ABSTRACTS

Abstracts for Free Paper Session:

CORONARY ARTERY DISEASE I

1.

Resting Echocardiography for the early detection of Acute Coronary Syndromes in Chest Pain Unit Patients

V M Parato, D Delfino, S Amabili, M Partemi, D Rossi, E Nardini
Chest Pain Unit, Cardiology Dept, C. and G. Mazzoni Hospital, Ascoli Piceno, ITALY

Aim. The purpose of this study is to assess the ability of resting echocardiography to detect an acute coronary syndrome (ACS) before the occurrence of ischemic ECG changes or Troponin-T elevations.

Methods. 403 patients who presented to the ER with chest pain, normal ECGs, and normal Troponin-T levels were admitted to the cardiologist-run Chest Pain Unit (CPU) for further monitoring. They underwent serial resting echocardiography for monitoring of left ventricle wall-motion (LVWM), ECG telemetry monitoring, and serial Troponin-T measurements.

Results. An ACS was detected in 49 patients (12.1%). These 49 patients were then subdivided into 3 different groups based on the initial mode of detection of their ACS. In group A, 16/49(32.6%) patients had ACS shown by echocardiographic detection of LVWM abnormalities. In group B, 24/49(48.9%) patients had an ACS detected by ischemic ECG changes. In group C, 9/49(18.3%) patients had an ACS detected by Troponin T elevations. The shortest time interval between CPU-admission and ACS-detection occurred in group A (A vs.B=p<0.003; A vs.C=p< 0.0001). In group A, cardiac angiogram showed that the culprit coronary lesion was more frequently in the **circumflex artery** (11 out of 16;68.7%) (LCx vs.LAD=p<0.02; LCx vs.RCA=p <0.001) and of these 11 patients with circumflex lesions, the ECG was normal in 8 (72.7%).

Conclusions. This study demonstrates the utility of LVWM monitoring by serial echocardiography as part of a diagnostic protocol that can be implemented in a CPU. Furthermore, **echocardiography could become an essential tool used in the diagnosis of ACS secondary to circumflex lesions.**

2.

Relation of Glycated Haemoglobin to Cardiovascular Outcome in Non-diabetic Adults with Acute Coronary Syndrome

YH Cheng, MKY Lee, CK Kwok, NH Luk, WS, Kwan, SF Chui, KC Chan, LK Chan, CY Wong, HS Ma, LY Tam, CL Fu, CW Chan, KT Chan, KC Ho, CS Chiang; Division of Cardiology, Department of Medicine, Queen Elizabeth Hospital, Hong Kong

Objective: To evaluate the value of glycated haemoglobin (Hba1c) in predicting cardiovascular outcome in non-diabetic adults admitted for acute coronary syndrome.

Patients and Method: This is a prospective cohort study of the patient being treated for acute coronary syndrome (ACS) in the coronary care unit of Queen Elizabeth hospital. A total of 122 patient admitted between 1st January 2009 to 31st March 2009 were enrolled. Blood sample was taken for Hba1c on admission. Demographic and clinical characteristics of the patients were recorded and clinical outcome were analyzed at the end of thirty days.

Results: 86 out of 122 patients did not have any previous diagnosis of diabetes. Sixty-five percent were male (56 males; 30 females; mean age= 68; range 34-85). The mean Hba1c was 6.47% (+/-1.42). Patient with admission Hba1c ≥ 6.0 % had higher fasting glucose (8.5mmol/l +/- 2.1 vs 5.5mmol/l +/- 0.9) ; lower ejection fraction (41.5% +/- 11.5 vs. 54% +/- 10.3) and more common to have multi-vessel disease (53.5%) . HBa1c was an independent predictor of 30-day death from cardiovascular causes with an odds ratio of 2.87 (95% CI= 1.43-26.31) after adjustment for other confounding variables.

Conclusion: Glycated haemoglobin had a role of predicting cardiovascular outcome in non-diabetic adults.

3.

Impact of Bleeding Risk on Prognosis of Patients with Acute Coronary Syndrome (ACS)

Ling-ling Cheung, Chi-Kin Chan, Chiu-sun Yue, Division of Cardiology, Department of Medicine and Geriatrics, United Christian Hospital, Kowloon, Hong Kong.

Background: Bleeding complication has become a major concern associated with contemporary treatment of acute coronary syndrome (ACS). However, the high bleeding risk group has not been well characterized and the impact of bleeding on clinical outcome has not been extensively studied in the local population.

Methods: The study recruited consecutive patients admitted to coronary care unit, United Christian Hospital from 1/2007 till 12/2007 who presented with ACS. The primary outcome was all-cause mortality. Bleeding events after the onset of ACS were documented.

Results: The study recruited a total of 155 patients including 118 ST elevation myocardial infarction (STEMI), 34 Non-ST elevation myocardial infarction (NSTEMI) and 3 unstable angina. Patients with major bleeding were older (≧70 years old), had lower body weight (<50 kg), impaired renal function (CrCl<50ml/min) and poor left ventricular ejection fraction (<40%). At 1 year follow-up, seven patients developed major bleeding and six of them died, whereas approximately 1 in 5 patients who did not have major bleeding experienced death. Major Bleeding as a time-dependent covariate was independently associated with 1-year mortality after adjusting for demographic, cardiovascular risk factors and cointerventions (hazard ratio= 6.89, 95%CI 1.81-26.30; P=0.005). The impact of bleeding on mortality was shown to be dose related and persisted throughout the follow-up period. Gastrointestinal bleeding (GIB) was a common cause of major bleeding in this study.

Conclusion: The study emphasized the adverse prognostic implication of major bleeding as a complication of ACS treatment, hence should prompt further research on reduction of bleeding, especially GIB. In order to further improve clinical outcomes, patients at high risk of bleeding should first be considered for prophylaxis against GIB.

4.

Review of STEMI treatment in a regional hospital in Hong Kong: Root cause analysis of time-delay in the treatment of ST elevation myocardial infarct (STEMI).

TS Chung, CK Chan, CS Yue. Division of Cardiology, Department of Medicine and Geriatrics, United Christian Hospital, Kowloon, Hong Kong.

Background: "Time is muscle". Benefit of reperfusion is time dependent. Timely reperfusion therapy for STEMI is the target. We aim at reviewing the causes of time delay for reperfusion therapy in STEMI patients.

Method: All STEMI patients admitted our Coronary Care Unit (CCU) from 1st Jan 2009 to 31st Dec 2009 were selected. The time of symptom onset and the individual time from accident and emergency department (AED) to treatment received were reviewed. The causes for the time delay were analysed. Median treatment time was selected because " mean" treatment time could be unduly skewed by time falling in extreme range.

Result: There were totally 136 STEMI presented to our CCU in 2009. Seventy-two patients (52.9% STEMI) received fibrinolytic. The median door-to-needle time(D2N) was 44.5min, 25.8% of patients had door-to-needle time within 30min. Thirty-eight PPCI (28% STEMI) were performed in our center in 2009. The median door-to-balloon time(D2B) was 88min, 52.6% of patients had door-to-balloon time within 90 minutes. Twenty-six patients (19.1% STEMI) did not receive reperfusion therapy. For all these STEMI patients, the median door-to-ECG time(D2E) was 8 min. Fourteen patients (10.3%) has no typical ST segment changes from first ECG in AED, and 12 patients(8.8%) had diagnosis of STEMI after admission to ward. The median symptom onset to AED time was 100min. Seventy-nine patients (58% STEMI) had symptom onset to AED time within 120min. For those patients received fibrinolytics, forty-nine patients had D2N time more than 30min. Eleven patients (22.4%) had vague presentation and delayed D2E. Seven patients (14.3%) started fibrinolytic in CCU and were delayed by transportation. Six patients (12.2%) did not have diagnostic ECG changes in AED and need further observation in ward. For those STEMI patients received PPCI, Eighteen patients had D2B more than 90min. Their median length of stay in AED was 42min. Four patients (22.2%) had vague symptoms and delayed D2E. Three patients (16.7%) did not have diagnostic ECG changes in AED and need further observation in ward. Two patients(11.1%) were delayed by further diagnostic CT scan. Three patients (16.7%) were delayed by operation table being occupied.

Conclusion: Early presentation and early diagnosis is the key for timely reperfusion for STEMI. High suspicion for patients with vague symptom and early ECG assessment can reduce time delay for diagnosis. Fibrinolytics should be started in AED as possible, once diagnosis is made. Suspected STEMI patients should be closely monitored in AED or in ward for new ECG or clinical changes. Public education for early attendance to AED for typical chest pain, especially persist pain more than 30 min, can reduce the total ischaemic time. ECG in ambulance and activation of AMI team before AED arrival may reduce length of stay in AED.

ABSTRACTS

Abstracts for Free Paper Session:

5.

Mortality in real life STEMI patients receiving fibrinolytics: a local hospital experience

Ling-ling Cheung, Chi-Kin Chan, Chiu-sun Yue. Division of Cardiology, Department of Medicine and Geriatrics, United Christian Hospital, Kowloon, Hong Kong.

Background: The mortality of ST elevation myocardial infarction (STEMI) has been improving in recent studies due to the advance of pharmacotherapy and coronary angioplasty. However, there is still significant variation in prognosis in different real-life patient cohorts. It is therefore essential to have a more comprehensive understanding of the outcome of STEMI patients in our local cohort of Chinese patients with a view to identifying room for improvement.

Method: The aim of this study was to evaluate 7-day, 30-day, 180-day clinical outcome of STEMI patients in a series of unselected prospectively collected consecutive patients admitted to Coronary Care Unit, United Christian Hospital from 1/1/2007 to 21/12/2007.

