean time of follow-up was 22.0 months (0-108 months). During follow-up, 43 patients (36.1%) died and 1 patient recived double-lung transplantation. Main causes of death including right heart failure, pulmonary hypertension crisis, asphyxia and massive hemoptysis. The mean survival time from diagnosis was 37.0 months, 1-, 2-, 3- and 5- year survival rate were 86.3%, 72.2%, 51.4% and 37.8% respectively. Survival analysis showed that patients in baseline NYHA functional class I~II had better prognosis. COX regression analysis showed that NYHA function class, edema, increased total bilirubin and troponin concentration and the PA/AO diameter ratio measured by echocardiogram are risk factors of pediatric IPAH (HR =2.310, 2.723, 1.066, 1.696, 3.719, P=0.028, 0.005, 0.001, 0.024, 0.030). While the existence of PFO/ASD, using bosentan and phosphodiesterase inhibitors, dual or triple therapy were protective factors (HR=0.563, 0.559, 0.603, 0.682, 0.044, P=0.169, 0.076, 0.115, 0.258, 0.220). In multivariate analysis only edema associated with decreased survival (HR=2.398, P=0.025).
Conclusion: Childhood idiopathic pulmonary arterial hypertension patients were seriously ill at visit. Worse cardiac function classification at visit associated with high mortality. Target therapy including using bosentan, dual or triple therapy improved survival. However, pediatric idiopathic pulmonary arterial hypertension is still a fatal disease with rapid progression and high mortality.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

8

Study on the IL-27 Gene Polymorphisms in Chinese Children with Kawasaki Disease

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Background: Kawasaki disease (KD) is the leading cause of acquired heart disease among children in developed countries. IL-27 is a member of the IL-6/IL-12 cytokine family with a broad range of anti-inflammatory and pro-inflammatory properties. Recent studies highlighted the effect of IL-27 in immune disease. We aimed to evaluate the associations between polymorphisms of IL-27 gene and Kawasaki disease in Chinese children.
Methods and Results: Genotyping for 8 SNPs of IL-27 gene (rs17855750, rs40837, rs26528, rs428253, rs4740, rs4905, rs153109, rs181206) was performed by direct sequencing of 100 KD patients and 98 healthy children controls. There was no significant difference in IL-27 genotypes between KD and control groups. However, among the 8SNps, a significantly increased risk of KD with coronary arterial lesions (CALs) was observed in the rs17855750 (T>G), rs40837 (A>G), rs4740(G>A), rs4905 (A>G), rs153109 (T>C), rs26528 (A>G). Especially the rs17855750(T>G), has a more frequency in KD with coronary arterial aneurysm.
Conclusion: These findings may be used as risk factors development of KD or for future generations of therapeutic treatments for KD.

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Predictors of Operability in Children with Pediatric Severe Pulmonary Hypertension Associated with Congenital Heart Disease

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Objective: This study aimed to evaluate prognosis and predictors for children with PAH-CHD underwent surgical correction with or without medicine.
Materials and Methods: The data were analyzed retrospectively for 59 children with severe PAH associated with simple CHD and underwent surgical correction, with or without postoperative medicines from May 2011 to June 2015 at Guangdong General Hospital. Regression analysis and receiver-operating characteristic (ROC) curve was utilized to evaluate the predictors of prognosis.
Results: Fifty-nine children (27 male, 32 female) 8 (4-14) years of age with severe PAH-CHD (PASP ≥70 mmHg) received heart catheterization (HC) and surgical correction, with or without specific anti-PAH drugs postoperatively. Median observation period was 49±20 months (range 24 to 78). Twenty-eight patients (50%) received ≥1 additional anti-PAH drugs after correction. At 2 years, the survival rate was 91.5% (54/59), 2 patients at risk, 3 lost to follow up, 12 patients (29%) still received >1 additional PAH-specific therapy, 42 (75%) had stopped drugs successfully, 2 (3.5%) had died, 1 underwent second thoracotomy for removing patch for VSD defect due to persistent pulmonary hypertension crisis (PHCS). WHO functional class, blood oxygen saturation, pulmonary artery pressure and pulmonary vascular resistance index are factors significantly associated with prognosis. The sensitivity and specificity of AVT criteria currently used for predicting outcome of pediatric PAH-CHD was low and different, we found pediatric PAH-CHD with PVR ≤6.65 WU • m^2 and PVR/SVR ≤0.39 during AVT with a good prognosis after surgical correction, and sensitivity and specificity of PVR, VR/SVR after nitric oxide (NO) inhalation is 0.983, 1.0 , 0.984, 1.0, respectively.
Conclusion: Although current AVT criteria are not suitable for PAH-CHD, PVR and PVR/SVR were excellent predictors for pediatric PAH-CHD. Repair-and-treat is an effective strategy and was recommended for pediatric severe PAH-CHD when PVR ≤6.65 WU • m^2 and PVR/SVR ≤0.39 after NO inhalation.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

13

Clinical and Genetic Profile of Congenital Long QT Syndrome in Hong Kong – 18-Year Experience in Paediatrics

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Introduction: Congenital long QT syndrome (LQTS) is a genetically transmitted cardiac channelopathy that can lead to lethal arrhythmia and sudden cardiac death in healthy young people. This study aims to report the clinical and genetic characteristics of all young patients diagnosed with LQTS in a Hong Kong single tertiary paediatric cardiology centre.
Methods: A retrospective review of all paediatric and young adult patients diagnosed at our centre with LQTS from January 1998 to December 2016 were performed. LQTS was established with a corrected QT interval 0.48, Schwartz scores 3 points or a presence of pathogenic mutation.
Results: Fifty-nine patients (33 boys) were included, with a mean age of 8.90 +/- 5.74 years at diagnosis. The mean follow-up duration was 5.33 +/- 4.65 years. Syncope was the most common form of initial presentation (23). Seven patients had ventricular tachycardia (VT) or ventricular fibrillation (VF) cardiac arrest on presentation. Fetal bradycardia and neonatal atrioventricular block were the modes of presentation in 3 infants. The mean corrected QT interval in our cohort was 0.504 +/- 0.047. 42.4% individuals had a positive family history. Thirdy-eight patients (64.4%) confirmed to have pathogenic mutation for LQTS genes (LQT1-10; LQT2-12; LQT3-7; LQT5-3; LQT8-5; LQT16-1). Forty-five (76.3%) patients were put on beta-blocker therapy. 70% of those presenting with dizziness, syncope or convulsion remained asymptomatic after being started on medical therapy and/or lifestyle advice.
Conclusions: 18-year experience in management of the largest cohort of LQTS patients in a Hong Kong tertiary paediatric cardiology centre is presented. Phenotype-genotype characteristics were described.

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Serum Levels of C1q/tumor Necrosis Factor Related Protein-1 in Children with Kawasaki Disease

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Objective: To investigate the serum C1q/tumor necrosis factor-related protein-1 (CTRP1) levels in children with acute Kawasaki disease (KD), as well as the relationship between CTRP1 levels and laboratory variables.
Methods: Eighty-seven children with KD and 38 healthy controls (HC) were included in this study. General characteristics were obtained from all subjects. Serum CTRP1 levels in all subjects and serum tumor necrosis factor-α (TNF-α), interleukin-1β (IL-1β), and interleukin-6 (IL-6) levels in KD patients were measured using enzyme-linked immunosorbent assay.
Results: Compared to the HC group, serum CTRP1 levels were significantly elevated in the KD group. Significantly higher serum TNF-α, IL-1β, IL-6, and CTRP1 levels were observed in patients with KD with coronary artery lesions (KD-CALs) than patients with KD without CALs (KD-NCALs). Serum CTRP1 levels were positively correlated with white blood cell counts (WBC), percentage of neutrophils (N%), thrombin time (TT), procalcitonin (Pct), TNF-α, IL-1β, and IL-6 levels. Meanwhile, CTRP1 levels were negatively correlated with percentage of leukomonocytes (L%) in KD patients. Furthermore, serum CTRP1 levels were positively correlated with the timepoint of intravenous immunoglobulin (IVIG), WBC, N%, TNF-α, IL-1β, and IL-6 levels in KD-CALs group.
Conclusion: CTRP1 may participate in the process of vasculitis and blood coagulation during the acute phase of KD.

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Using RNA-Seq to Explore the Pathogenesis of Restrictive Cardiomyopathy

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Objective: RNA-seq was used to study the mechanism of restrictive cardiomyopathy in mice with restriction cardiomyopathy caused by normal mice and cTnI mutation.
Method: The heart of 3 month old C57 mice and ctni 193 site mutant mice were extracted, all mRNA of myocardial tissue was transcribed into cDNA, PCR was amplified, high-throughput sequencing was carried out, the different expression genes were compared and the biological process in which they might be involved was analyzed by bioinformatics.
Result: A total of 26 differentially expressed genes were identified, 17 of which were high, 9 of which were low, and 41 KEGG biological pathways ($P<0.05$).
Conclusion: In the course of the restriction of cardiomyopathy caused by the mutation of CTNI gene, 26 gene expression differences were found, among which genes such as Ifi202b, Pik3ap1, Abhd1, Ctss, Itgb2, Tifab may be closely related to the progression of the restriction of cardiomyopathy, of which Pik3ap1 may cause the restriction of cardiomyopathy by regulating the P3K-Akt signaling pathway. This result provides us with new pathway and mechanism information for the comprehensive study of the specific pathogenic process of restrictive cardiomyopathy.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

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Inaccuracy of Doppler Echocardiography Estimates of Pulmonary Artery Pressure in Childhood with Congenital Heart Disease

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Background: Doppler echocardiography (D-ECHO) is the most critical, noninvasive imaging technique that is currently used for both the diagnosis and follow - up of congenital heart disease (CHD). In addition, D-ECHO is used as a noninvasive screening method and assessment tool to examine systolic pulmonary arterial pressure (sPAP). However, recent studies have demonstrated that D-ECHO produced inaccurate sPAP measurements in adults with structural cardiac defects. The goal of this study is to evaluate the ability of D-ECHO to accurately estimate sPAP in children with CHD.
Methods: We carried out a prospective study to compare sPAP measurements made by D-ECHO with right heart catheterization (RHC) in 397 children with CHD. Pearson correlation analyses were used to calculate the correlation coefficients between RHC and D-ECHO. Bland-Altman analyses were carried out to assess the agreement between the two methods.
Results: A total of 397 CHD children were prospectively enrolled in this study. We demonstrated a significant underestimation of sPAP by D-ECHO compared with RHC (-30.6±8.9 mmHg vs 27.6±7.2 mmHg; $p<0.01$). We observed a strong correlation (r=0.957, $p<0.01$) between sPAP (36.1±14.9 mmHg) and RVSP (36.0±14.5 mmHg) observed during RHC. However, only a relatively weak correlation (r=0.228, $p<0.01$) was observed between sPAP (36.1±14.9 mmHg) observed during RHC and RVSP (33.8±9.7 mmHg) as estimated using D-ECHO. The Bland-Altman analysis demonstrated that the bias for D-ECHO sPAP estimates was 1.4 mmHg with 95% limits of agreement ranging from -28.8 mmHg to 31.6 mmHg. A total of 63.8% of D-ECHO measurements were found to be accurate, with accuracy predefined as 95% of agreement within ±10 mmHg for sPAP estimates.
Conclusions: D-ECHO may provide inaccurate estimates of sPAP in childhood CHD.