Results: A total of 118 patients with STEMI were included. Sixty seven patients were given fibrinolytics (streptokinase SK 68.7%, alteplace rtPA 16.4%, tenecteplase TNK-tPA 14.9%). The cumulative 7-day, 30-day and 180-day mortality among the fibrinolytic and non fibrinolytic users were 12% vs. 16%, 13% vs. 20% and 15% vs. 32% respectively. There was a significant difference (p=0.05) in survival between the two groups at 180 days (85% vs. 68%). Among those who were given fibrinolytics, two suffered from TIMI major bleeding, one from intracranial haemorrhage and the other from severe gastrointestinal bleeding.

Conclusion: In an unselected patient cohort, short-term mortality of STEMI patients was still high despite active reperfusion using fibrinolytics. Yet, reperfusion is associated with better mortality outcome. Other reperfusion strategy should also be considered.

6.

Local experience: Tenecteplase (TNK) as Thrombolytics for STEMI Patients

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Objective: The aim of this study was to evaluate the short term outcome and complication of Tenecteplase (TNK) as thrombolytics for patients with ST Eleation Myocardial Infarction (STEMI).
Methods: Hospital records of all STEMI patient treated with TNK since the introduction of TNK in Queen Elizabeth Hospital (Oct 2009) were reviewed. Demographic data, co-morbidities, outcome and complication were analyzed.
Result: Total number of 26 patents were given TNK for STEMI during the study period. There was 23 male (88.4%) and 3 female (11.6%). Their mean age was 61.1 +/- 11.1 years. The mean onset of pain to needle time was 5hrs 12mins. 13 of patients had anterior MI (50%) and 13 of them had inferior MI (50%). 19 patients (73%) were showed to have successful thrombolysis. Coronary angiogram had been performed following thrombolytics in 24 of them (92%). None of them showed TIMI 0 flow. Four patients did not receive coronary angioplasty: 3 of them showed minor disease only and 1 of them showed triple vessels disease which later referred to cardiothoracic surgery. None of them had complication of intracranial bleeding. One patient had complication of upper gastrointestinal bleeding. None of them died of bleeding complication. 3 patients (11.5%) died of other causes.
Conclusion: The short term outcome in local population of TNK is promising. Further prospective studies are yet needed.

7.

BMP9 Promotes Cardiac Progenitor Cells Ameliorate the Heart Function in the Rat Model of Myocardial Infarction

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Department of Heart Center, Children's Hospital of Chongqing Medical University, Chongqing, PR China

Purpose: To observe whether cardiac progenitor cells (CPCs) which induced by bone morphogenetic proteins9 (*BMP9*) can improve the heart function of the rat with myocardial infarction.
Methods: CPCs were infected by AdBMP9 which express green fluorescent protein. After twenty-four hours, the expression of *BMP9* mRNA of infected CPCs were examined by semi-quantitative RT-PCR. Then, infected CPCs by AdBMP9 were injected into the infracted heart. The hearts were collected, after postoperative four weeks. The change of CPCs morphology was observed by HE staining and immunofluorescent analysis to investigate the expression of cardiac-specific structural proteins alpha myosin heavy chain (a-MHC) and a-Actin of the implanted CPCs. The cardiac infarct size was detected by Masson staining. Heart function was examined by echocardiography, in preoperative and postoperative four weeks.
Result: After twenty-four hours, the expression of *BMP9* mRNA of CPCs infected by AdBMP9 improved significantly. The result of HE staining and immunofluorescent showed that the grated-CPCs could fuse with the normal cardiomyocytes and expressed the cardiac-specific proteins a-MHC and a-Actin, at four weeks after transplantation. But the expression of cardiac-specific structural proteins is lower than the abnormal cardiac tissue. At postoperative four weeks, the implanted CPCs can reduce the size of infracted obviously ($P<0.02$) and which can be promoted by *BMP9* ($P<0.001$). The result of heart function is similar with the Masson staining.
Conclusion: CPCs induced by *BMP9* can improve the heart function of the rat with myocardial infarction.

8.

Secondary Prevention of Coronary Heart Disease – How closely are we achieving our targets?

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Background: The question of "How successful is our secondary preventions being practiced at the clinics" substantially helps to improve patient outcome as well as cost saving, while repeated revascularization procedures are costly and risky.
Methods: To evaluate the patients after percutaneous coronary intervention (PCI), 143 YCH patients undergoing 173 PCI procedures in the year 2005 were recruited and followed up for a mean period of 5 years. There were a total of 5 non-cardiac deaths(3.5%) - 2 carcinomas, 1 chronic lung disease and 2 pneumonias, while 11(7.7%) were referred to other hospitals or defaulted during the follow-up period. There were 11(7.7%) cardiovascular deaths, and 116(81.1%) patients are currently being followed up at our clinic.
Results: All except one patient received aspirin (99%), clopidogrel in 19(16%), beta-blocker in 70(60%) while 109 (94%) patients received statins. No patient suffered from clinical myositis nor hepatitis, but 2 patients stopped statins for ALT increase and 3 patients had dose reduction for CPK elevation. The table listed the blood pressure, glycaemic and lipid controls.

	5 years follow up patients (n=116)	
	Baseline	5 years follow up
Sex (male)	77(66%)	77(66%)
Age (years)	64±10	69±11
Body Weight(kg)	65.3±11.4	65.4±10.3
Smoker (%)	51(44)	3(2.6)
HT (%)	64(55)	64(55)
DM (%)	36(31)	56(48)
A1C(%)	7.3±1.3	7.0±1.2
Systolic Blood Pressure(mmHg)	143±19	143±21
Diastolic Blood Pressure(mmHg)	76±9	74±10
CrCl(ml/min/1.73m^2)	72±21	69±20
TC (mmol/l)	5.0±1.0	4.0±0.8
TG (mmol/l)	1.8±0.9	1.3±0.6
LDL-C (mmol/l)	3.4±0.8	2.4±0.8
HDL-C (mmol/l)	1.13±0.31	1.05±0.30

Conclusion: The standard of our clinical practice is only fair – with suboptimal blood pressure, glycaemic and lipid controls, and room for improvement in secondary prevention.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC ARRHYTHMIAS, ELECTROPHYSIOLOGICAL STUDIES AND CARDIAC REHABILITATION

9.

Radiofrequency Catheter Ablation of Symptomatic Atrial Fibrillation

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Purpose: Antiarrhythmic drugs (AAD) are commonly used for prevention of recurrent atrial fibrillation (AF) but effectiveness of AAD remains inconsistent. In the advent of catheter ablation, radiofrequency ablation in the left and right atrium becomes an established therapy for patients with symptomatic AF. The purpose of this study was to assess the efficacy of catheter ablation for symptomatic paroxysmal and persistent AF in our center.

Methods: A total of 60 patients (43 men, age 55.7±11.6 years) with AAD refractory symptomatic AF (44 patients had paroxysmal AF, 16 patients had persistent AF) were studied. Ablation procedure was undergone by one of the following techniques: (1) Ablation Frontiers Cardiac Ablation System (n=30) or (2) Ensite NavX system in combination with irrigation ablation catheter (n=30). Patients were followed clinically for recurrence of AF at months 3, 6 and 12. Clinical recurrence of AF was defined as AF/atrial flutter >1 minute in duration.

Results: The mean duration of AF was 55.2±51.3 months before index procedure. During the follow-up time of 8.9±4.8 months, 77.3% of patients with paroxysmal AF and 62.5% of patients with persistent AF remained free from recurrence of AF after single procedure. Also 71.4% of patients who underwent ablation by Ablation Frontiers and 74.4% of patients who underwent ablation by using irrigation catheter were free of symptomatic AF (P=NS). Major adverse events occurred in 5% of patients. No procedure related mortality was recorded.

Conclusion: Among patients with symptomatic AAD refractory AF, a clinically satisfactory result can be achieved in >70% of patients. The clinical efficacy of using different ablation catheters was similar and the procedural risk was low.

10.

Real Time Intracardiac Echocardiography and Electroanatomic Mapping in Patients with Post-infarction Ventricular Tachycardia

C P Chan; F Morady; F Bogun. University of Michigan, Ann Arbor, MI

Purpose: Post infarction VT often originates from myocardial scar tissue. The arrhythmogenic substrate has not been characterized by intracardiac echocardiography. The purpose of this study was to evaluate the value of real time intracardiac echocardiography to guide ablation of ventricular tachycardia in patients with ischemic cardiomyopathy.

Methods: In a series of 20 consecutive patients (19 men, age: 65±10 years, left ventricular ejection fraction: 0.25 ±0.13) referred for ablation of post-infarction VT, intracardiac echocardiography (CARTOSOUND) was used with a 3-D electroanatomic mapping system, to characterize critical VT isthmus areas as being located within an dyskinetic segment, a segment with hypokinesis / akinesis or normal contraction

Results: 187 VTs could be induced (cycle length 385±95 ms) during the index procedure. For 90 VTs, critical isthmus areas could be identified. Critical areas for 51/90 (57%) VTs were located in a dyskinetic segment, 33/90 (37%) VTs were located in an area of akinesis and 6/90 (7%) in an area of hypokinesis; none were located in normal contracting myocardium. The area of dyskinesis was smaller than the area of dense scar (33±14 cm2 vs 54±25 cm2; $p<0.05$). Post ablation 15/20 patients were non-inducible. During a follow-up time of 10±6 months 2 patients had recurrent VT.

Conclusion: The majority of critical areas for post-infarction VT were identified within dyskinetic segments rather than other parts of the scar. Dyskinetic segments identified by ICE have a localizing value in identifying the arrhythmogenic substrate.

11.