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A Novel Mutation in Activin Receptor-Like Kinase 1 Gene in Childhood Idiopathic Pulmonary Arterial Hypertension

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Objective: To determine whether childhood idiopathic pulmonary arterial hypertension (IPAH) have mutations in activin receptor-like kinase 1 gene (ALK1) and bone morphogenetic protein receptor II gene (BMPR2).
Methods: Fourteen pediatric patients and their thirteen family members were enrolled in this study, and no consanguineous relationship among these pediatric patients. The promoters and exons of BMPR2 gene and ALK1 gene were directly sequenced, and the results were compared with the sequence of BMPR2 gene and ALK1 gene in GenBank. We also collected 106 healthy controls too.
Result: A novel missense mutation, a C-to-T transition at position 77 in exon 3, which encodes a Pro 26 Leu mutation, of the ALK1 gene, was identified in a female pediatric patient with idiopathic pulmonary arterial hypertension but without hereditary hemorrhagic telangiectasia (HHT). No ALK1 mutation was identified in the same position in 106 healthy controls. One missense mutation of BMPR2 gene in exon 11 (c.1447T>C:p.C483R) were detected in a female pediatric patient, another in exon 5 (c.621+8T>C) of BMPR2 were detected in a male patient's mother, and the last one in exon 10 (c.1322G>A:p.G441E) of BMPR2 were detected in a female patient's mother. All the three missense mutations have been reported.
Conclusions: A missense mutation in exon 3 of ALK1 gene was first discovered in pediatric patients with IPAH. The new missense mutation may be responsible for the development of idiopathic pulmonary arterial hypertension.

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Serum Levels of Syndecan-1 in Patients with Kawasaki Disease

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Background: Kawasaki disease (KD) is an acute systemic vasculitis with coronary artery lesions (CALs) being the major concern. Syndecan-1 (SDC-1) is a major core protein expressed on the glycocalyx of endothelial cells. Shed SDC-1 in serum is regarded as a biomarker for endothelial activation or damage.
Methods: In this study, we aimed to determine the serum levels of SDC-1 and evaluate the relationship between serum levels of SDC-1 and the CALs in the acute phase of KD. Serum SDC-1 levels were measured in 119 children with KD and in 43 healthy children as normal controls and in 40 children with febrile disease. All KD patients were administrated a single dose of intravenous immunoglobulin (IVIG) and aspirin P.O. within 10 days of KD onset.
Results: Serum levels of SDC-1, in addition to albumin and hemoglobin were significantly increased in patients with KD than in healthy controls and febrile controls. Furthermore, the serum levels of syndecan-1, albumin, and hemoglobin were significantly elevated in KD patients with CALs than those without CALs. Additionally, serum levels of SDC-1 were significantly correlated with levels of hemoglobin and serum albumin in patients with KD. After IVIG therapy, serum levels of interleukin (IL)-6, soluble cell adhesion molecules-1(sICAM-1), and resisitin were reduced while serum levels of SDC-1 were significantly increased in KD patients.
Conclusion: SDC-1 serum levels may mirror vascular endothelial damage and inflammation in KD. This might be utilized as a potential novel target for coronary artery protection in KD patients.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

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The Multi-factor Analysis of Postoperative Early Withdraw Ventilator Influencing in Infants with Congenital Heart Diseases

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Objective: To analyze related influencing factors for postoperative mechanical ventilation time in infants undergoing surgery with congenital heart disease.
Methods: The clinical data of 105 infants with congenital heart disease which monitored by pediatric cardiology ICU in the First Affiliated Hospital of Sun Yat-sen University were recorded. Retrospectively respectively analyze the relationship between the observed variables included preoperative, intraoperative, and postoperative influencing factors and postoperative early withdraw ventilator.
Results: (1) Non conditional logistic regression analysis of preoperative related influencing factors showed that preoperative cardiac function grade I was an independent factor, the value of OR (95%CI) was 3.9 (1.9-7.7). (2) Non conditional logistic regression analysis of intraoperative related influencing factors showed that the time of cardiopulmonary bypass (CPB) was an independent factor, the value of OR (95%CI) was 1.03 (1.02-1.04). (3) Non conditional logistic regression analysis of postoperative related influencing factors showed that the postoperative duration of anesthetic drugs using was an independent factor, the value of OR (95%CI) was 1.09 (1.05-1.13). (4) The ROC (Receiver Operating Characteristic) curve showed that the predictive value of the postoperative duration of anesthetic drugs using for early withdraw ventilator was 0.989 (SE=0.047).
Conclusion: The preoperative cardiac function grade I, the short time of CPB and the less duration of anesthetic drugs using were beneficial to the early ventilator weaning of infants undergoing reparative surgery for congenital heart disease. After comprehensive analysis with all preoperative, intraoperative, and postoperative influencing factors, the postoperative duration of anesthetic drugs using was an independent factor to influence the early ventilator weaning, with the good predictive value.

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Different Interventions in Treatment of Children Congenital Aortic Stenosis

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Objective: To evaluate the efficacy and safety of PBAV (percutaneous balloon artic valvuloplasty) with retrograde & antergrade way or right ventricular pacing in children.
Methods: This is retrospective clinical study including 32 children were treated with PBAV for congenital aortic stenosis from January 2008 to June 2017 in our institute. The general clinical data including residual stenosis and aortic stenosis again, and degree of artery injury, aortic regurgitation were particularly assessed.
Results: A total of 32 patients consisting of 27 boys and 5 girls underwent the procedure, with mean age (55.8±52) months (range from 20 days to 15 years) and the mean body weight (18.2±14) kg (range from 3.5 kg to 59 kg). Two infants accepted left cardiac catheterization through femoral vein and one has interventional indication then accepted PBAV through the patent foramen ovale .The others have been taken the retrograde way, including 24 case with right ventricular pacemaker quickly. The catheter-measured peak systolic the aortic valve gradient decreasing from (81.6±28) mmHg to (41.4±19) mmHg immediately after percutaneous interventional treatment (t=9.543, P=0.000). The peak systolic valve gradient of the pre-PBAV and the second day after PBAV measured by Doppler echocardiography was decreasing from (82.7±23) mmHg to (44.6±18) mmHg (t=11.732, P=0.016). The diameter of the aortic valve were (13.8±3) mm (range from 6.5 mm to 21.0 mm) and the balloon were (14.1±4) mm (range from 6 mm to 23 mm). The follow-up period was 1 to 72 months. The peak systolic valve gradient measured by Doppler echocardiography was increasing from (44.6±18) mmHg to (58.6±30) mmHg (t=-2.549, P=0.016). During the procedure, 5 children (14.7%) have accepted surgery for restenosis or regurgitation. Seven appeared regurgitation, one has femoral artery embolism and one death after the second day after the procedure.
Conclusion: PBAV have relaxation effect and improve the safety for children aortic valve stenosis with steps of normalization and tool diversification.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

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The Application of Modified Chinese Version of Duke Activity Status Index (DASI) in Congenital Heart Patients

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Background and Objectives: Assessment of exercise capacity has been part of the clinical evaluation in patients with congenital heart disease (CHD). However, its use is limited by the cost and availability of a well-equipped cardiopulmonary exercise laboratory and the trained expertise to conduct the test. Studies demonstrated the feasibility of using Duke Activity Status Index (DASI), a 12-items validated disease-specific self-reported questionnaire, to assess the functional capacity in patients with heart failure and patients after cardiac surgery. Regression equation has been derived to estimate the peak oxygen consumption (MVO2) using DASI. Our group has demonstrated its use in Chinese CHD patients in a preliminary study. We modified the item of DASI in order to decrease missing response. We aimed to report the performance of modified Chinese version of DASI in local patients with congenital heart disease.
Methods: The 12-items DASI questionnaire was translated into traditional Chinese and back-translated into English for comparison with the original English version. Modification was made to enhance the comprehension of the items in Chinese. One of the items (item 9) was modified in order to ensure better response in the activity of respective metabolic equivalents (METS). The translated DASI (C-DASI) and the modified DASI (C-DASIM) were administered during the period from May 2015 to August 2016 and from August 2016 to January 2018 respectively, to patients with CHD at the time just before their scheduled cardiopulmonary exercise test (CPET) on Treadmill using Bruce protocol in Queen Mary Hospital, Hong Kong SAR. Correlation between the DASI score, NYHA class, Warnes-Somerville Ability Index (WSAI), Disease complexity and CPET variables was assessed accordingly. Regression equation was estimated to predict peak oxygen consumption (VO2), exercise duration and peak heart rate (HR) during CPET.
Results: For the whole cohort, 18 patients had resting SpO2 ≤93%. One hundred and seventy four patients (71%) were in NYHA class I, and 12 patients (28%) in NYHA class II. For WSAI, 174 patients in grade 1 and 69 patients in grade 2. Most of the patients' heart were of moderate complexity (N=130), with 108 of great complexity and 5 of simple complexity. Severity was low in 107 patients, moderate in 99 patients and high in 37 patients. The mean peak VO2 was 27.92±6.59 ml.kg-1.min-1 and the mean exercise duration was 9.35±2.02 minutes. Peak VO2 was significantly lower in women, patients with desaturation, greater complexity, higher severity, worst NYHA class and WSAI grades (all <0.001 except complexity p=0.04). Ninety-three patients completed C-DASI and subsequent 150 patients completed C-DASIM. There was no difference in demographic and CPET variables between them. The mean C-DASI score was 42.31±11.18 and C-DASIM was 46.68 11.22. Internal consistency of the DASI items measured by Cronbach's alpha was higher in C-DASIM than C-DASI (0.810 vs 0.78). Missing response of item 9 was significantly lower in C-DASIM (4.77% vs 46.2%, p<0.001). C-DASIM was significantly correlated with peak VO2 (r=0.32, p=<0.001), exercise duration (r=0.41, p<0.001), peak HR (r=0.29, p<0.001), OUES (r=0.38, p<0.001), and VE/VCO2 slope (r=-0.28, p<0.001). Peak VO2, exercise duration and peak HR was predicted by C-DASIM in regression analysis respectively as: Peak VO2 (ml.kg-1.min-1) = 26.074+ 0.197 x DASI + 0.349 x Sex (1 if male) - 0.174 x Age – 0.197 x Cyanosis (1 if SpO2 ≤93%); Exercise duration (minute) = 7.419 + 0.060 x DASI + 0.26 x Sex (1 if male); Peak HR (bpm) = 178.474 + 0.172 x DASI - 0.263 x Age - 0.222 x Severity (1 if severity =3) - 0.214 x Cyanosis (1 if SpO2 ≤93%).
Conclusions: Chinese version of modified DASI (C-DASIM) is a feasible and convenient instrument to assess the functional capacity in Chinese patients with CHD. Further studies may help confirm its predictive power and follow-up assessment.

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3-Year Experience of Tilt Table Test (TTT) in Children with Recurrent Unexplained Syncope in a Local Regional Hospital

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Background: Recurrent unexplained syncope constitutes a significant portion of hospital admissions and neurally mediated syncope (NMS) is the most common cause of syncope in both adult and children. However, NMS has a wide range of presentation and classical history suggestive of NMS is not always present. Increasing evidences show that Tilt table test (TTT) is an important and useful test for diagnosing NMS for recurrent unexplained syncope cases. Data regarding the use of TTT in children is scarce and we would like to report our 3-year results of TTT.
Method: A retrospective chart review of 62 children with recurrent undiagnosed syncope underwent TTT from 01 January 2014 to 31 December 2016 was done in the pediatric department of a regional hospital in Hong Kong. The baseline characteristics, episodes of syncope, and clinical features suggestive of NMS were recorded. Patients were then divided into two groups according to the positive and negative TTT results and Chi square test was used to identify clinical factor which may be used to diagnose of NMS clinically in children.
Results: 28 out of 62 (45%) children had a positive TTT. Among 33 children with negative TTT, 8 children were found to have alternative diagnoses (6 postural orthostatic tachycardia syndrome (POTS) and 2 psychogenic syncope). There was no statistical significance difference regarding the baseline characteristics, episodes of syncope and clinical history suggestive of NMS between the two groups. No single clinical feature was found to be reliable in diagnosing NMS in children with recurrent unexplained syncope.
Conclusion: TTT is a safe and useful test in diagnosing and managing children with recurrent unexplained syncope as both positive and negative TTT results have their own clinical significance. Alternative diagnoses for recurrent syncope in children such as POTS and psychogenic syncope should also be considered.