Review of Electrophysiological Study as Day Case in a Local Regional Hospital

CK Kwok, NH Luk, WS Kwan, YH Cheng, SF Chui, LK Chan, CY Wong, HS Ma, LK Chan, CL Fu, LY Tam, CW Chan, KY Lee, KT Chan, KC Ho and Dr. CS Chiang
Department of Medicine, Queen Elizabeth Hospital, HKSAR

Background: Electrophysiological study (EPS) is an invasive investigation to analyze the pathophysiology of cardiac arrhythmias. Although the procedure related complication and mortality rate are negligible, there is still potential risk of vascular injury, local or systemic thromboembolism, infection, cardiac perforation, myocardial infarction, arrhythmias and stroke. As a result, patients undergoing EPS usually hospitalize overnight for close observation before discharge.

Objective: To evaluate the feasibility and safety of EPS as day cases in a local regional hospital

Patient and methods: Day case EPS approach was introduced in our hospital since October 2005. Patients with symptomatic arrhythmias were arranged for EPS first and subsequently decided if ablative intervention is required. For those whom further intervention was not indicated or refused, transvenous catheters were removed immediately after procedure and haemostasis was achieved by manual compression. Patients were observed in cardiac dayward for few hours and were discharged home on the same admission day if no immediate complication was noted. Wound care management was educated by nurse. They were phone contacted the next day for follow up of symptoms, wound status and any complication.

Results: From October 2005 to March 2010, 23 patients underwent EPS as day cases. Mean age was 47 years old. Male to female ratio was 3:7. Supraventricular arrhythmias (52%), ventricular arrhythmias (39%) and unexplained palpitation (8%) were the indications of EPS. Among them, 70% had no inducible arrhythmias or abnormal accessory pathway, while the remaining 30% had inducible arrhythmias yet radiofrequency ablation was not proceeded either because of patient's choice or unfavorable anatomy. Average length of stay in hospital was 9 hours. Among all patients, there were no reported complication including bleeding and haematoma formation.

Conclusion: Day case EPS is a feasible and safe approach provided that proper patient education is offered and close follow-up is provided. Overnight hospitalization can be avoided.

12.

Monitoring and comparative analysis of remote real-time electrocardiogram monitoring system and routine 12-leads electrocardiogram in patients with cardiovascular disease

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Purpose: A remote real-time wireless electrocardiography monitoring system based on GPRS was tested in order to contrast the accuracy and stability of electrocardiosignal with the 12 leads electrocardiogram（ECG）, and then evaluated this device's clinical practice value, security and validity.

Methods: The data were collected from 194 in-patients from April 2008 to December 2008 in Fuwai hospital. All subjects were received the remote real-time ECG monitoring and the 12 leads ECG, and these patients were divided into two groups. The aspects of ECGs were compared between 2 systems including the general waves, clinical diagnosis, time and voltage parameters.

Result: In remote ECG groups, the baseline stability of precordial leads is better than limb leads. Compare to 12 leads ECG, detectable rate of arrhythmia is higher in remote ECG groups, and it identified 266 cases of arrhythmia, including 135 cases of tachyarrhythmia and 131 cases of bradyarrhythmia, The most common arrhythmia is ventricular premature beat(18.7%), one degree atrioventricular block is second(13.9%)and atrial fibrillation is third(13.5%) in turn. There were no significant difference found in the time parameters between 2 systems, and was significant correlation. The voltage parameter of the 2 systems was no significant difference.

Conclusion: The accuracy and stability of the remote real-time ECG monitoring system based on GPRS is in accordance with the standard ECG instrument. The remote real-time electrocardiogram monitoring system may be a helpful tool in assisting physicians in the diagnosis of common arrhythmia and malignant ventricular arrhythmia disorders, and showed high safety in data recording.

ABSTRACTS

Abstracts for Free Paper Session:

13.

Successive Electrocardiograph Telemetry Monitoring For Sudden Cardiac Death Forewarning

Zuxiang Fang, Xiaomei Wu, Cuiwei Yang, Fudan University, Shanghai, China

Purpose: Sudden cardiac death (SCD) is a very serious cardiac event that it will deprive patient's life within several minutes. Most of SCDs are induced by ventricular tachycardia (VT) or ventricular fibrillation (VF). We think it is possible to make an early warning by use of the real-time, successive, and long-distance electrocardiograph (ECG) monitoring. And this is the objective of our studies.

Methods: In order to realize the objective of forewarning high risk heart diseases such as SCD, the monitoring system should obtain real-time and continuous dynamic ECG, the active range should be wide, the system also should work long-term, analyze ECG real-time and the corresponding medical advice should be transmitted immediately to patient. This monitoring system mainly comprises three parts: tens of mobile patient units designed as a pocket-size terminal with several vital sensors, a hospital monitoring center, and two such parts are connected wirelessly by a mobile network of GSM/GPRS. The proposed long-distance monitoring system possesses such technology features as following:

1) Continuously acquiring 1-3 channels ECG and location information of patient and transmitting data by GPRS module.
2) An embedded mono-chip MCU used to compress, manage, and transmit ECG data to hospital center.
3) Transmitting data to hospital center in batches (seconds delay) through the GPRS module under UDP protocol.
4) Multi-user real-time ECG are simultaneously received and displayed on the CCU's screen in front of physician, an alarm will be start up automatically while heart calamity event occur find out by central analysis system.

Results: In order to validate the proposed method, subsequent experimental tests by using the developed prototype have been carried out on three volunteers moving along streets in Shanghai city of China. The preliminary test results indicate that three-channel ECGs from each of three volunteers and their localization are real-timely and continuously transmitted from the mobile units carried by them to the central monitor through GSM/GPRS network; and the main clinic information are analyzed instantly and displayed on the monitor screen. Although no transmission errors or intermission were been observed, further tests will be expected to perform a full evaluation of this system in clinical trials, especially for patients who have high risk heart diseases.

Conclusion: The main contributions of this work described above are to functionally evaluate the proposed method with the developed prototype system. According to the experimental results, this method provides practical potentials to be as an alternative effective approach of real-time and remote monitoring for out-of-hospital patients, especially preventing onset SCD by an early alarm.

14.

Changes of the mRNA and protein expression of α1 subunit of L-type and T-type calcium channels in human atrial myocardium of rheumatic atrial fibrillation patients

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Purpose: To investigate whether there are changes in the expression, at mRNA and protein level, of α1 subunits of L-type (α1C) and T-type (α1G andα1H) calcium channels in the human atrial myocardium among normal sinal rhythm (NSR), rheumatic sinal rhythm (RSR) and rheumatic atrial fibrillation (RAF) patients.

Methods: The right atrial tissue was obtained from three distinct groups of patients during the cardiac surgeries, and the numbers of the patient were 10 for NSR, 11 for RSR, and 16 for RAF, respectively. Real-time quantative RT-PCR was used to measure the abundance of mRNA of three different calcium channel α1 subunits (CACNA1C, CACNA1G, CACNA1H) by the 2-ΔΔCt method. Western Blot was also used to examine the expression of these three channel proteins by a semi-quantative method.

Results: In comparison with the NSR and RSR groups, the mRNA abundance and protein expression level of α1C and α1H subunits was significantly up-regulated in the RAF group ($P<0.05$). However, the level of α1G subunit was not significantly different among the three groups. Between the NSR and RSR groups, there were no significant differences of the expression of all three subunits.

Conclusion: The present study demonstrated that the expression of α1C and α1H subunits, but not α1G subunit, was up-regulated in atrial fibrillation, suggesting rheumatics may not affect the expression level of L-type and T-type calcium channel. Whether the rheumatics might still change calcium channel functions remains elusive.

15.

Rate-Dependent Block of hKv1.5 Channels and the Molecular Determinant by the Natural Flavone Acacetin

HJ Wu, W Wu, GR Li. Department of Medicine, the University of Hong Kong

Purpose: We have recently demonstrated that the natural flavone acacetin is an atrial-selective compound that inhibits ultra-rapid delayed rectifier potassium current (I_{Kur}) and transient outward potassium current (I_{to}) in human atrial myocytes, and also acetylcholine-activated potassium current ($I_{K,ACh}$). It increased atrial effective refractory period and effectively prevented atrial fibrillation (AF) in anesthetized dogs without prolonging QT interval of ECG. The present study was designed to determine whether the I_{Kur} block of acacetin is rate- and/or use-dependent, and the molecular determinant of the channel block in HEK 293 cells expressing hKv1.5 channels (coding I_{Kur} in human atrial myocytes).

Methods: Whole-cell patch clamp and site-directed mutagenesis techniques were used to study the inhibitory effect of acacetin on hKv1.5 channels stably expressed on HEK 293 cell lines and the molecular determinant of the channels with transient transfection technique.

Result: It was found acacetin was an open channel blocker of hKv1.5 channels and inhibited hKv1.5 current in use- and frequency-dependent manner. The IC_{50} of acacetin for inhibiting hKv1.5 was reduced from 3.7 μM at 0.2 Hz to 3.1 μM at 0.5Hz, 2.9 μM at 1Hz, 2.1 μM at 3 Hz, and 1.7 μM at 4 Hz. The mutagenesis study showed that the hKv1.5 mutant I508A in the S6-segment exhibited a significant reduction of the channel block by acacetin (IC_{50}, 19.4 μM, 5.2- fold of WT).

Conclusion: These results demonstrate that acacetin is an open channel blocker by binding to the S6 domain of hKv1.5 channels. The use- and rate-dependent blocking property of hKv1.5 by acacetin indicates that this natural compound could exert a strong suppressive effect on atrial fibrillation in man.

16.