ABSTRACTS

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Height, VKORC1 1173 and CYP2C9 Genotypes Determine Warfarin Dose for Pediatric Patients with Kawasaki Disease in Southwest China

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Background: Long-term oral warfarin is recommended in pediatric patients of Kawasaki disease with severe coronary artery lesions(CAL) or thrombogenesis, but heterogeneity is considerable. Metabolic enzyme genes about warfarin have been widely researched in adult cases. Few studies focused on the relationship between warfarin and genotypes in pediatric diseases, especially Kawasaki disease.
Aims: Our study aimed to analyze variables affecting warfarin dosage in Kawasaki disease including clinical characteristics and genotypes.
Methods: The enrolled individuals were divided into 4 groups as follows: 1) Group A: cases received warfarin; 2) Group B: cases with normal coronary arteries; 3) Group C: patients with small or medium-sized CAL; 4) Group D: normal children without Kawasaki disease. The relevant genotypes, CYP2C9 (*2 and *3 alleles), VKORC1(1173, -1639, 3730) and CYP4F2, were respectively detected in 4 groups by Beijing Genomics Institute. Genetic distribution was recorded and analyzed in each group. For 44 patients in group A, clinical characteristics and genotypes were collected and correlation between above columns and warfarin dose were detailed.
Results: There existed no statistical difference of mutation frequencies in CYP2C9, VKORC1 and CYP4F2 among 4 groups (total 194 cases). Multiple linear regression analysis has showed that height, VKORC1 1173 and CYP2C9 respectively accounted for 61.2%, 7.9% and 4.3% of dosing variability. Sex, age, weight, body surface area, target international normalized ratio, VKORC1 -1639, VKORC1 3730 and CYP4F2 made no contribution in the final model. The predicting formula of warfarin dosage: Y=-0.018 + 0.023*height(cm) - 0.653* VKORC1 1173TT -0.46*CYP2C9 *1/*3.
Conclusions: Height explained main individual variability of warfarin dosage in Kawasaki disease with severe CAL or thrombogenesis, and genotypes impact on warfarin dosage varied among studies. New formula should be built using data obtained from children if the benefit has been proven effective.

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Short Term Therapeutic Efficacy of Treprostinil in the Treatment of Pulmonary Arterial Hypertension Post-operation of Congenital Heart Disease in Children and Teenagers

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Objective: To evaluate short term therapeutic efficacy and analysis treatment strategies of pulmonary vasodilation therapy applying intravenous/subcutaneous Treprostinil for pulmonary arterial hypertension (PAH) post-operation of congenital heart disease (CHD) in children and teenagers.
Methods: A total of 7 patients were included. Three cases were post-operation of left-to-right shunt CHD, 4 cases were single ventricle physiology after bidirectional Glenn shunt or Fontan operation. All of the patients were treated with intravenous/subcutaneous Treprostinil infusion for 1~3 months. The therapy was carried out during perioperative period in 3 of the patients, for the rest of cases the therapy was carried out in non-perioperative period. Clinical symptoms, WHO functional class, NT-proBNP, echocardiography and were evaluated periodically to analysis its therapeutic efficacy and adverse effects.
Results: The mean maintenance dosage of Treprostinil was (16.07±4.04) ng/kg*min, and the median treatment duration was 1 (0.25, 3) months. In group perioperative period, symptoms of right ventricular dysfunction were relieved and WHO FC was significantly improved compared with pre-dosing level (P=0.014). The average RSVP declined significantly after the therapy [(120.0±1.4) mmHg vs. (47.5±3.5) mmHg, P=0.031]. In group non-perioperative period, patient No.7, who underwent bidirectional Glenn shunt, weaned from the therapy because of severe diarrhea. For the rest of 3 patients, compared with pre-dosing level, symptoms of edema and ascites were improved and abdominal circumference was significantly declined [(73.33±13.89) cm vs. (62.67±11.85) cm, P=0.04)], while level of NT-proBNP and WHO FC did not change significantly. Adverse effects were detected, including infusion site pain in 4 patients, epistaxis in 1 patient, and diarrhea in 1 patient.
Conclusion: Short term administration of intravenous/subcutaneous Treprostinil for PAH post-operation of CHD in children and teenagers, especially during perioperative period, can significantly relieve symptoms of right ventricular dysfunction and improved WHO FC. For patients in non-perioperative period, earlier and longer treatment of Treprostinil may help improve therapeutic effect.

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Application of Grown-up Congenital Heart Self-Assessment Questionnaire (GUCH-SAQ) to Identify and Improve Knowledge Gap and Self-Management in Patients with Congenital Heart Diseases

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Background and Objective: Improved management of congenital heart diseases in children leads to substantial survival to adulthood. Transition from paediatric services to adult services represents an important aspect of care. One of the tasks in transition is to improve their knowledge and self-management. Studies showed that grown-ups with congenital heart (GUCH) had inadequate knowledge and perception about their condition and care, which has been implicated in inconsiderable consequences. There is lack of local data on patients' knowledge and self-management among GUCH. The current study aims to explore patients' knowledge, perception and their self-management using a structured questionnaire in local GUCH.
Methods: GUCH (18 years or above) who first attended Adult Congenital Heart Disease Clinic in Queen Mary Hospital were asked to complete the Grown-up Congenital Heart Self-Assessment Questionnaire (GUCH-SAQ), an self-administered questionnaire on the knowledge and perception of their congenital heart disease, and respective self-management. Patients' responses were assessed according to published management guidelines or cardiologists' assessment.
Results: Ninety patients (Male =52) with mean age of 24.9±6.7 years (range: 18 May 2017 to February 2018. Disease complexity was mild in 15 (17%), moderate in 53 (59%) and severe in 22 (24%). Fifty-five patients (61%) could tell the name of their heart diseases either fully correct (n=27, 30%) or partially correct (n=28, 31%); 30 (33.3%) patients could not recall and 5 (5.5%) gave the wrong name. Seventy-eight patients (86.7%) had cardiac surgery; 8 patients (9%) recalled correctly the surgery and 14 (18%) partially correct. Disease severity was correctly perceived in 31 (34%) patients. Nineteen patients (21%) reported that they received information about their heart diseases from doctors only. Patients who received information from doctors only reported higher correctness on their perceived severity (χ^2 = 10.9, df 4, p=0.028). Sixty-six (73%) patients knew recommendation on participation in vigorous exercise, 82 (92.1%) in moderate exercise, and 64 (72%) in contact sports respectively. Seventy-four patients (82%) did not know about endocarditis. Among 22 patients who should require prophylactic antibiotic, 5 (22.7%) thought that they didn't require, and 7 (32%) did not know. Modified WHO pregnancy risk class was I in 8 patients (21.1%), II in 21 (%), III in 6 (15.8%) and IV in 3 (7.9%). Seven (19%) under-estimated and 16 (43%) over-estimated their pregnancy risk.
Conclusions: The GUCH-SAQ allows systematic assessment of patients' knowledge, perception and respective self-management; and this revealed deficit in all these aspects among local GUCH. This calls for strategies to provide more structured education and transition care.

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Quality of Life and Individual Attributes in Grown-up Congenital Heart Disease (GUCH)

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Background and Objectives: Quality of life (QOL) among patients with congenital heart disease is increasingly recognized. Studies suggested heterogeneity of physical and psychosocial predictors on QOL. Current study aimed to examine QOL and its relationship with individual clinical and psychological attributes among grown-ups congenital heart disease (GUCH).
Methods: Local Chinese GUCH patients (N=208, male =103) were recruited to complete self-administered questionnaires: 36-items Short Form Health Survey version 2 (SF36), satisfaction with life scale (SWLS), Connor-Davidson Resilience Scale (RISC), Hospital Anxiety and Depression Scales (HADS), and NEO Five Factor Inventory (NEOFFI-3), and were compared to control subjects (N=104, male=41). GUCH patients also completed Brief Illness Perception Questionnaire (BIPQ). Disease complexity, illness severity, New York Heart Association (NYHA) class and Warnes-Somerville Ability Index (WSAI) were retrieved from patients' record. Correlation analysis and multivariate regression was performed to identify the predictors of SWLS and SF36.
Results: GUCH patients had lower SWLS, SF36-physical component summary (SF36-PCS) and RISC (all $p<0.001$), and greater depression ($p<0.05$) than control subjects. Among GUCH patients, greater disease severity was associated with lower SF36-PCS and SF36-mental component summary (SF36-MCS) respectively (both $p<0.01$). Higher WSAI was associated with lower SWLS, SF36-PCS, and SF36-MCS respectively (all $p<0.01$). SWLS, SF36-PCS, and SF36-MCS were correlated with RISC, HADS, and illness perception respectively (all $p<0.001$). RISC was positively correlated with positive illness perception ($p<0.01$). RISC, several domains (Consequences, Concern) of BIPQ, and neuroticism were predictors of SWLS respectively (all $p<0.05$). WSAI, RISC, and BIPQ (Consequences) were predictors of SF36-PCS respectively (all $p<0.05$). Neuroticism, anxiety and depression were predictors of SF36-MCS respectively (all $p<0.01$).
Conclusions: Reduced QOL among GUCH patients was associated with both physical and psychological attributes. Resilience and illness perception might play an important role and might be potential targets for improving QOL in these patients.

ABSTRACTS

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The Role of Body Mass Index – Is a "Fat" Boy Prone to Coronary Artery Lesions in Kawasaki Disease?

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Purpose: The aim of this study was to determine whether body mass index (BMI) exerts a predicable role in coronary artery lesions (CALs) in children with Kawasaki disease (KD).
Methods: The clinical data were analyzed in 569 children who were diagnosed as KD for the first time and exclusive of reccurent cases from December 2016 to March 2018 in Guangzhou Women and Children's Medical Center. Echocardiogram was carried out at the acute stage. Receiver operating characteristic curve (ROC) analysis was performed for the prediction of BMI in CALs.
Results: In total, 362 boys and 207 girls aged from 3.92 months to 13.62 years old were enrolled in the study. Boys had similar age, weight, height and length of hospital stay, but higher BMI ($p<0.05$) and higher CALs morbidity ($p<0.01$) when compared with girls. CALs children had higher BMI [(16.40± 1.62) kg/m^2 versus 15.81±1.74) kg/m^2], younger age, lower weight and height but longer length of hospital stay than non-CALs (nCALs) children (all $p<0.01$). A BMI cut-off of 15.24 kg/m^2 provided a sensitivity of 79% and a specificity of 42.3% for predicting CALs in KD. A regression formula was made including BMI, gender, age, height and weight. Eventually the variables entered were BMI, gender and height in the equation as the sensitivity and the specificity went up to 80.9% and 53.9%, respectively.
Conclusions: Boys have a tendency of CALs in KD. BMI may be a potential predictor for CALs in KD children, and a "fat" boy with higher BMI is prone to CALs.