Effects of Aerobic Exercise Training on Exercise Capacity, Cardiac Function and Quality of Life in Chronic Heart Failure Patients with Cardiac Resynchronization Therapy - A Pilot Study

BKLYunk,[1] AYM Jones,[3] K Fan,[2] WH Chow[2]
[1]Physiotherapy Department and [2]Cardiac Medical Unit, Grantham Hospital & [3]Department of Rehabilitation Sciences, Hong Kong Polytechnic University

Purpose: The objective of this study was to investigate the exercise capacity, cardiac function and quality of life in patients with chronic heart failure prior to cardiac resynchronization therapy (CRT), after one month of implantation and after an eight weeks aerobic exercise training programme.

Methods: From April 2008 to November 2009, 7 chronic heart failure patients with ambulatory NYHA functional class IV (5 men and 2 female) underwent CRT implantation and were randomized to either the aerobic exercise group or control group. The aerobic exercise group performed 8-week aerobic exercise training program under close supervision and the control group remained physically inactive.

Results: Four subjects (two of them being heart transplant candidates) were allocated to the aerobic exercise group and three patients were allocated to the control group. Two subjects in aerobic exercise group were withdrawn due to heart transplantation and repeated gouty attacks on lower limbs respectively. After one month of CRT implantation, the peak oxygen consumption (VO2max), 6-minutes walk test distance and quality of life score for all subjects were similar to baseline but left ventricular ejection fraction has improved from 29.5±6.6 to 36.0±7.2 %. After eight weeks of aerobic exercise training, the two remaining subjects in the aerobic exercise group showed an increase in VO2max(Exercise: 26.5% ,control: 11.8%), peak heart rate (Exercise: 15.1% , control: 3.6%), decrease in left ventricular end diastolic diameter (Exercise: -2%, control: 0.9%), left ventricular end systolic diameter (Exercise: -7% control: 0%), mitral regurgitation score (Exercise: -100%, control: 28%). One female subject in aerobic exercise group was successfully removed in heart transplantation list during exercise phase.

Conclusion: Aerobic exercise training is safe and feasible for chronic heart failure patients with CRT. On-going collection of data is required to show the improvement on physical, quality of life and other parameters of cardiac function such as mitral regurgitation, left ventricular end diastolic end systolic diameter.

ABSTRACTS

Abstracts for Free Paper Session:

17.

Clinical Attributes of Patients Participated in Phase II Cardiac Rehabilitation Program over the Past 10 Years

YMW Mak, CS Yue, KF Leung. Division of Cardiology, Department of Medicine and Geriatrics, United Christian Hospital, Hong Kong

Purpose: The aim of the study was to examine the clinical profile of patients entering phase II cardiac rehabilitation program (CRP) from 2000 to 2009.

Methods: Patients were classified into 5 groups according to their period of recruitment into phase II CRP. Clinical profile of those patients was analyzed.

Results: A total of 1391 patients were classified into period 1 (2000-2001, n=248), period 2 (2002-2003, n=300), period 3 (2004-2005, n=277), period 4 (2006-2007, n=288), and period 5 (2008-2009, n=278). There were 1034 males (74%) and 357 females (26%). Across the period, there was no significant change in the gender distribution (male 71.5% - 78.1% vs. female 21.9% - 28.5%). The mean age was 63.9 (SD=10.1, range 28-86) years. There was no significant change in mean age and range from period 1 to period 5. However, male patients were younger than their counterpart (male vs. female = 63.2 vs. 65.8 years) when they enrolled in the program. In addition, the proportion of patients aged 75 or above was increased by 74% from period 1 to period 5. Patients with hypertension and obesity were increased by 19% and 19%, respectively; whereas, patients with hyperlipidaemia was decreased by 32%. Patients that were on welfare assistance and waived for the service were increased by 35%.

Conclusions: There were more elderly patients aged 75 or above having cardiac rehabilitation program. More patients that participated in Phase II cardiac rehabilitation program suffered from hypertension and obesity. On the other hand, more patients that received cardiac rehabilitation service were receivers of welfare assistance.

ABSTRACTS

Abstracts for Free Paper Session:

PERCUTANEOUS CORONARY INTERVENTION AND CORONARY ARTERY DISEASE II

18.

Long term survival of Percutaneous Coronary Intervention (PCI) Patients in a local hospital

Yip TWC, Kong CM, Man SY, Tam KM, Law TC, Kwong NP, Yuen CM, Kwan WK, Woo KS. Department of Medicine, Yan Chai Hospital, HKSAR, China

Background: Revascularization therapy is not without risk and long term survival data is lacking in our local population, as tremendous effort is spent to compare and contrast PCI and bypass surgery. As we are closely following up and prospectively treating a subset of PCI patients according to current guidelines, the demographic data of those who died can be readily compared with those survived.

Methods: To evaluate the patients after percutaneous coronary intervention (PCI), 143 YCH patients undergoing 173 PCI procedures at PMH in the year 2005 were studied and followed up over 5 years. 2 groups of patients (survival and death) were compared.

Results: There were a total of 5 non-cardiac deaths (3.5%) while 11(7.7%) were referred to other hospitals or defaulted. There were 11(7.7%) cardiovascular (CV) deaths, while 116 patients are being regularly followed up at our clinics.

	CV Death (n=11)	Survivors (n=116)
Baseline Age (range)	72±6*(59-79)	64±10(39-86)
Sex (male)	4(34%)*	77(66%)
Indications (MI/CHF/ACS) (%)	73/55**/82**	60/13/38
DM (%)baseline	6(55)	36 (31)
HT (%)baseline	5 (46)	64(55)
Ex-/Smoker (%)	4 (34)	51 (44)
CVA (%)	2(17)	3(2.6)
SCr Before/After procedure (umol/L)	111±55/149±101	96±30/114±114
CrCl Before/After procedure (ml/min)	60±24/49±23**	72±21/67±20
CrCl <60 ml/min/1.73m^2(%)	55	26
Drop in CrCl >10 ml/min/1.73m^2(%)	64*	28
Contrast dose(ml)	188±106	163±81
LAD/Type2 or 3 lesions (%)	18**/82	51/61
>1 vessels/>1 lesions diseases/>1 stents	68/46/55	64/23/41
Stent size/Length(mm)(range)	2.9±0.2/39±24(13-94)	3.2±0.5/36±20(12-108)
Stent number per vessel/<2.6mm (%)	1.7±0.7/34	1.6±0.8/22
Stent Length ≧40mm (%)	46	31
DES (%)	64	63

** p<0.05, ** p<0.01 as compared with the other group(s)*

Conclusion: The elderly with higher prevalence of co-morbidities and in particular chronic kidney diseases were associated with cardiovascular death. They presented acutely with higher prevalence of congestive heart failure and a significant deterioration in renal function after the PCI procedures.

19.

Improvement of Door to Balloon Time in Primary Percutaneous Coronary Intervention After Introduction of Cardiac Rapid Response (CRR) Team

KC Chan, CK Kwok, NH Luk, WS Kwan, YH Cheng, SF Chui, LK Chan, CY Wong, HS Ma, CL FU, LY Tam, CW Chan, KY Lee, KT Chan, KC Ho, CS Chiang
Department of Medicine, Queen Elizabeth Hospital. HKSAR

Background: Door to balloon time (DTBT) during primary PCI for STEMI has been extensively studied during the past several years. They are correlated with patient mortality, and numerous efforts have been made to improve this parameter. National guidelines recommend DTBT within 90 minutes.

Objective: To study the impact of the DTBT for STEMI undergoing primary PCI in a local regional hospital after the introduction of cardiac rapid response (CRR) team.

Patient and methods: CRR team was introduced in our hospital since March 2009. Patient presenting with STEMI during office hour from Monday to Friday will be assessed by our cardiologist and cardiac nurse together in the emergency department. Suitable patients will be transferred directly to the catherization lab for primary PCI. 45 patients were screened and 26 patients had primary PCI done from 3/2009 to 2/2010. 32 patients underwent primary PCI during office hour from 3/2008 to 2/2009 were used as a control sample. Baseline clinical characteristic and door to balloon time will be analyzed and compared between 2 groups.

Result: Mean age of these 58 patients were 64. There was no difference between the age, presence of diabetes mellitus, hypertension and smoking status. They had similar occurrence of cardiogenic shock, congestive heart failure, and had similar number of disease vessels. They used similar type of stent (bare metal vs drug eluted stents). More patients had hyperlipidaemia in the study group (88.5% vs 62.5% p=0.035). There was an improvement of DTBT from 193 minutes to 81 minutes after the introduction of CRR team (p= 0.000).

Conclusion: The implementation of the cardiac rapid response team result in a statistically significant improvement of door to balloon time in primary PCI setting.

20.

Clinical outcomes and angiographic follow-up after stenting of unprotected left main coronary artery stenosis in a regional hospital

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Introduction -Significant unprotected left main stem coronary artery (ULMCA) disease treated medically have a 3-year mortality of 50%, and coronary artery bypass graft (CABG) is the cornerstone of treatment for these patients. Increasing data had demonstrated the safety and feasibility of ULMCA using percutaneous coronary intervention (PCI) In fact, American guidelines had upgraded the indication of PCI to ULMCA from Class III to IIb. This study aims to evaluate the clinical outcome of patients undergoing PCI to ULMCA disease in a regional hospital.

Method- All patients who had undergone PCI to ULMCA in United Christian Hospital (UCH) during Jun 2007 - Dec 2009 were included for analysis.