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Clinical Value in Diagnosis of Supravalvular Aortic Stenosis in Children by 2D Echocardiography

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Objective: The left ventricular outlet obstruction above the opening of the coronary artery is a sort of rare congenital heart disease. It is aimed to explore the clinical value of echocardiography in the diagnosis of congenital supravalvular aortic stenosis (SVAS) in children.
Methods: Nine children with SVAS were studied by 2D echocardiography. The images from parasternal long axis, parasternal short axis, apical four-chamber, apical five-chamber and suprasternal fossa aortic arch long axis views were collected. The following contents were scanned: left ventricular outflow tract, aortic valve leaflets, aortic annulus, valsalva sinus, sinus aorta junction, ascending aorta, aortic arch, descending aorta; origin, path and diameter of left and right coronary artery; pulmonary valve, pulmonary artery and branch; size, thickness and activity of atrium and ventricle, morphology and function of mitral and tricuspid valve. Followed by color Doppler mode observation: blood flow of left ventricular outlet, aortic valve and aorta; blood flow of pulmonary valve, pulmonary artery and branch; blood flow conditions of mitral and tricuspid valve; abnormal shunt blood flow signals of ventricular and atrial septum. Pulse or continuous Doppler spectrum were taken at the stenosis part to measure blood flow peaks velocity and pressure gradient. In addition, children with ideal acoustic window conditions were further scanned to observe stenosis or dilation of the aortic arch branch. The findings were compared with other imaging findings.
Results: The stenosis range of the nine cases was different, but all involved the sinus aorta junction with thickening of the ascending aorta wall. All the children had other cardiovascular malformations. The most common malformation is the stenosis of the pulmonary artery branch. The degree and range of stenosis varied significantly. The direct complications observed by 2D echocardiography are widening of coronary artery and left ventricular hypertrophy. The results of 3 children who underwent CTA examination were completely consistent with those seen with echocardiography. The results of echocardiography in 4 children who could follow-up showed no significant changes of stenosis as the rising of them.
Conclusions: 2D echocardiography is the first choice in diagnosing, evaluating degree and scope of stenosis and making a follow-up visit of SVAS in children.

ABSTRACTS

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An Analysis of the Clinical and Pathological Characteristics of Fifteen Children with Constrictive Pericarditis

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Objectives: To study the clinic characteristic and pathologic features of constrictive pericarditis in children.
Methods: Data from patients with constrictive pericarditis who admitted to our hospital from 2003 to 2015 were retrospectively analyzed.
Results: Fifteen cases were diagnosed with constrictive pericarditis in our hospital. The positive signs included 8 cases of hepatomegaly, 8 cases of peritoneal effusion, 5 cases of jugular vein engorgement, and 3 cases of odd veins. The chest radiograph revealed 6 cases of pleural effusion and 3 cases of pulmonary congestion. Echocardiography showed 7 cases of constrictive pericarditis, 7 cases of double atrial enlargement, 5 cases of mitral regurgitation, 6 cases of tricuspid regurgitation, 4 cases of pericardium thickening, and 3 cases of widen inferior vena cava. The coincidence rates of cardiac ultrasound, cardiac CT, and surgical diagnosis were 46.7% (7/15) and 83.3% (10/12). Etiological examination: 4 cases were suspected of tuberculosis infection, 1 case of Staphylococcus aureus infection, and the remaining etiology was unknown. Ten cases underwent radical pericardiectomy and pathologic diagnosis during the period. One case was suspected of "constrictive pericarditis" for pericardial fenestration before operation. There was no death in all patients. Five children didn't have surgery. The pathological evidences were nonspecific inflammation showed fibrous connective tissue hyperplasia, hyaline degeneration, vascular proliferation, congestion and hemorrhage, exudation or cellulose deposition, lymphocytes and neutrophil infiltration and calcification, no caseous necrosis, epithelioid granulomas, epithelioid cell nodules and multinucleated giant features of tuberculosis. Clinical symptoms of the patients disappeared and the growth and development returned to normal.
Conclusions: Constrictive pericarditis is uncommon in children. The positive rate of echocardiography was low. Computed tomography is a better diagnosis tool. The final therapy of the constrictive pericarditis is the radical pericardiectomy. Major pathological changes are nonspecific inflammation. For suspected cases, pericardial fenestration is a desirable transitional treatment.

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Deacetylation Mediated by HDAC1 Regulates the Expression of Cardiac Tropnoin I

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Cardiac tropnoin I (cTnI) is an essential structural protein in cardiomyocytes, which plays a critical role in the regulation of diastolic function. We previously identified that cTnI low expression induced by histone deacetylation might be one of the causes of cardiac diastolic dysfunction in ageing hearts. And histone deacetylase 1 (HDAC1) might play an important role in this progress. In order to elevate cTnI expression and investigate a way to prevent cardiac diastolic dysfunction in ageing mice, we down-regulate and up-regulate HDAC1 in cardiomyocytes of newborn mice, respectively. And our experiments proved that HDAC1 could repress the acetylation on histone 3 near cTnI promoter and inhibit transcription of cTnI. Wonderfully, knockdown of HDAC1 could elevate cTnI expression by suppressing acetylation of histone 3 near cTnI promoter. These findings provide new insights into histone deacetylation mechanisms of cTnI that may contribute to the prevention of cardiac diastolic dysfunction in aging populations.

ABSTRACTS

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The Clinical Characteristics of Kawasaki Disease in Children Older than 10 Years Old

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Background: Kawasaki disease (KD) predominantly affects children aged 6 months to 5 years old. The clinical manifestations of KD patients in extreme age spectrum (<6 months or >10 years) are always atypical, which substantially lead to delay in the diagnosis of KD, impede prompt IVIG treatment and develop a higher risk of coronary artery lesions (CAL). In recent years, the pediatricians' recognition and awareness of KD patients under 6 months have significantly improved. However, studies focusing on KD patients older than 10 years are extremely lacking.
Objectives: To summarize the clinical characteristics of KD patients older than 10 years in our medical center, aiming to improve the recognition and awareness of KD patients in this age spectrum for pediatricians, particularly in underdeveloped areas.
Methods: The clinical data of KD patients older than 10 years old at West China Second Hospital of Sichuan University between January 2007 and July 2017 were retrospectively analyzed. On the basis of the patients' first hospitalization, those patients were divided into two groups: group A, whose first hospitalization was our hospital, while group B, who were transferred from their local hospital or community health center.
Results: A total of 17 KD patients older than 10 years old were identified, with a constituent ratio of 0.8% (17/2118). It included 13 males and 4 females, aged from 10.1~13.5 years (median age, 11.8 years), 58% (10/17) were 10~11 years of age, 18% (3/17) were 12~13 years of age, 24% (4/17) were older than 13 years of age. Those patients had a high incidence of atypical clinical manifestations, such as gastrointestinal (58.8%), respiratory symptoms (47.1%), neurological (35.3%), genitourinary (35.3%), musculoskeletal symptoms (23.5%), and the incidence of incomplete KD referred to 47.1% (8/17). Most of them were initially misdiagnosed as tonsillitis, upper respiratory infection, lymphangitis, pneumonia, infectious diarrhea, sepsis and viral exanthema, suspicious of intracranial infection and allergic rash. The median time at diagnosis from symptom onset were 10.2 days, 47.1% (8/17) patients had not got a does 2 g/kg of IVIG as a standardized therapy. 17.6% (3/17) patients presented to be resistant to IVIG and further received steroid treatment. 29.4% (5/17) patients developed CAL, but most regressed finally. With similar baseline information and relative prevalence of atypical KD, patients from group B had a significant longer fever duration before diagnosis and IVIG treatment (13.8±8.1 vs. 5.1±1.8, P=0.08; 12.3±5.1 vs. 7.9±2.0, P=0.028), higher incidence of CAL (40.0% vs. 14.3%, P<0.001), in comparison with that of group A.
Conclusions: The constituent ratio of KD patients older than 10 years old was relatively low. The clinical features of those patients were atypical, diverse and had a high incidence of misdiagnosis. However, the diagnosis of KD should still be highly suspected for patients >10 years old with prolonged fever more than 5 days. The high incidence of IVIG resistance and CAL might associated with paediatrician' poor recognition and subsequent delay and/ or not standardized IVIG treatment.

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The Combination of Neutrophil-to-Lymphocyte Ratio and Platelet-to-Lymphocyte Ratio as a New Risk Score for Intravenous Immunoglobulin Resistance in Kawasaki Disease: A Prospective Study

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Background: Approximately 10%-20% of Kawasaki disease (KD) patients might present to be resistant to initial IVIG, developing a substantial risk of coronary artery lesions (CAL). It is important for clinician to predict KD patients with a risk of IVIG resistance before the initial therapy. Several retrospective studies with relatively small sample size have suggested the effectiveness of neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) in predicting IVIG resistance. However, prospective studies with a larger sample size in different population are still lacking.
Method: A prospective study at West China second hospital of Sichuan university from January 2015 and December 2017 was performed to compare the NLR and PLR between IVIG- resistance (n=101) and IVIG-response (n=441) and evaluate its validity for predicting IVIG resistance by comparing with the Kobayashi, Egami and Sano risk-scoring systems.
Results: The logistic regression analysis revealed that NLR and PLR were independent risk factors for predicting IVIG resistance. ROC curve analysis identified the best NLR and PLR cut-off value was 3.37 (AUC=0.614, P<0.001) and 124 (AUC=0.605, P=0.001), respectively. Their sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy were 0.59, 0.61, 0.25, 0.87, 0.61 and 0.56, 0.65, 0.27, 0.87, 0.63, respectively. The combination of NLR ≥3.37 and PLR ≥124 showed a relatively high sensitivity (0.48), negative predictive value (0.86), and relative low specificity (0.73), positive predictive value (0.29) and diagnostic accuracy (0.68), while the Kobayashi, Egami and Sano risk-scoring system showed relative low sensitivity (0.34, 0.20 and 0.30 respectively) and negative predictive value (0.85, 0.84 and 0.84 respectively), high specificity (0.95, 0.84 and 0.85 respectively), positive predictive value (0.32, 0.45 and 0.31 respectively) and diagnostic accuracy (0.82, 0.75 and 0.75 respectively).
Conclusions: The combination of NLR ≥3.37 and PLR ≥124 was an effective marker for IVIG resistance prediction.

ABSTRACTS

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Value of Color Doppler Ultrasound in the Diagnosis of Prenatal Pulmonary Sequestration

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Objectives: To analysis the ultrasonic manifestations of fetal pulmonary sequestration (PS) and investigate the diagnosis value of Color Doppler ultrasound for the fetal PS.
Methods: A Voluson E8 three-dimensional color Doppler ultrasonic apparatus was used to screen fetus abnormality in approximately 1,500 pregnant women in metaphase and terminal period A fetal four-chamber view, sagittal section of thorax, and coronal section were used to thoroughly observe the shape and size of fetal lung tissue and their surrounding tissue, to check whether there are abnormal echo, and observe the shape, size, blood supply type and whether combined with other deformities.
Results: Three cases of fetal PS was detected in a total of 1,500 cases. In the three case, one was extralobar PS combined with diaphragmatic hernia, one was extralobar PS combined with Type II congenital cystic adenomatoid, and the other was intralobar PS; two of them located in right pleural, one of the in the left pleueal. In the three of them, two accompany with the heart compressed and shift. The blood supply of two were originate from descending aorta, the other was from branch of aortic arch. All three pregnant patients under went induced labor and PS diagnosis of their fetuses was confirmed by autopsies and pathological examinations.
Conclusions: Color Doppler ultrasound can serve as an effective tool for prenatal diagnosis of PS. It can provides important reference value for clinical in early diagnosis and treatment of fetal PS.