Results – A total of 1238 cases of PCI were performed in UCH during the above period. In 65 (5.2%) of these cases the target lesion involved ULMCA. The mean age of patients whom had PCI to ULMCA was 68.2 +/- 8.9 years and most of them (74%) were males. Most patients (63%) had normal left ventricular systolic function (LVSF) (defined as LVEF > 55%), 35% had fair LVSF (LVEF 35-55%) and 2% had poor LVSF (LVEF <35%). Distal ULMCA was affected in 88% of cases, while the rest affected either the ostium or the shaft. Immediate procedural success rate was 100%. The majority of cases had utilized drug-eluting stents (DESs) (78%); the rest had non-DES for their ULMCA PCIs. All ULMCA PCIs performed were to de novo ULMCA lesions except 8 instent restenosis (ISR) cases. Intravascular ultrasound and prophylactic intra-aortic balloon pump was used in 85% and 3.1% of patients respectively. One patient required rotational atherectomy. In distal ULMCA disease group, 75% had single stent and the rest had 2 stents implanted mainly using T-stenting strategy, and kissing balloon was performed in 36.7% for single stent and 94% for 2 stents strategies. Mean ULMCA stent size was 3.54 +/- 0.42 mm in diameter and 19.1 +/- 6.8 mm in length. At a mean follow-up time of 358 +/- 220 days, there were 2 deaths (3%); one due to chest infection and the other due to sudden cardiac death, 3 patients had recurrent non Q-wave myocardial infarction (4.6%) and 5 patients required target lesion revascularization (7.6%)all due to non-DES ISR. There was no occurrence of stroke but 1case of possible stent thrombosis in this study population.

Conclusion - ULMCA stenting provided excellent immediate procedural success rate and mid term results in this selected population. These findings suggested that PCI may be considered as a safe and effective alternative to surgery for relatively low risk patients with ULMCA disease in our hospital.

21.

Nine-months clinical outcome for the treatment of in-stent restenosis with second generation compared to first generation drug-eluting stents

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Purpose: The safety and efficacy of first generation drug-eluting stents (DES) in the treatment of instent restenosis (ISR) has been verified. In this study, patients with bare metal ISR diagnosed angiographically between 1 Jan 2006 and 1 Aug 2009 were treated with either first generation (sirolimus or paclitaxel) or secondary generation (zotarolimus or everolimus) DES. Their intermdiate clinical outcome after 9 months was compared.

Method: Patients who had bare metal ISR treated with DES in the United Christian Hospital between 1 Jan 2006 and 31 July 2009 were included. Those who have mixed drug DES were excluded. Demographic data was retrieved from our clinical records and percutaneous coronary intervention registry. Patients' baseline parameters including clinical presentation, age, gender, smoking status, left ventricular ejection fraction, previous history of cardiovascular disease, previous coronary intervention, comorbidities including diabetes mellitus, hypertension, hyperlipidaemia, peripheral vascular disease and renal impairment were collected. Angiographic data including target vessel, ISR patterns, total stent length, maximal inflation pressure were compared. Data regarding their clinical outcomes were retrieved from the computer based clinical record. Major adverse cardiac events were defined as mortality, target lesion revascularization (TVR) and myocardial infarction.

Results: A total of 48 patients were included. Twenty-seven patients were treated with first generation (paclitaxel and sirolimus) stents and twenty- one patients were treated with second generation (everolimus and zotarolimus) stents. Baseline characteristics were similar between the two groups , except mean maximal inflation pressure was significantly higher in the second generation stent group (17 ± 5.3 mmHg vs. 14 ± 1.5 mmHg, P < 0.02). During the 9-months follow up, there was no stent thrombosis and target lesion revascularization. Three patients had nonfatal myocardial infarctions in the first generation DES group. One patient died of acute pulmonary oedema and 4 patients developed non-fatal myocardial infarctions in the second generation DES group. There was no significant difference in incidence of MACE between patients treated with first and second generation DES (11.1% vs 23.8%, respectively, P = 0.279).

Conclusion: In this study, nine-months clinical outcome of the treatment of ISR with second generation DES was comparable to that of the first generation DES. Second generation DES may be a promising option for the treatment of bare metal ISR.

ABSTRACTS

Abstracts for Free Paper Session:

22.

Clinical Outcome of Patients Undergoing Percutaneous Coronary Intervention with Endothelial Progenitor Cell Capture Stent (Genous Stent)

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Objective: The aim of this study was to evaluate the midterm outcome of patient undergoing PCI with Genous stent.

Method: Hospital records of all patients who received PCI with Genous stent from August 2007 to Sept 2009 were reviewed. The baseline demographic data, indication of PCI, duration of dual-antiplatelet treatment, procedure details, major adverse cardiovascular events were analyzed.

Results: A total of 33 patients were recruited between the study periods. Their mean age was 70.94 +/- 9.35 years. There was 9 females (27.3%) and 24 males (72.7%). 75.8% of patients had more than 1 cardiovascular risk factors (i.e., smoking history, DM, HT, hyperlipidaemia, previous CVA/PVD). The mean LV EF was 55.37% +/- 9.5%. 8 patients (24.2%) presented with stable angina while 13 (39.4%) and 12 (36.4%) patients presented with NSTEMI or STEMI respectively. 69.7% of patients had multi-vessel disease. The mean duration of dual-antiplatelet treatment was 2.03 +/-2.20 months. At 6 months post-PCI, none of our patients suffered from sudden death/cardiac death, 5 patients (15%) suffered from non-cardiac death (3 died of pneumonia, 1 died of COPD exacerbation, 1 died of CVA). The cumulative rate of recurrent myocardial infarction was 12% (4 out of 33 patients) at 6 months and 2 of these patients underwent repeat revascularization.

Conclusion: The use of endothelial progenitor cell capture stent in patient with high risk of bleeding undergoing PCI is safe and appears promising. Long-term outcome remains to be evaluated.

23.

Genous™ Experience - A Local and Global Perspective on ACS and Special Indication Patients

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The Genous™ Endothelial Progenitor Cell (EPC) capturing stent has been clinically demonstrated to be a safe stent that helps reduce thrombosis and restenosis despite only a 4-week duration of dual anti-platelet therapy (DAPT) as according to on-label use. In consistency with recent publications and clinical releases on STEMI patients treated with the EPC stents, a total of 174 patients (including 29.9% STEMI patients and 26.4% NSTE-ACS patients) at Queen Mary Hospital (QMH) implanted with the stent also showed comparable findings. In addition, a small number of patients with special indications (e.g. drug intolerance, inability to withstand prolonged DAPT, bleeding issues and peri-operative etc.) also benefited from the EPC stent with favorable results.

Enrollment and Method: ACS and special indication patients with post-procedural DAPT of 4 weeks as according to on-label use.

Results/Outcomes: MACE at 30 days was 5.7% (10); Cumulative MACE at 3 months was 6.8% (12); Cumulative MACE at 1 year was 11.5% (20); Cardiovascular mortality at 1 year was 5.2% (10); Clinically-driven TLR at 1 year was 5.7% (10); Subacute Stent Thrombosis: 0.6% (1); Late Stent Thrombosis: 0.6% (1).

Clinical follow-up data (overall and ACS subgroup) from QMH appears consistent with data from the worldwide 5,000-patient e-Healing Registry (primary outcome of MACE: 7.7%; SAT: 0.2%; LST: 0.3%). To further address the issue of restenosis, a multi-center randomized in-human trial called REMEDEE has been initiated to demonstrate the safety and efficacy of a combo stent that both promotes accelerated healing whilst reducing cell proliferation.

24.

Role of N-Terminal Pro-B-Type Natriuretic Peptide in Diagnosis and Prognosis of Chinese Patients with Stable Coronary Artery Disease

Dr CY Wong 1, Ms BY Wong 1, Ms SY Ng 1, Ms MC Chan 1, Ms YP Iu 2, Dr AOK Chan 2, Dr KY Lee 1, Dr CC Shek 2, Dr KT Chan 1, Dr KC Ho 1, Dr CS Chiang 1
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Objective N-terminal pro-B-type natriuretic peptide (NT-proBNP), synthesized in response to ventricular wall stress, cardiac ischaemia and atherosclerotic burdens, has been well recognized for its clinical utility in diagnosis and prognosis of heart failure. Recently, evidences are emerging with regard to its value in patients with coronary artery disease (CAD). This study aimed to determine the diagnostic value of NT-proBNP in angiographically proven disease, as well as prognostic implication in Chinese patients with stable CAD. The performance of NT-proBNP in comparison to another cardiac biomarker high-sensitivity C-reactive protein (hsCRP) was also assessed.

Method 174 Chinese patients referred for coronary angiogram from 1st July, 2008 to 30th September, 2008 were enrolled. Blood samples were taken for NT-proBNP assays before angiogram. Demographic and clinical characteristics of patients, pre-operative non-invasive investigations and angiographic results were recorded and analyzed. All patients were followed for 1 year for any major adverse cardiovascular events (MACE).

Results The patients were categorized according to the recommended cutoff values of the biomarkers (125 pg/ml for NT-proBNP and 3mg/L for hsCRP). Patients with NT-proBNP value above the cutoff point (n = 89) were older, more likely to have past history of myocardial infarction and heart failure, atrial fibrillation and left ventricular hypertrophy. They had more significant CAD when compared to patients with NT-proBNP level below 125 pg/ml (71.8% vs 50.6%, p = 0.006).

Using multiple logistic regression analysis, NT-proBNP was found to be an independent predictor of significant coronary artery disease with odds ratio 2.73 (95% C.I. = 1.43 – 5.21, p = 0.002) after adjustment for confounders, although the discriminating power was fair only as indicated by an area under receiver operating characteristic curve of 0.628 (95% C.I. = 0.541 – 0.715, p = 0.004).