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Identification of the Functional Enhancers in DLL1 Gene Promoter

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Background: DLL1 was the ligand of Notch signal pathway which plays an important role in the normal development of second heart field. The abnormal expression of DLL1 was observed in the TOF tissue. However, little is known about the regulation mechanism of the DLL1 gene expressions in TOF patients.
Objective: Screening and identification of the functional enhancers in DLL1 gene promoter.
Methods: The protein level of DLL1 was confirmed by immunohistochemical (IHC) staining. ECR Browser was used to figure out potential enhancers in DLL1 promoter region. Luciferase transfect assay and transgenic zebrafish models were performed to analysis the function of the enhancers. Alggen was used to predict potential transcription factors binding site.
Results: The decreased expression of DLL1 showed decreased significantly in TOF patients ($P<0.05$). The luciferase activation of vector containing enhancer 1# and enhancer 2# was increased compared with pGL3-promoter (relative luciferase activation increased about 1.2-fold in 3T3, and 2.0-fold in H9C2, $P<0.05$). The luciferase activation of vector containing enhancer 1# was also increased (about 1.4-fold in 3T3 and 2.3-fold in H9C2, $P<0.05$). However, luciferase activation of enhancer 2# alone showed no difference with pGL3-promoter. In transgenic zebrafish models, the DLL1-enhancer 1# construction showed expression of GFP in heart ($P<0.0001$).
Conclusion: The functional enhancer region (enhancer 1#) ranging from -515 bp to -276 bp upstream to transcription start site of DLL1 gene may be responsible for the gene expression.

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Catheter Ablation of Ventricular Arrhythmias Originating from the Pulmonary Sinus Cusp in Pediatric Patients

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Purpose: The purpose of this study was to assess the characteristics, mapping and ablation of VAs arising from the PSC in pediatric patients.
Methods: We conducted a study of 10 children undergoing successful ablation of VAs originating from the PSC. Clinical, echocardiographic, and ablation data were reviewed.
Results: The weight of these 10 patients were from 30 to 63 kilogram. Nine patients had structurally normal hearts. One patient had transposition of the great arteries and underwent the arteria switch operation. The initial ablation was performed in the right ventricular outflow tract (RVOT) or the aortic sinus cusp and failed to terminate the VAs in 8 patients. The successful ablation site was in the right cusp (RC) in 5 patients, the anterior cusp (AC) in 2 patients, the left cusp (LC) in 1 patient, between the RC and the LC in 1 patient. The earliest potential recorded at the PSC ablation site preceded the onset of QRS complex during VAs by 29.4±4.9 ms. Two patients have the ventricular tachycardia (VT) originating from RVOT, and have the presence of Ventricular Late Potentials.
Conclusions: The VAs showed LBBB morphology and inferior axis maybe originated within the PSC in children. When an early local ventricular activation could not be found in the RVOT, the mapping in PA could be considered routinely.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

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The Pulmonary Hypertension Management after the Biventricular and Univentricular Procedure: The Preliminary Experience of Intravenous Remodulin

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Objectives: Remodulin is a kind of prostacyclin analogs and one of the pharmacotherapeutic options for pulmonary artery hypertension (PAH). The experience about Remodulin used in the postoperative treatment for congenital heart defects (CHD) is rarely reported.
Methods: We retrospectively reviewed the records of 14 consecutive patients who underwent open heart operation from January 2017 to January 2018. Seven patients underwent Fontan operation and seven patients underwent biventricular repair. The initial dose of intravenous Remodulin was 5 ng/kg/min, then added 5-10 ng/kg/min every 10-20 minutes and maintained the dose of 25-40 ng/kg/min.
Results: There was no hospital mortality in Fontan group. Two deaths occurred in biventricular group due to non-PAH cause. In Fontan group, the median number of central venous pressure was lower after using venous Remodulin (22 vs 15 mmHg, $p<0.001$) as well as the systolic systemic pressure had no significant change (100 vs 102 mmHg, $p>0.05$). The patients in biventricular group accepted the therapy of intravenous Remodulin in the operation room. They had high mean pulmonary pressure and decreased significantly with the therapy of Remodulin (40 vs 25 mmHg, $p<0.001$). Meanwhile, the ratio of systolic pulmonary pressure and systemic pressure decreased significantly (0.96 vs 0.45, $p<0.001$). No obvious drug related bleeding complications.
Conclusions: Remodulin is beneficial for patients with PAH. The therapy of intravenous Remodulin has improved early outcomes after the Fontan procedure. The decrease of central venous pressure was obvious. The withdrawing of ventilator was easier. The measure of mean pulmonary artery pressure decreased in biventricular group treated by intravenous Remodulin, but the outcome of biventricular group was influenced by many factors.

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LPIN1 Mutation: A Rare Cause of Sudden Cardiac Death in Children

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LPIN1 Mutation: A Rare Cause of Sudden Cardiac Death in Children K.Y. Ng, S.F. Ng, W.L. Yiu, N.C. Fong. Princess Margaret Hospital, Hong Kong.
Purpose: Homozygous LPIN1 mutation is associated with recurrent rhabdomyolysis and high mortality by sudden death. We report a case of fatal rhabdomyolysis and cardiac arrhythmia in a child with LPIN1 mutation. Vigilance for this disease and early intervention is important. Cardiac investigations and follow up should be offered.
Case Report: The patient was born to consanguineous Pakistani parents. From 2 years of age, he had two episodes of acute rhabdomyolysis precipitated by viral illness. Plasma creatinine kinase (CK) peaked up to 149645 U/L. Blood parameters normalized with hyperhydration. He had no interval symptoms. At five years old, he presented with acute collapse following acute bronchitis. ECG showed widened QRS complexes with tall T-waves, progressing shortly to ventricular tachycardia and leading to death. Initial serum potassium was 6.7 mmol/L. Bloods during resuscitation showed elevated CK to 10150 U/L and potassium to 11.0 mmoL/L. Para-mortem muscle biopsy showed features of acute rhabdomyolysis and lipid storage disease related to LPIN1 mutation. Post-mortem genetic analysis showed a homozygous non-sense mutation in the LPIN1 gene (NM_145693.2 (LPIN1): c. 1162C>T (p.Arg 388*).
Conclusion: LPIN1 mutation may lead to acute rhabdomyolysis and fatal cardiac arrhythmia. ECG changes can occur despite initial subnormal serum potassium. Previous death cases have demonstrated adipocyte or lymphoplasma cellular infiltration in the myocardium, and dilated cardiomyopathy. The high mortality rate of LPIN1 mutation, probably related to cardiac arrhythmia and cardiomyopathy, warrants further study. High index of suspicion for LPIN1 mutation is needed in managing children with severely elevated plasma CK levels. When the diagnosis is confirmed, cardiac investigations and genetic screening should be done. Prompt management and prevention of catabolism during rhabdomyolysis may prevent critical rhabdomyolysis and cardiac death.

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Percutaneous Coronary Intervention in a 6-Year-Old Boy after Kawasaki Disease: A Case Report

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Percutaneous coronary intervention in a 6-year-old boy after Kawasaki disease: A case report Introduction: Coronary artery stenosis in a severe sequala resulting from Kawasaki disease. Though percutaneous coronary intervention (PCI) and coronary artery bypass grafting (CABG) have been described as treatment of stenotic lesions in several previous studies, the optimal technique of obtaining restoration of coronary flow in young patients is still not known. We present a case achieving revascularization by stent implantation in a 6-year-old boy after Kawasaki disease. Case Presentation: A 6-year-old boy, diagnosed with Kawasaki disease at the age of 1, lacking regular reexamination, developed ventricular fibrillation and went through electric defibrillation in recent days. Electrocardiography indicated anterior myocardial infarction, cardiac CT showed stenotic lesions in left anterior descending artery (LAD) and right coronary artery (RCA). Selective coronary angiography revealed totally occluded LAD and aneurysm followed by critical stenosis in RCA. Balloon angioplasty and stent implantation were subsequently performed in these two arteries. The size of drug-eluting stent deployed in LAD and RCA were 3.5 mm*38 mm and 4.5 mm*12 mm, respectively. Intravascular ultrasound (IVUS) was performed after implantation, revealing that the stents fitted into the vessel wall snugly and no vascular complication occurred. Angiography showed significant improvement in coronary flow. Patient recovered well postoperatively and no symptoms arose at 4-week visit. Conclusion: Procedure of coronary stent implantation can be safely performed in pediatric patients as young as 6 years old, revealing an encouraging short-term result. Close long-term follow-up is necessary in evaluating the efficacy of PCI in stenotic lesions after KD.

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Ablation for Accessory Pathway-Related Cardiomyopathy in Children: Case Report and Literature Review

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Ablation for Accessory Pathway-Related Cardiomyopathy in Children: Case Report and Literature Review Abstract In children, atrioventricular accessory pathway (AP) is often revealed by atrioventricular reentrant tachycardia episodes and the Wolff-Parkinson-White (WPW) pattern on electrocardiographic which indicates the ventricular preexcitation. Rarely, this syndrome can be the cause of acquired dilated cardiomyopathy (DCM) and congestive heart failure (HF), resulting from either rapid ventricle frequency or ventricular dyssynchrony due to the accessory pathway. Experience on evaluation and therapeutic option of radio-frequency ablation (RFA) for AP-related cardiomyopathy in children is limited. We present 4 critical paediatric cases in our department (aged from 4-month-old to 8-year-old)of AP-related cardiomyopathy with different clinical features including: symptomatic sustained supraventricular tachycardia presenting as tachycardia-induced cardiomyopathy (TIC), initially misdiagnosed as congenital membranous ventricular septal aneurysm (MVSA), administered medicine therapy for DCM with progressive HF for 2 years and aborted sudden cardiac death (SCD) with neither arrhythmia nor any other heart desease record previously. All of these cases underwent RFA with myocardial dysfunction improved post-ablation. We performed TTE and EP study on these patients. The accessory pathway location was classified by the ECG feature and the site of successful catheter ablation in each case. A literature review is discussed. Although TIC and W-P-W syndrome combined with DCM are well reported, there still remained several special clinical considerations for paediatric cardiologist. Physicians should be aware of the different types of APs with/without tachycardia that might be associated with cardiomypathy and HF. Even in the infant/toddler group, ABL might be the first line of therapeutic options for AP-related cardiomyopathy.

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Clinical Characteristics and Outcomes of Complete Left Bundle Branch Block Developed after Device Closure of Peri-Membranous Ventricular Septal Defect

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Objectives: The study retrospectively reviewed the clinical characteristics and outcomes of patients with complete left bundle branch block (CLBBB) developed after percutaneous closure of peri-membranous ventricular septal defect (pmVSD), discussed the therapeutic and prophylactic methods and guided the clinical practices.
Methods: There were 3521 patients who underwent percutaneous device closure of pmVSD in our medical center, from January 2003 to November 2017, while 15 cases developed CLBBB (0.43%). Another 2 patients with CLBBB who had received interventional therapies in other centers were referred to our department for further managements. Among them, 5 cases had CLBBB in 24 hours after the procedures, 5 cases had in 1 to 3 months and 3 cases had in 3 to 6 months. 4 patients developed CLBBB more than 6 months after the procedure and the latest case happened in 25 months post-therapy which was set as the time point in this follow-up study. That patient had incomplete right bundle branch block (IRBBB) found by electrocardiogram (ECG) in his 1-year follow-up. In our medical center, patients routinely received antiplatelet therapy after the procedures. Patients with CLBBB transiently or developed in early stage after the procedures had corticosteroid (Methylprednisolone) intravenously for 3-5 days. Patients had echocardiography, ECG or Holter examination regularly in follow-ups.
Results: Totally 17 patients with CLBBB were in follow-ups. The follow-up time varied from 5 months to 149 months. 4 patients recovered and had normal ECG results after conservative therapies. 3 patients required remove of devices by surgical repairs and had ECG result of complete right bundle branch block (CRBBB). Nine patients had persistent CLBBB despite appropriate managements while 2 of them had cardiac enlargements and 1 with left ventricular dysfunction, finally failed to resuscitate and died. The remaining case had intermittent CLBBB in Holter examination.
Conclusions: CLBBB is the severe arrhythmia complicated by cardiac intervention therapy and is required more attention. Device closure is not recommended when CLBBB happen during the procedure. It is suggested to remove the device as soon as possible when CLBBB develop early after procedure. Persistent CLBBB is the risk factor of developing cardiac enlargement and dysfunction even death. Therapeutic methods in time is required, otherwise missing the appropriate time of management. For patient with CLBBB developed after devices closure of pmVSD, routine follow-up regularly is suggested no matter it has recovered or not after receiving appropriate treatment.

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Successful HeartWare VAD Implantation for a Failing Single Ventricle Circulation in an Adolescent Boy

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Nowadays many children with single functional ventricle being treated with the Fontan procedure survive into adulthood. Despite improvements in operative techniques and follow-up medical care some Fontan circulations will progressively deteriorate including dysfunction of the systemic ventricles. The ability to use a fully implantable ventricular assist device in such children can improve the haemodynamic conditions, restore their health into pre-morbid levels, and allow rehabilitation and preparation for future heart transplantations. We report the case of an adolescent boy suffering from Fontan failure being treated with a successful implantation of an adult HeartWare device.

ABSTRACTS

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Prevention of Epigallocatechin Gallate on Decreasing Expression of Cardiac Troponin-I in Aging Mice Hearts and Its Mechanism

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Methods: Expression levels of cTnI mRNA and protein were detected by using RT-PCR and Western blot assays in each age group. A total of 32 C57 BL/6 female mice of 12 month old were randomly divided into the blank group, the EGCG low-dose group [EGCG-L, 50 mg/(kg.d)], the EGCG medium-dose group [EGCG-M, 100 mg/(kg.d)] and the EGCG high-dose group [EGCG-H, 200 mg/(kg.d)]. Mice from EGCG intervention groups were treated with EGCG by water for 6 months. The female mice at age of 3-month were chosen as the young group. The cTnI and HDAC1 mRNA expression were measured by RT-PCR. The protein level of cTnI was determined by Western blot. The binding level of acetylated lysine 9 on histone H3 (AcH3K9), HDAC1, transcription factors GATA4 and Mef2c near cTnI's promoter was identified by CHIP-Q-PCR.
Results: During the aging process, both expressive levels of cTnI mRNA and protein of 16-month-old mice began decreasing when compared with 12-month-old mice ($P<0.05$). After EGCG intervention, the HDAC1 expression and the binding level in cTnI's promoter region in the EGCG-H group were lower than those in the blank group ($P<0.05$). In the blank group, AcH3K9 levels in cTnI's promoter region and binding levels of GATA4 and Mef2c were decreased, respectively. In the EGCG-H group, AcH3K9 levels, GATA4 and Mef2c binding levels in the proximal promoter region of cTnI gene were increased (all $P<0.05$). Expressive levels of cTnI mRNA and protein in the EGCG-H group were higher than those in the blank group (all $P<0.05$).
Conclusion: High dose EGCG can prevent the decline of cTnI in aging mice by inhibiting HDAC1 and elevating AcH3K9.

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Libman-Sacks Endocarditis in Children with Systemic Lupus Erythematosus: A Case Report and Review of the Literature

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Objective: To summarize the clinical and laboratory features, diagnosis and treatment of Libman-Sacks endocarditis in children with systemic lupus erythematosus (SLE), and review the literature.
Methods: The clinical data was retrospectively analyzed in a patient, who was diagnosed with SLE complicated with Libman-Sacks endocarditis in the First Affiliated Hospital of Sun Yat-sen University between November 2016 and June 2017. And related literature from CNKI database, Wanfang database, PubMed, OVID, Web of Science database to date (up to May 2017) with "verrucous endocarditis" and "Libman-Sacks endocarditis" as the key words was reviewed.
Results: The patient was male, aged 2 years and 5 months. The swelling symptoms associated with skin ecchymosis and hematuria, repeated embolism, serum antiphospholipid antibodies and lupus related antibodies were positive, pathological section of diffuse proliferative glomerulonephritis with membranous lupus nephritis, immunofluorescence. Echocardiography indicated vegetations in mitral valve and aortic valve (mitral valve, 7×17 mm, 8×7 mm, aortic valve, 8×3 mm). The treatment included prednisone, tacrolimus, anticoagulation and diuretic therapy. There was one case report in China, and 12 cases report from foreign languages. In addition to this case, a total of 14 cases were analysed. The age range is 9 months to 17 years old, 9 cases (64.28%) older than 9 years. There were 10 female and 3 male cases, ratio of female to male about 3:1. The main manifestations included heart failure, chorea, hematuria and so on. Among them, there were 6 cases of heart failure, accounting for 42.85%. The total number of patient with heart problem was 11, accounting for 78.57%. The involved valve included mitral valve in 11 cases (78.57%), aortic valve in 2 cases (14.28%), and three in 2 cases (14.28%). There were 8 cases given conservative medical treatment only. The main treatment measures included hormone, immunosuppressant, anticoagulant therapy, 7 cases improved, and 1 cases died of heart failure. Cardiac surgery was performed in 6 patients (42.85%), including 5 patients with congestive heart failure, including valvular plastic surgery in 2 cases, valve replacement in 4 cases, postoperative improvement in 5 cases, and 1 case died of renal failure after 44 months of operation.
Conclusions: SLE combined with Libman-Sacks endocarditis in children is more common in girls, and the clinical manifestations are various. Heart failure is one of the most common manifestations, and mitral valve is the main affected valve.

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Histone Modifications Down Regulate PDE2a and PDE4d in Restrictive Cardiomyopathy Mice with cTnI Mutation

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Our previous studies showed that increased Ca2+sensitivity could result in Restrictive Cardiomyopathy (RCM) in cTnI193His mutant mice. However, the underlying mechanism regulating Ca2+sensitivity remains unclear. In this study, we aimed to test the expression of phosphodiesterase (PDE), which is closely related to Ca2+sensitivity, and its underling regulatory mechanism in cTnI mutant RCM hearts. We also aimed to test the hypothesis that nuclear cTnI might impact epigenetic regulation. Here we show that cardiac-specific PDE2a and PDE4d decreased in cTnI193His double transgenic hearts compared to wild type. We further found that epigenetic modifications associated with activation, including acetylation of histone 3 lysine 4 and lysines 9, and tri-methylation of histone 3 lysine 4, were decreased near the promoter regions of PDE2a and PDE4d, while binding levels of histone transmethylase SMYD1 and histone deacetylase HDAC1 were increased in the same regions in cTnI193His double transgenic hearts. Our mass spectrometry analysis suggests cTnI could be involved in multiple signaling pathways. A dose-independent increase in mutant cTnI in the nucleus was observed in RCM mice. We also found evidence for inter actions between cTnI, SMYD1, and HDAC1 by co-immuniprecipitation assays. Therefore cTnI may have nuclear functions in addition to its typical functions as a thin filament that regulates muscle contraction. These observations indicate that PDE2a and PDE4d decreased in double transgenic RCM mice through histone acetylation and methylation and nuclear cTnI might affect epigenetic regulation via HDAC1 and SMAD1.

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Diagnosis of Anomalous Origin of the Left Coronary Artery from the Pulmonary Artery with Echocardiography and Digital Subtraction Angiography: A Case Report

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Anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) is a common coronary artery anomaly associated with high mortality, and may lead to sudden death if left unrecognized and untreated. This report describes an 8-year-old female who had cardiac murmur but with no clinical symptoms. Electrocardiogram (ECG) was normal, but echocardiography made the diagnosis of ALCAPA. Digital subtraction angiography (DSA) with Cardiac catheterization angiography (CAG) confirmed the diagnosis and finally the patient received surgery. This case demonstrates that echocardiography is a sensitive and convenient technique for establishing the initial diagnosis of ALCAPA in both symptomatic and asymptomatic patients.

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Functional Pulmonary Atresia in a Neonate with Tricuspid Valve Dysplasia: A Case Report and Review of Literatures

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Pulmonary atresia with intact ventricular septum (PA/IVS) is a less common cyanotic congenital heart defect that is characterized by membranous or muscular atresia of the pulmonary valve without antegrade blood flow from the right venticular outflow tract into the pulmonary trunk. Typically, it is complicated by various degrees of right ventricular hypoplasia, which is decisive for the treatment strategy and outcome. Occasionally, there are cases in which the pulmonary valve is anatomically normal but do not show obvious opening during the period of right ventricular contraction, which is referred to as functional pulmonary atresia. It is such a rare condition that only a few cases were documented. Here we report a case that is previously misdiagnosed as anatomical pulmonary atresia with intact ventricular septum. In conclusion, functional pulmonary atresia is a rare condition that could easily be misdiagnosed. Such patients are mostly in neonatal period, suffering from severe tricuspid regurgitation in Ebstein's anomaly, Marfan syndrome, and tricuspid valve dysplasia. However, normal intracardiac anatomy could not exclude this condition. Both invasive and non-invasive modalities can be helpful for the differentiation of functional from anatomical atresia, in which TTE is the most important. Typically, the functional ones have better-developed right ventricle, which reminds us further careful investigations for either antegrade or retrograde flow through the pulmonary valve. In this process, some specific maneuvers, such as vigorous crying, may be useful. Medical treatment is effective in most cases. Surgical repair for tricuspid valve can be considered in rare cases who failed the medical therapy.

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3D-Imaging Evaluation of Double Aortic Arch with MSCTA: A Case Report and Mini-Review

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Double aortic arch (DAA) is a rare congenital anomaly associated with the formation of a vascular ring. Patients with DAA commonly suffer from complications caused by intracardiac and extracardiac malformations and different degrees of airway stenosis. It can be subclinical or clinical, which requires a high index of clinical suspicion for diagnosis, management and awaiting corrective cardiac surgery. Multi-slice computed tomographic angiography (MSCTA) is an intuitive and effective medical imaging technique in clinic diagnosis of DAA. MSCTA can accurately diagnose DAA complicated by anomalies and airway stenosis, it is important in treating DAA and thus serves as a major tool for DAA diagnosis. In this paper, we present a case of DAA diagnosed by MSCTA with 3D-static images and rotated reconstruction images, and mini-review was made.

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Extended Education to All Acute Coronary Syndrome (ACS) Patient in a Regional Hospital

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Background: Clinical evidence showed that the cardiac rehabilitation was beneficial to physical activity, psychological well-being and quality of life in patients with coronary heart disease (CHD). However, for in-patient cardiac rehabilitation (CR), education on basic angina management may not be provided for those patients with acute coronary syndrome (ACS) who were admitted to general wards. In UCH, about 1,200 ACS patients were admitted each year. Only 45% of them were admitted to cardiac specialty wards; while the other 55% were admitted to general wards and could not receive CR education. These ACS patients or their caregivers seem to show a lack of the knowledge of ACS and the self-management, e.g. CHD risk factor control, angina management, usage of glyceryl trinitrate (TNG). Hence, an extended service on the Cardiac Rehabilitation Education Program was started in 2016.
Objective: To enhance the knowledge of ACS and its self-management for ACS patients or their caregivers.
Methods: CR team nurse would visit all general medical wards and screen for eligible ACS patients. Eligible patients who were mentally capable or with caregivers support were recruited, and received the Cardiac Rehabilitation Education Program. Pre- and post-education questionnaires were done before and after the education session to assess patient / care-giver's level of learning. The contents of education included knowledge of CHD, ways to reduce the cardiovascular risk, medication knowledge and emergency chest pain management. Moreover, they got the interview and completed the questionnaires to consolidate their knowledge and assessed their satisfaction before discharge. The 5-point Likert scale was done to assess the effectiveness of the education program.
Results: From January to December 2017, total 721 ACS patients were screened, 532 patients (74%) were recruited. Four hundred twenty-six eligible patients (80%) had completed the education. There was significant increase in the correction rate of each quiz after education. The average correction rate of the quiz increased from 25% (pre-education) to 89% (before discharge). After health education, 335 of them (79%) could answer all the questions correctly. Three hundred and sixty of them (95%) found the Cardiac Rehabilitation Education Program helpful.
Conclusion: The Cardiac Rehabilitation Health Education Program could improve and strengthen the knowledge of ACS and self-management of the ACS patients and their caregivers.