At 1 year follow up period, there were no significant differences between high and low NT-proBNP groups in terms of all-cause mortality, cardiovascular (CV) mortality, myocardial infarction (MI), heart failure (HF) and stroke. The overall MACE (CV mortality, MI, HF and stroke combined) rate, however, was higher in high NT-proBNP group (12.9% vs 3.4%, p = 0.02). Moreover, there were significantly more patients in this group presented with unstable angina requiring hospital admissions (10.6% vs 0%, p = 0.001).

On the other hand, the level of hsCRP did not show correlation with angiographic severity, has no value in predicting significant coronary artery disease, and was not associated all major adverse cardiovascular events at 1 year follow up.

Conclusion Higher NT-proBNP level in stable patient was associated with more severe angiographic diseases, and was shown to be an independent predictor with fair discriminating power. More adverse events, in particular unstable angina were observed in higher NT-proBNP group at 1 year follow up period. Longer follow up would be indicated to further assess the prognostic value of this biomarker.

25.

The Effects of Vitamin B12 and C Supplementation on Carotid Atherosclerosis in Subjects Exposed to High Environmental Tobacco Smoke

TWC Yip[4], P Chook[4], ML Chiu[1], XH Feng[2], ML Evora[1], KV Koon[1], TYK Chan[4], XM Zhang[2], CL Chu[3], HC Leong[3], KS Woo[4]. [1]Hospital Central Conde de S. Januario, Macao, [2]Kiang Wu Hospital, Macao, [3]Macau Heart Foundation, [4]The Chinese University of Hong Kong

Introduction: Atherosclerosis is the most important medical problem of modern society. High environmental tobacco smoke in casino is associated with an accelerated atherogenic process. We have previously shown vitamin B12 or C supplementation improves vascular reactivity and may be beneficial in vascular protection.

Methods: 78 passive smoking casino employees (19.2% male, mean age 45.0±8.2 years) were randomized to receive vitamin B12 (500μg daily), vitamin C (200μg daily), vitamin B12+C or double image-matched placebo capsules in double-blind 2 x 2 factorial design fashion for 1 year. Carotid intima-media thickness (surrogate atherosclerotic marker, IMT) was measured by ultrasound (automatic edge detection and measurement) at baseline and 12 months.

Results: Of the 78 passive smokers, 9% had hypertension, 6.4% had diabetes mellitus and 19.2% hypercholesterolemia. There were no significant changes in their blood pressure, lipid (LDL-C, HDL-C and TG) profiles, glucose, creatinine and body mass index (BMI) during supplementation for 1 year, but a significant increase in blood B12 during vitamin B12 (p=0.03) and vitamin B12+C supplementation (p<0.01). Carotid IMT improved during 3 active treatment periods, but not during placebo, and was more significant during vitamin B12+C combination (p<0.0001) than either vitamin B12 or C period (p<0.001).

	Placebo (n=21)		Vitamin B12 (n=15)		Vitamin C (n=19)		Vitamin B12+C (n=23)	
	Baseline	12 months	Baseline	12 months	Baseline	12 months	Baseline	12 months
SBP (mmHg)	123±19	120±17	124±15	122±18	117±16	111±10	116±12	108±11
DBP (mmHg)	83±11	79±9	84±12	80±12	78±11	73±10	79±5	73±6
Glucose (mmol/l)	5.1±1.1	5.2±1.0	4.8±0.5	5.1±0.6	4.7±0.8	5.0±0.9	4.9±0.8	4.9±1.0
Creatinine (μmol/l)	70.7±16	64.8±17.1*	76.2±10.0	74.5±10.6	73.9±14.9	69.9±15.5*	69.2±10.2	62.9±9.5
LDL-C (mmol/l)	3.2±0.9	3.0±0.8	2.9±1.4	3.1±1.1	3.3±1.0	3.4±1.1*	2.7±0.8	2.9±0.7
HDL-C (mmol/l)	1.8±0.5	1.6±0.4	1.7±0.4	1.6±0.4	1.8±0.4	1.6±0.4*	1.8±0.4	1.6±0.3
TG(mmol/l)	1.5±1.1	1.9±1.8	1.2±0.7	1.6±1.6	1.2±0.6	1.2±0.6	1.0±0.6	1.2±0.6
BMI (kg/m^2)	23.4±4.2	23.7±3.6	23.4±3.5	23.4±4.2	22.0±2.8	22.3±3.1	22.5±2.9	23.0±2.7
B12 (pg/l)	464±159	510±198	439±148	695±251*	491±161	486±186	504±215	767±345**
Carotid IMT (mmse^{-1})	6.74±0.86	6.67±0.76	6.66±0.91	6.48±0.84*	6.76±1.19	6.54±1.18*	6.68±1.01	6.53±0.98**

*Compared with baseline: *p<0.001; **p<0.0001*

Conclusion: Vitamin B12 or C supplementation improves carotid IMT and may contribute to atherosclerosis prevention in high environmental tobacco smoke.

ABSTRACTS

Abstracts for Free Paper Session:

26.

Coronary Artery Disease and Visceral Fat – A Hospital Based Case Control Study

Iyengar SS, Blessan V, Smritha S, Srilakshmi MA, Santhosh MJ, Shetty GG, Kiron V, and Patil CB, St. John's Medical College Hospital, Bangalore, India

Purpose : Coronary artery disease (CAD) is assuming an epidemic proportion amongst young Indians, Central adiposity through its visceral fat is known to be associated with an increased cardio-metabolic risk. This hospital based case control study attempts to assess the correlation of visceral fat with anthopometric measurements, metabolic parameters and presence of CAD in young Indians.

Methods : Male subjects aged 55 years or less and female subjects aged 65 years or less formed the study population. 20 patients with confirmed CAD were compared with 30 age and gender matched controls. Body mass index (BMI), waist circumference and waist hip ratio (WHP) were measured. Blood samples were collected for sugar, lipids and C reactive protein (CRP). CT scan of the abdomen was done for visceral and subcutaneous fat in all subjects.

Results : There was no significant difference in BMI between controls and cases (23.92 ± 3.00 vs 25.47 ± 2.65, p = 0.067). Waist (88.17 ± 8.17 cms vs 94.90 ± 6.68 cm p= 0.004), Waist Hip Ratio (WHR) (0.92± 0.05 vs 1.00 ± 0.05 p < 0.001), visceral fat area (VFA) (88.40 ± 36.95 cm2 vs 122.58 ± 37.59 cm2. P=0.003). visceral fat by subcutaneous fat ratio (VFA / SFA) (0.044 ± 0.16 vs 0.66 ± 0.24 p <0.001), fating blood sugar (FBS) (97.77 ± 13/04mg% vs 145.25 ± 57.08 mg% p<0.001), triglycerides (128.60 ± 50.86 mg% vs 176.10 ± 73.57mg% p=0.009) and CRP (0.28 ± 0.26 mg% vs 0.58 ± 0.37 mg% p 0.002) were significantly higher in cases compard to controls. Visceral fat area was an excellent predictor of cardio metabolic risk in young CAD patients as seen by Area under ROC curve and also correlated well with BMI, WHR, FBS, triglycerides and CRP_2.

Conclusion : Visceral fat was associated with an increased risk of CAD in young Indian population and it also correlated with BMI, waist, waist hip ratio, increased serum triglyceride levels and raised C-Reactive Protein.

27.

Central Aortic Pressure and Assessment of End Organ Function

A Avolio, M Butlin, M Kim, A Qasem, S Graham. *Australian School of Advanced Medicine, Macquarie University, Sydney, Australia*

Purpose. Arterial blood pressure (BP) is conventionally measured in the upper arm with cuff sphygmomanometry. However, due to elastic and geometric characteristics of the arterial tree, brachial pulse pressure (PP) is usually higher than in the central aorta. Aortic pressure (aBP) determines cardiac load and stress on arteries in central organs and vascular beds (kidney and brain). Recent studies [1,2] have shown that central aortic PP is independently associated with cardiovascular risk and can better differentiate anti-hypertensive agents compared to brachial BP. Aim of this study was (i) to associate aBP indices with presence of glaucoma and (ii) to use aBP for non-invasive estimation of critical closing pressure (CCP) in the cerebral circulation.

Glaucoma. 107 glaucoma subjects were compared with age matched controls (66±12 years). Brachial systolic/diastolic pressures and tonometric radial pressure waveforms were measured and the aBP waveform calculated using a validated transfer function (Sphygmocor, AtCor Medical). Central PP was lower in the glaucoma group (41±1 vs 47±1 mmHg, p<0.001). However, pulse pressure amplification between aortic and brachial site was higher (1.32±0.01 vs 1.24±0.01, p<0.001).

Cerebral critical closing pressure. Central aortic pressure (similar to the glaucoma study) and flow velocity (FV) signals were measured in 19 healthy subjects (22-34 years, 9 females). FV signals from the right middle cerebral artery and radial ABP were recorded simultaneously using transcranial Doppler and applanation tonometry. Cerebral CCP was computed by linear regression between FV and radial and central aBP waveforms. Estimates of central CCP (mmHg, mean ± SD) were: Radial Pressure: 23.5±8.8; Aortic Pressure, 31.1±7.6 (P<0.01). The estimate using aortic waveforms was closer to the values of 32.9±11 from a previous study [3] using long diastoles in patients in ventricular fibrillation. While FV waveforms and radial artery pressure can be used to estimate CCP, aortic pressure gives an estimate closer to the true value.

Conclusions. Findings from these two studies have shown that central aortic pressure derived from non-invasive recordings of the radial pulse can be used, to obtain better characterization of vascular changes associated with glaucoma and improved evaluation of cerebral CCP.