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A Study of the Spatial Relationship between Cardiac Chambers in the Fetal Human Heart Using a Macrovascular Corrosion Casting Technique

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Objective: To explore the application of a macrovascular corrosion casting technique via ABS perfusionin clarifying the spatial relationship between cardiac chambers in the fetal human heart.
Methods: Cardiovascular casting via ABS perfusion was performed for 28 fetal hearts, including 18 obtained from induced labor after permission due to congenital heart disease prenatally diagnosed by fetal ultrasound and 10 normal ones obtained from induced labor due to other non-cardiac causes.
Results: A total of 28 fetal cardiovascular casts were successfully prepared. The 10 normal fetal hearts generally showed a top-bottom spatial relationship between the atrium and ventricle at both the left and right sides, and a left-right spatial relationship between the two ventricles as well as between the two atriums. However, among the 18 fetal hearts with complex congenital heart (CHD), one heart had a front-back spatial relationship between the left atrium and ventricle, three had a left-right spatial relationship between the right atrium and ventricle, and others showed a normal top-bottom atrium-ventricle relationship. In addition, one heart had a front-back spatial relationship between the left and right atriums, 12 hearts had a front-back spatial relationship between the left and right ventricles, two hearts had a top-bottom spatial relationship between the left and right ventricles, while others showed a normal left-right relationship of the ventricles or atriums between the two sides.
Conclusions: Clarification of the spatial relationship between cardiac chambers in the fetal heart helps us understand the anatomical structure of the heart. Macrovascular casting can serve as an effective tool to intuitively demonstrate the spatial relationship between cardiac chambers of heart with complex CHD. This technique can provide us with further information regarding the connection between the spatial relationship of cardiac chambers and CHD to improve accuracy of ultrasonic diagnosis, thereby possessing important clinical significance to surgical treatment.

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Achieved Lipid Profiles and Long-Term Clinical Outcomes in Stable Patients after Percutaneous Coronary Interventions – The Impacts of Statin Use and Type 2 Diabetes

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Background: The lipid management for patients with stable coronary artery disease (CAD) is different according to American versus European guidelines. Whether these guidelines can be applied to ethnical Chinese patients with CAD in the post statin era is not known.
Methods: A series of stable CAD patients who had undergone percutaneous coronary interventions were enrolled prospectively. All of them were divided into 3 low-density lipoprotein cholesterol (LDL-C) groups and 3 high-density lipoprotein cholesterol (HDL-C) groups according to achieved lipid profiles at baseline. The presences of adverse cardiovascular events within 12 months were recorded.
Results: The study enrolled a total of 2,045 patients. The mean age was 63.5±11.9 years. 84.2% were male, 35.8% had type 2 diabetes mellitus, and 73.5% were on statins at baseline. Overall, there were no significant differences in total cardiovascular events among three LDL-C groups in 12-month follow-up. Prespecified subgroup analyses showed that in patients with type 2 diabetes mellitus or those without statin treatment, achieved LDL-C <70 mg/dL was associated with the lowest risk of total cardiovascular events by Cox regression analysis. Achieved HDL-C <40 mg/dL was associated with the highest incidence of total cardiovascular events. However, Cox regression revealed no difference in multivariate analysis.
Conclusions: In ethnical Chinese populations, achieved LDL-C levels <70 mg/dL may not be universally beneficial, although it may be considered for stable CAD patients with type 2 diabetes mellitus or patients without stain use. The clinical impacts of achieved HDL-C levels should be further justified.

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EPO Enhance Protective Effects of MSCs in Bronchopulmonary Dysplasia Hyperoxic Injury in Neonatal Mice

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Aim: Bronchopulmonary dysplasia (BPD) is the most common type of chronic lung disease in infancy, for which no effective therapy is currently available. The aim of the present study was to investigate the effect of treatment with bone marrow mesenchymal stem cells (BMSCs) in combina-tion with recombinant human erythropoietin (rHuEPO) on BPD-induced mouse lung injury, and discuss the underlying mechanism.
Method: The BPD model was established by the exposure of neonatal mice to continuous high oxygen exposure for 14 days, following which 1x106 BMSCs and 5,000 U/kg rHuEPO were injected into the mice 1 h prior to and 7 days following expo-sure to hyperoxia. The animals received four treatments in total (n=10 in each group). After 14 days, the body weights, airway structure, and levels of matrix metalloproteinase-9 (MMP-9) and vascular endothelial growth factor (VEGF) were detected using histological and immunohistochemical analyses. The effect on cell differentiation was observed by examining the presence of platelet endothelial cell adhesion molecule (PECAM) and VEGF using immunofluorescence.
Result: Compared with the administration of BMSCs alone, the body weight, airway structure, and the levels of MMP-9 and VEGF.
Conclusion: The results of the present study demonstrated that the intravenous injection of BMSCs significantly improved lung damage in the hyperoxia-exposed neonatal mouse model. Furthermore, the injection of BMSCs in combination with intraperitoneal injection of rHuEPO had a more marked effect, compared with BMSCs alone, and the mechanism may be mediated by the promoting effects of BMSCs and EPO. The results of the present study provided information, which may assist in future clinical trials.

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Differentiation of Urine-Derived Human Induced Pluripotent Stem Cells to Cardiomyocytes from a Chlid with Noncompaction of Ventricular Myocardium

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To explore the genetic and epigenetic mechanisms of noncompaction of ventricular myocardium, we need to get the cardiomyocytes carrying the genetic background of patients through IPS technology. So we got urine resourse cells from a 16-year-old child with noncompaction of ventricular myocardium for generating ips cells and differentiating into cardiomyocytes. We have succeeded in getting IPS and beating cardiomyocytes. The IPS has normal karyotype. We have done the IF of their pluripotency marks and their abilities for differentiating into three germ layers. We have master the IPS-CM technology. The IPS-CM provides an ideal model for our studying of the genetic and epigenetic mechanisms of noncompaction of ventricular myocardium.

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Acetylation of H3K4, H3K9 and H3K27 Mediated by P300 Regulates the Expression of GATA4 in Cardiomyocytes

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The transcription factors GATA4 is an important regulator in cardiomyocytes, which serve as a potent driver of cardiomyogenesis. Histone acetylation can regulate gene expression by changing chromatin structure. We had previously uncovered that histone acetyltransferases inhibitor curcumin can repress GATA4 expression. To release the mechanism of histone acetylation in GATA4 expression, we concentrate on one of the histone acetyltransferases, P300. Experimental down-regulation of P300 repressed the expression of GATA4 obviously while another transcription factor Tbx5 kept unchanged. And the whole acetylation in histone 3 near GATA4 and Tbx5 promoter repressed, the same as the acetylation on H3K4, H3K9 and H3K27. Furthermore, the selective inhibitor of bromodomain in CBP/P300, CBP30, can down-regulate GATA4 transcription by repressing histone acetylation in H3K4, H3K9 and H3K27 near GATA4 promoter. Taken together, we identify that acetylation of H3K4, H3K9 and H3K27 mediated by P300 plays an important role in GATA4 expression.

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The Sonograms and Autopsy Data of 3 Cases of Fetal Right Atrial Isomerism and Literature Analysis

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Objective: Analysis sonograms feature of cardiovascular malformation and its associated anomalies in fetus with right atrial isomerism.
Methods: The sonograms and autopsy data of 3 cases found in 256 pregnant women and 676 cases found in literature with right atrial isomerism which confirmed by angiocardiography autopsy, and surgical operation were analyzed retrospectively.
Results: In our 3 cases, the stomach and gallbladder were all located on the right side, asplenia in 2 cases, and the other was located in the right side. They were trilobites lung (asymmetric), and both sides were the right auricle (asymmetric). Associated anomalies included right valve atresia, single ventricle, single atrium, complete atrioventricular atrioventricular septal defect, double outlet of right ventricular, right aortic arch, pulmonary artery stenosis, total anomalous pulmonary venous connections, etc. According to the literature, the rate of right and left atrial isomerism was 2.5:1 (524: 209), the age of children were from 0 to 15 years. The main cardiovascular abnormalities included anomalous pulmonary venous connections (57.6%), single ventricle (64.8%), single atrium (21.5%), endocardial cushion defect (37.8%), double superior vena cava (24.9%), double outlet of right ventricular (24.2%), pulmonary artery stenosis (33.9%), pulmonary atresia (19.7%), VSD, right aortic arch, PDA, and left superior vena cava, etc. In 284 cases, The median of liver (97%), asplenia (91.1%), abdominal aorta and inferior vena cava located in the same side of spine (93.6%), bilateral trilobites lung (87.9%), bilateral right bronchial (100%), were the main abnormalities Outside the heart.
Conclusion: Right atrial isomerism was combined complex cardiac anomalies, short-term and long-term prognosis were not optimistic. They always accompanied the median of liver, asplenia, abdominal aorta and inferior vena cava located in the same side of spine, anomalous pulmonary venous connection, etc. Prenatal ultrasound was effective method for diagnosis of the fetus with right atrial isomerism.

ABSTRACTS

Abstracts for Poster Presentations:

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The Optimized Fabrication of a Novel Nanobubble for Tumor Imaging

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Objective: Nanobubbles with a size of less than 1 μm can be used as ultrasound contrast agents for diagnosis and as drug/gene carriers for therapy. However, the optimal method of preparing uniform-sized nanobubbles is considered controversial.
Methods: In this study, we developed a novel biocompatible nanobubbles by performing differential centrifugation to isolate the relevant subpopulation from the parent suspensions.
Results: Compared with the method of modulating the thickness of the phospholipid film without centrifugation, nanobubbles fabricated under the optimal centrifugation conditions exhibited a uniform bubble size, good stability, and low toxicity. In vitro ultrasound imaging, nanobubbles displayed excellent enhancement ability, which was comparable to microbubbles. In vivo experiment, the video intensity of nanobubbles in tumors were stronger than those of microbubbles at different times (5 min, 163.5±8.3 a.u. vs 143.2± 7.5 a.u., $P<0.01$; 15 min, 125.4±5.2 a.u. vs 97.3±4.6 a.u., $P<0.01$). Fluorescence imaging obtained by confocal laser scanning microscopy demonstrated obviously more nanobubbles passed through vessel wall into the extravascular and intercellular space of tumors, compared with microbubbles.
Conclusion: By this optimal centrifugation method, it will broaden the future applications of nanobubbles in imaging and therapy.

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The Prenatal Diagnosis-Postpartum Treatment of the Intractable Tachyarrhythmia in a Fetus

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Purpose: In this paper, we reported the prenatal diagnosis-postpartum treatment of the intractable tachyarrhythmia in a fetus.
Methods: After diagnosis of a fetal tachycardia, digoxin was used in the fetus. The newborn had failed of antiarrhythmic medications. This patient underwent electrophysiological study and ablation. A single catheter was used for mapping and ablation. The earliest atrial activation site was identified by measuring the activation time relative to the maximum amplitude of the R wave in the lead V1. The patient finally resorted to atrial appendectomy.
Results: In the case, supraventricular tachycardia was detected in 34 weeks gestation. The ventricular rate of the fetus varying between 190 and 210 beats per minute. The fetus was treated with digoxin, but failed to conversion to a regular sinus rhythm. The fetus was delivered in 37 weeks gestation. The electrocardiogram of the newborn showed atrial tachycardia. The heart rate of the newborn was difficult to control with digoxin. When the patient was 3 months, the echocardiogram showed impaired ventricular function. After treated with oral amiodarone, metoprolol and diuretic, the ventricular function improve in this patient. The patient presenting in incessant tachycardia, and uncontrollable with antiarrhythmic drugs. Combining the characteristics of the echocardiogram, we speculated the tachyarrhythmia originating from right atrial appendage (RAA). When the patient was 15 months (weight 11 kg), it was decided to perform catheter ablation. The earliest atrial activation was originating from the top leaflet of RAA. After ablation, temporary termination of tachycardia could be achieved, and atrial appendectomy was performed in the patient 5 days later. The patient was restored to sinus rhythm over a follow-up period of 5 months.
Conclusion: When it was difficult in vessel puncture, mapping and ablation with single catheter was practicable. The prenatal diagnosis-postpartum treatment of the intractable tachyarrhythmia could decrease mortality and affect the benefit for the patient.