[1] Williams B et al *Circulation.* 2006;113(9):1213-25; [2] Roman MJ et al *JACC* 2009 ;54(18)1730-4]; [3] Aaslid et al, *Stroke.* 2003;34:1645-1649.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC IMAGING AND CORONARY RISK FACTORS

28.

Clinical and Echocardiographic Characteristics of Patients with Bicuspid Aortic Valve

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Purpose: Bicuspid aortic valve (BAV) is the commonest congenital heart abnormalities affecting 0.5 to 2 % of the population. It is a serious condition with notable valvular and ascending aortic risk. Limited data are available in local community. We sought to describe the clinical and echocardiographic features of patients with BAV in a single centre serving about eight hundred thousand of population.

Method: All patients with the diagnosis of BAV were identified through hospital computerized data base (CDASE) and manually in the cardiac out-patient's clinic. Operative records from patients with aortic valve replacement (AVR) were also traced to identify those patients with operative finding of BAV (without pre-operative diagnosis of BAV). Patient's demographic including family history, baseline echocardiographic features including aortic root assessment and associated cardiovascular abnormalities, and clinical outcome were retrospectively analyzed.

Results: Thirty patients with the diagnosis of BAV were identified (age, 46 +/- 18 years, range 12 - 85, 67 % male, 97 % were > 18 years). Five patients were diagnosed at time of AVR. The mean age at diagnosis was 43 +/- 18 years. 43 % of patients were asymptomatic. No patient had known family history of heart disease. Ninteen patients (63%) had heart murmur (systolic murmur in 13, diastolic murmur 4, both in 2). Associated congenital cardiac abnormalities were found in 4 patients (13%) A typical BAV (R-L fusion) was presnet in 25 patients; an atypical BAV was present in 4 patients (one is not identifable). At diagnosis, aortic stenosis was present in 20 patients (67%); aortic regurgitation in 19 patients (63%); aortic root to ascending aortc dilatation in 13 patients (43%, 6 of them only had mid-ascending aortic dilatation). The median follow up time was 3.7 years. The incidence of total medical events (cardiac death, congestive heart failure, new cardiac symptoms stroke and endocarditis) was 27 %; and new cardiac symptoms (dyspnoea, cardiac chest pain, and syncope) 10 %. The incidence of total surgical events (aortic valve, ascending aorta and aortic coarctation) was 50 %; aortic valve surgery (AVR or surgical valvotomy) 50 %, ascending aortic surgery 20 %. One patient had aortic dissection.

Conclusion: Our cohort of patients exemplified that BAV can incur frequent cardiovascular events. Vigilant identification of BAV and associated abnormalities and comprehensive follow up are warranted.

29.

Hypertrophic Cardiomyopathy:
lessening of right ventricular outflow tract obstruction due to development of right bundle branch block. A case report.

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A 20-year old woman, with an history of resuscitated cardiac arrest and ICD implant came to our out-patient clinic for HCM. The first clinical presentation of HCM had been ventricular fibrillation successfully resuscitated some months before our observation. Patient's history was otherwise unremarkable in that she did not referred symptoms. The electrocardiogram revealed normal sinus rhythm, with 107 ms QRS duration and Q waves in the inferior leads; there were no ventricular depolarization abnormalities . Echocardiography showed severe maximal wall thickness (38 mm at mid septal level) and absence of significant left ventricular tract obstruction (LVOTG) at rest. The right ventricle was of normal dimensions (EDD: 29 mm; RV/LV EDD ratio: 0,6), hypertrophied (free wall thickness: 12 mm) with normal systolic function (RV fractional area change: 48%; TAPSE: 14 mm). The right ventricle outflow tract was obstructed at the level of the crista supraventricularis, and there was a septal systolic contact with the right ventricular free wall . Doppler interrogation revealed severe RVOTG, i.e. peak gradient 70 mmHg . Symptoms-limited exercise showed a flat blood pressure response, normal exercise tolerance (exercise time 11 minutes) in the absence of significant arrhythmias and ST\T wave modifications. Therapy with beta-blockers was instituted. At yearly intervals patient was followed-up performing electrocardiogram, echocardiogram and symptoms-limited exercise. There were no changes within the follow-up until the fifth year when electrocardiogram showed RBBB. RVOTG lessen to 40 mmHg which remained stable after 6 months. Right ventricular dimensions and function did not change.

30.

Unusual Non-Compaction Cardiomyopathies. A Case Report

V M Parato, D Rossi, M Partemi, D Delfino. Cardiology Dept, C. and G. Mazzoni Hospital, Ascoli, ITALY

A young man, 35 years old, presented to our institution for palpitations. He had frequent ventricular premature beats on ECG. He had a history of hypertension and tobacco abuse. On physical examination there was a significant olosystolic murmur on the apex, but not clinical signs of heart failure. His ECG treadmill test was normal. The resting echocardiogram showed a typical picture of non compaction cardiomyopathy through the following echo-criteria for the diagnosis:

1) two distinct layers of myocardium ; 2) a ratio (R) of maximal thickness of noncompacted myocardium / compacted myocardium (NC/C) >2 in end-systole; 3) prominent, deep intertrabecular recesses communicating with the LV cavity (@ color doppler).

There can be several pitfalls in the diagnosis of left ventricular hypertrabeculation/non-compaction, because of ventricular hypertrabeculation may be also observed in hypertensive patients, aortic stenosis or hypertrophic cardiomyopathy.

Non compaction cardiomyopathy is frequently associated with congenital heart diseases, abnormal origin of coronary arteries, patent foramen ovale. It may be associated also with Ebstein's anomaly, Wolf-Parkinson-White's Syndrome, Tako-Tsubo like cardiomyopathy and ARVD. We found also an association with bicuspid aortic valve. Our case is quite unusual because the cardiomyopathy was associated with:

1) a monoleaflet mitral valve,
2) a bicuspid aortic valve,
causing a double severe regurgitation.

To the best of our present knowledge, this is the first case with similar features in the medical literature.

ABSTRACTS

Abstracts for Free Paper Session:

31.

Untwisting Rate Determines Filling Pressure Response in Dobutamine Stress Echocardiography

Willis C W Lam, T Marwick. University of Queensland, Brisbane, Australia

Background: Left ventricular untwisting rate (UTR) is a determinant of diastolic suction and early LV filling. Reduced UTR is associated with increased LV filling pressure (E/e') during exercise in patients with diastolic heart failure. In this study, we sought association between time course of UTR and E/e' response during dobutamine stress echocardiography (DSE).

Methods: Routine DSE was combined with measurement of transmitral pulse-wave Doppler, myocardial tissue Doppler and speckle tracking echocardiography at baseline and peak dose in 110 patients (51 women, 62 ± 12y). Untwisting rate (proto-diastolic and isovolumic [IVRT]) was measured by speckle tracking imaging. Filling pressures were represented by E/e'; E/e' > 15 defined raised filling pressure. ANOVA and post-hoc analysis were used to evaluate association of filling pressure response and UTR.

Results: Patients were sub-categorized into 3 groups – Group 1 (n=44), normal resting and peak E/e'; Group 2 (n=33), normal resting E/e' but raised peak E/e'; Group 3 (n=33), abnormal resting E/e'. Risk factors and resting EF were similar in each group. Proto-diastolic untwisting rate was an independent predictor of raised filling pressure at peak stress (r^2=0.3, p=0.03). An abnormal filling response during DSE was independently predicted by resting UTR_{IVRT} (p=0.003), and resting E/a (<p=0.0001) (model pseudo-r^2 = 0.76).

	Group 1 (n=44)	Group 2 (n=33)	Group 3 (n=33)	p-value
Age	60 ± 13	59 ± 10	67 ± 11	0.006
Hypertension %	90.9	57.5	87.9	<0.001
Resting EF %	57.7	57.9	55.3	NS
Resting E	0.63 ± 0.19	0.62 ± 0.13	0.84 ±0.21	<0.001
Resting e'	0.06 ± 0.017	0.06 ± 0.014	0.04 ±0.012	<0.001
Resting UTR-IVRT	-57.0 ± 32.4	-52.5 ± 28.6	-36.2 ± 28.8	0.008
Peak UTR-IVRT	-106.0 ± 58.7	-91.7 ± 69.8	-78.0 ± 54.5	0.15

Conclusion: Patients with abnormal E/e' response during DSE have reduced resting LV untwisting rate during IVRT. This phenomenon supports the contribution of impaired LV suction to the filling pressure response to stress.

32.

Abnormal Left Ventricular Untwist Links Ischemia with Raised Filling Pressure at Dobutamine Stress Echocardiography (DSE)

Willis C W Lam, T Marwick. University of Queensland, Brisbane, Australia

Background: Abnormal diastolic responses to stress are linked to myocardial ischemia. We sought whether this was associated with abnormal LV untwist.

Methods: Routine DSE was combined with measurement of transmitral pulse-wave Doppler, myocardial tissue Doppler and speckle tracking imaging at baseline and peak dose in 110 pts (51 women, 62 ± 12y). Peak diastolic untwisting rate (UTR-PD) was computed by GE EchoPac software. Ischemic responses and other echo parameters were read separately by readers blinded to the other measurement. An ischemic DSE response was defined by any new regional wall motion defect at peak dose. ANOVA was used to analyze association between LV untwisting rate and various DSE responses.

Results: Patients were categorized into 3 groups, normal DSE (n=65), ischemic DSE (n=33) and scar DSE (n=12). The ischemic and scar DSE groups had a higher proportion of pts with prior myocardial infarction and lower resting EF. Patients in ischemic and scar DSE groups are significantly older. However, UTR – which was not different at rest – was lower in the ischemic and scar groups at peak.