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A De Novo Mutation of MTUS1 May Act as Pathogenic Gene for Noncompaction of Ventricular Myocardium Through RhOA Pathway

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Noncompaction of ventricular myocardium (NVM) is rarely and serious cardiovascular disease in children. But its etiology is unclear so far. Recently, some researchers reported the polarity of myocardial cells plays an important role in the development of NVM. A de novo mutation of MTUS1, which maybe related to NVM, was discovered in our team based on a rare NVM family by whole exome sequencing.

Objective: To identify whether de novo mutation of MTUS1 c. 2617a->c (rs187103704) changes the cell polarity and affects the myocardial densification process.

Method: The lentiviral vectors of de novo mutation of MTUS1, wild-type of MTUS1 and blank vector were constructed respectively, then co-infected with HEK293 cell. The stability and localization of alpha -tubulin, alpha/beta-tubulin and polar protein(PAR6) which represent cell polarity were examined by Immunofluorescence assay. Expression levels of MTUS1 and RhOA (controlled by tubulin to mediate cell polarity) were assayed by real-time PCR. The phosphorylation level of RhoA was detected by Western blot.

Result: The lentiviral vectors of mutation of MTUS1, wild-typeof MTUS1 and blank vector were constructed successfully. Immunofluorescence assay results showed the fluorescence intensity of alpha-tubulin was decreased and alpha/beta-tubulin was increased in mutation groups, which were significantly different from those of wild-type and blank groups. Meanwhile the fluorescence intensity of PAR6 was decreased and the location was abnormal in mutation groups. The RNA expression levels of MTUS1 in mutant group and wild group were significantly higher than those in the blank group. There were no significantly differences of the expression level of RhoA between the mutantion and wild-type groups. The phosphorylation of RhoA in the mutantion group was significantly decreased compared with those in wild-type and blank groups.

Conclusion: De novo mutation of MTUS1 changed the stability of microtubules which altered the polarity of cell through RhOA pathway, which maybe partly elucidate cellular mechanism of NVM.

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A Case of Right Atrial Sensation of Left Ventricular High Lateral Posterior Wall Epicardial Pacing for the Treatment of Infantile Dilated Cardiomyopathy

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Objective: To investigate the treatment of dilated cardiomyopathy in infants with epicardial left ventricular synchronization.

Methods: The infant, male, 3 years old and 7 months old, weighed 12 kg and hospitalized for "three years of heart enlargement". Prior to the hospital treatment, the treatment effect was not good, and was admitted to the hospital on December 4, 2017. Electrocardiogram: (1) Sinus rhythm; (2) Heart chamber conduction block, QRS wave width: 148ms; Echocardiography: the left ventricle was significantly enlarged, LVDD 55 mm, ventricular wall motion was not coordinated, and the middle segment of the ventricular septum and the apex of the heart were obviously distended to the right ventricle, which was not synchronized with the left ventricular wall and the lower posterior wall motion. Simpson method was used to measure LVEF (four-chamber heart cut surface): 17%. Tissue Doppler simultaneous imaging showed: Q-AV 166 ms, Q-PV 106 ms, apical 4-chamber view: left ventricular lateral wall was 138 ms earlier than the posterior ventricular interval; apical 2-chamber: lower left ventricular wall The peak time of the anterior wall was delayed by 69 ms; the apical three-chamber view: the posterior wall of the left ventricle was delayed by 20 ms compared with the anterior chamber interval; the maximum difference of the left ventricular 12-segment reached 148 ms, the standard deviation was 49 ms; and the mitral annular tissue velocity S' 5 cm/s, E' 9 cm/s, A' 8 cm/s. Based on the above results, we implanted the right atrium and left ventricular pacemaker electrodes with the smallest incision and the fastest speed (The intraoperative threshold was not measured). Incision location: the 5th intercostal intercostal margin and the left costal margin of the bilateral clavicle midline; Right atrial electrode position: at the junction of superior vena cava and right atrium, the left ventricular electrode position: the posterior wall of the superior lateral wall of the left ventricle in the lower part of the atrioventricular groove; How to start: the right room perceives the left ventricle. Atrial tachycardia and atrial flutter appear in the operation. The pacemaker cannot start normally. After a small dose of amiodarone is injected into the vein, the cardiac function is slightly improved. After being slightly improved, betaloc and amiodarone are taken orally to control the arrhythmia. The infant was discharged after two after surgery. Close follow-up in outpatient service.

Results: Echocardiography was performed 3 months after surgery, LVDD 41 mm, and LVEF (four-chamber view): 40% by Simpson's method.

Conclusions: For dilated cardiomyopathy combined with intraventricular blocks, QRS wave width ≥150 ms, or left ventricular movement dyssynchrony of infants, right atrial perception of epicardial pacing in the high lateral posterior wall of the left ventricle can significantly improve cardiac function, delaying the time of heart transplant or not requiring heart transplant.

ABSTRACTS

Abstracts for Poster Presentations:

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Implantating Implantable Cardioverter-Defibrillator in a Pediatric Patient with Hypertrophic Cardiomyopathy to Prevent Sudden Cardiac Death: A Case Report and Literature Review

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Hypertrophic cardiomyopathy (HCM) is a common clinical cardiomyopathy, characterized by asymmetric septal hypertrophy and left ventricular outflow tract obstruction. Patients often have fatigue, palpitations, chest pains and other symptoms, can cause syncope, and even sudden death. The treatment is related to whether the patient is complicated by left ventricular outflow tract stenosis and arrhythmia. At present, treatment methods include drug therapy, surgical treatment, interventional therapy, dual-chamber pacemaker therapy and implantable cardioverter defibrillator (ICD) therapy. Sudden death is a serious complication of HCM. In 2013, the European Society of Cardiology Guidelines on cardiac pacing and cardiac resynchronization therapy pointed out that for patients with indications of ICD implantation, dual-chamber ICD implantation should be considered, which can significantly reduce obstruction and improve symptoms. Research has confirmed that implantable cardioverter defibrillators are very effective in preventing sudden death of HCM. In China, most patients with ICD implanted with HCM are adults. There has been no report on the primary prevention of sudden death in children with HCM undergoing dual-chamber ICD implantation. In this case, due to severe obstruction of the left ventricular outflow tract, the patient has received surgical treatment in early period. After surgery, he has been treated with drugs such as beta blockers and calcium antagonists. Review of echocardiography suggested good evacuation of the left ventricular outflow tract, ventricular septal and apical myocardial was thick, of which thickest place is about 35 mm. The hypertrophic myocardium of the child was located in the mid-ventricular septum and the apex of the heart. There was no pressure gradient in the left ventricular outflow tract, therefore no re-surgical septal myocardium resection can perform. At the same time, with no significant left atrial or left ventricular enlargement and heart failure performance, there is no indication of cardiac transplantation. Considering that the interventricular septum thickness is more than 30 mm and the symptoms of chest pain and electrocardiogram changes, there is a risk factor for sudden death. An implantable cardioverter defibrillator with dual-chamber pacing function is benefit to this patient. The results of postoperative review showed that the QRS duration of the electrocardiogram of the patient was longer than before. Echocardiography showed that the systolic stenosis of the anterior papillary muscle and interventricular septum of the left ventricle was significantly improved. Also the symptoms of dizziness and chest pain improved in the patients. At the same time, ICD can effectively terminate the malignant arrhythmia that may occur during the course of this patient, thus effectively preventing the occurrence of sudden death.

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Two Cases of 8p23.1 Microdeletion Syndrome

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Several microdeletion and microduplication syndromes are emerging as disorders that have been proven to cause multisystem pathologies frequently associated with intellectual disability (ID), multiple congenital anomalies (MCA), autistic spectrum disorders (ASD) and other phenotypic findings. There are few reports on the chromosome 8p microdeletions and microduplication syndromes. Here, we report two patients¡A 8p23.1-23.3 regions were absent, 8p11.22-p22 and 8p12-p23.1 were all new mutations. Both parents did not carry these mutations, which may be the cause of their occurrence. The microdeletion and microduplication syndrome were different from clinical phenotypes. In this report, the region in 8p23.1-23.3 included known pathogenic genes such as ARHGEF10, CLN8, DLGAP2, and MCPH1, while the region of the first patient with the 8p11.22-22 duplication included DLC1. Disease-causing genes such as TUSC3, MSR1, FGF20, and PCM1 are known to have been tested and showed that the father and mother don't carry these two mutations. Therefore, these two mutations may be new. Related cases reported that these two copy number variations were due to the inversion of the chromosome 8 between arms. The clinical manifestations of the children reported in this case were same, large ventricular septal defect, multiple muscular atrial stenosis, pulmonary hypertension, ocular malformations, unable to stand walking and speak, growth retardation.
Introduction: Microdeletion and microduplication syndromes (MMSs) are caused by genome rearrangements caused by copy number variations (CNVs) in specific chromosomal regions, including the deletion and duplication of DNA fragments. As a result, it can causes changes in the amount of sub-microscopic levels of the gene, which can range from a few kb to several Mb. Since the medical community first discovered in the 1980s that microdeletions or microduplications of chromosomes can lead to the occurrence of diseases, the clinical significance of microdeletion and microduplication syndromes has also increased due to the deepening of human genome research and the continuous development of cell molecular detection technology. The more attention is paid to microdeletion and microduplication syndromes. In recent years, nearly 300 MMSs have been reported globally, with morbidity ranging from 1/2000000 to 1/4000, with a combined incidence of nearly 1/600. The study found that MMSs can cause systemic dysfunction, and its common clinical manifestations are: abnormal growth and development, mental retardation, malformations of internal organs, special facial features, endocrine abnormalities, changes in mental behavior and cancer. This article reports two cases of 8p23.1 microdeletion syndrome.
Methods: Second-generation sequencing: The core idea of the second-generation sequencing technology is Sequencing by Synthesis, which determines the DNA sequence by capturing newly synthesized end-labels.
Discussion: There are few reports on the chromosome 8p microdeletions and microduplication syndromes. However, the regions of the disease are different. The mutation-related disease is the chromosome 8 short arm rearrangement syndrome according to the OMIM, which is an autosomal dominant genetic disease. Similar to other chromosomal microdeletion syndromes, there are individual differences in clinical phenotypes, which may be due to differences in deletions and duplications between regions in terms of changes in gene function and regulation of genomic expression. In this report, the region in 8p23.1-23.3 included known pathogenic genes such as ARHGEF10, CLN8, DLGAP2, and MCPH1, while the region of the first patient with the 8p11.22-22 duplication included DLC1. Disease-causing genes such as TUSC3, MSR1, FGF20, and PCM1 are known to have been tested and showed that the father and mother don't carry these two mutations. Therefore, these two mutations may be new. In addition, with the gradual development of gene detection technology, array-CGH technology has great advantages for chromosome microdeletions and micro-duplicate detection.