	Normal DSE (n=65)	Ischemic DSE (n=33)	Scar DSE (n=12)	p-value
Age	59.4 ± 12.2	64.6 ± 8.2	65.8± 9.2	0.032
Prior MI	10 (15%)	21 (64%)	6 (50%)	<0.001
Resting EF	59.2 ± 3.5	54.4 ± 11.6	52.5 ± 9.7	0.002
Resting E/e'	**13.2 ± 6.7**	**17.64 ± 10.71**	**13.49 ± 6.17**	**0.01**
Peak E/e'	**13.57 ± 5.01**	**18.31 ± 11.59**	**15.12 ± 10.41**	**0.009**
Resting UTR-PD	-102.39 ± 38.47	-102.08 ± 31.43	-81.53 ± 24.94	0.162
Peak UTR-PD	**-204.01 ± 64.27**	**-167.86 ± 76.72**	**-157.90 ± 69.86**	**0.014**

Conclusion: Ischemic and scar dobutamine stress echo response is associated with raised filling pressures at rest and peak stress, and reduced diastolic untwisting velocities at peak. UTR may link ischemia to increased filling pressure.

ABSTRACTS

Abstracts for Free Paper Session:

33.

Gamma-glutamyl transaminase level predicts the development of hypertension

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Introduction: Liver enzymes are elevated in cardiometabolic diseases, particularly when there is non-alcoholic fatty liver disease. We therefore investigated if hypertension is associated with elevated levels of alkaline phosphatase, alanine aminotransferase (ALT), aspartate aminotransferase, and γ-glutamyl transaminase (GGT).

Methods: We included 235 hypertensive and 708 normotensive subjects from the Hong Kong Cardiovascular Risk Factor Prevalence Study-2 (CRISPS-2) in 2000-2004 who had fewer than one alcoholic drink a week. In the follow-up study in 2005-8 (CRISPS-3), 126 out of the 708 subjects had developed hypertension.

Results: In CRISPS-2, after adjusting for age, sex, body mass index, plasma ALT (OR=1.31 per SD of log-transformed level, P=0.005) and GGT (OR=1.52 per SD of log-transformed level, P<0.001) were significantly associated with prevalent hypertension. Among subjects not on anti-hypertensive medication, plasma GGT was associated with systolic (β=0.096, P=0.004) and diastolic blood pressure (β=0.102, P=0.004). In forward stepwise logistic regression analysis of subjects normotensive at CRISPS-2, the highest tertile of plasma GGT level was an independent predictor of the development of hypertension in CRISPS-3 (OR=2.34, P=0.009), together with age, BMI, systolic blood pressure, and plasma CRP at baseline, and change in BMI. The other liver enzymes were not significantly predictors of new-onset hypertension.

Conclusions: Among the four liver enzymes, elevated GGT level is the strongest risk factor for hypertension in Hong Kong Chinese.

34.

Using glycosylated hemoglobin to define the metabolic syndrome in United States adults

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Introduction: Recently, the American Diabetes Association has proposed the use of glycosylated hemoglobin (GHb) in the definition of diabetes and the category of increased diabetes risk. We therefore investigated whether GHb can be used instead of fasting plasma glucose in identifying individuals with the metabolic syndrome, which is associated with increased risk of cardiovascular diseases.

Methods: Participants of the US National Health and Nutrition Examination Survey (NHANES) 1999-2006 who had fasting blood glucose were included (n=3551 in 1999-2002 and n=3412 in 2003-2006). The metabolic syndrome was defined using International Diabetes Federation criteria in 2009. Raised blood glucose was defined either as fasting glucose ≥100 mg/dl (5.6 mmol/l), or as GHb ≥5.7%.

Results: In 2003-2006, there was 91.3% agreement between GHb and fasting glucose when either is used to define the metabolic syndrome, although the use of GHb slightly lowered the syndrome's prevalence (34.8% vs 38.8%, P=0.012). The agreement was good (≥87%) irrespective of age, sex, race/ethnicity, and BMI. Only 2.3% of the sample population had the metabolic syndrome defined using GHb but not using fasting glucose. The syndrome, defined using GHb alone, was associated with cardiovascular diseases (ischemic heart disease, heart failure or stroke) (OR=1.95, P=0.002). Similar results were found in 1999-2002.

Conclusions: Using GHb instead of fasting glucose to define the metabolic syndrome is feasible. The syndrome defined this way also identifies individuals with increased cardiovascular risk.

35.

Serum uric acid, a cardiovascular risk, is associated with common clinical variables and the SLC2A9 polymorphism in Chinese patients

Miao Hu, Valiant WL Mak & Brian Tomlinson. Department of Medicine & Therapeutics, The Chinese University of Hong Kong, Hong Kong SAR.

Purpose: Serum uric acid levels have been associated with increased risk of cardiovascular and renal disease in epidemiological studies. Recently, genome-wide association studies have identified new loci associated with serum uric acid levels including membrane transporters *SLC2A9* and *ABCG2*. We examined whether these and other genetic factors were associated with uric acid levels in Chinese patients.

Methods: Eight single nucleotide polymorphisms (SNPs) in *SLC2A9* (rs1014290, rs12510549), *SLC22CA12* (rs893006, rs11231825), *CCL-2* (rs1860188), *GCKR* (rs1260326) and *ABCG2* (rs2231142, rs2231137) were genotyped in Chinese patients with increased cardiovascular risk and relationships with uric acid were examined.

Results: In 349 patients (including 137 with familial hypercholesterolaemia, 105 with diabetes, 186 with hypertension) mean (± SD) uric acid was 0.35 ± 0.09 mmol/L. Male gender, high creatinine levels, having hypertension, high waist circumference and high levels of triglycerides were significantly related to higher uric acid levels. The *SLC2A9* rs1014290 T>C polymorphism was the only SNP independently associated with uric acid levels before and after adjustment for those clinical variables (CC vs. TC vs. TT = 0.38 ± 0.08 mmol/L: 0.34 ± 0.09 mmol/L: 0.31 ± 0.10 mmol/L, $P=1.0\times10^{-5}$) and the association was more pronounced in women than in men, consistent with previous findings. In multivariant analysis, all these genotypic and phenotypic factors totally explained 36.6% of the variance in uric acid levels.

Conclusions: Uric acid levels were related to common clinical variables and the *SLC2A9* rs1014290 polymorphism in these Chinese patients.

36.

Influence of Genetic Variants and Other Cardiovascular Risk Factors on High-Sensitivity Will C-Reactive Protein in Chinese Patients on Simvastatin Therapy

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Introduction: High sensitivity CRP (hsCRP) is a marker of inflammation and cardiovascular risk and is modulated by genetic variation and by other cardiovascular risk factors. Statins reduce hsCRP and achievement of lower hsCRP levels appears to be associated with better outcomes. We examined the relationships of hsCRP levels with genetic and phenotypic factors in patients on simvastatin treatment.

Method: Lipid parameters and plasma hsCRP were measured in Chinese patients treated with simvastatin 40 mg daily for at least 6 weeks. Phenotypic factors and single nucleotide polymorphisms (SNPs): *HNF1α I27L, CRP 3872G>A* and *CRP 5237A>G*; were analyzed for relationships with on-treatment hsCRP.

Results: In 271 patients with good adherence to therapy, reductions in plasma total cholesterol and LDL-cholesterol were -35.7±8.4% and -47.3±12.7%, respectively. Higher levels of hsCRP were associated (p<0.05) with having diabetes, higher waist circumference, higher plasma triglycerides, and lower plasma HDL-cholesterol. Multivariate logistic regression analysis showed that the odds ratio of having CRP>1mg/L was 2.4 (95%CI: 1.1-5.5; p<0.05) in subjects with wild-type *CRP 3872GG* variant compared to patients with *3872A* alleles after adjustment for waist circumference and plasma HDL-cholesterol level. There were no significant relationships with other candidate SNPs.

Discussion: A common SNP in *CRP* and other risk factors related to the metabolic syndrome influence hsCRP levels in Chinese patients on treatment with simvastatin.

ABSTRACTS

Abstracts for Free Paper Session:

37.

Role of eNOS Enhancer in Prevention of Coronary Endothelial Dysfunction Induced by Homocysteine

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Purposes: Elevation of blood homocysteine levels (hyperhomocysteinemia) is a risk factor for cardiovascular disorders that has been demonstrated to be associated with endothelial dysfunction In this study, we investigated the effect of a newly developed transcription enhancer of endothelial NOS (eNOS), AVE3085, on homocysteine-induced coronary endothelial dysfunction.

Methods: Isometric force study was performed in a myograph with both endothelium-dependent and -independent relaxation examined in porcine coronary small arteries (diameter 600-800 μm) that were incubated for 24 hours with homocysteine (50 μM), AVE3085 (10 μM), or homocysteine plus AVE3085. Protein expression of eNOS and the phosphorylation of eNOS at serine-1177 (p-eNOS^{Ser1177}) were determined by Western blot.

Results: Incubation with homocysteine for 24 hours did not alter the endothelium-independent relaxation to sodium nitroprusside in coronary arteries but significantly decreased the vasorelaxation to endothelium-dependent vasodilator, bradykinin (60.9±5.4% vs. 93.1±2.0% in control, $p<0.0001$; EC_{50}: -6.64±0.39 vs. -7.73±0.26 LogM, $p<0.05$). Protein expressions of eNOS and p-eNOS^{Ser1177} were markedly inhibited by homocysteine. Cotreatment with AVE3085 restored bradykinin-induced relaxation (90.5±1.6% vs. 60.9±5.4% $p<0.0001$) and enhanced eNOS and p-eNOS^{Ser1177} expression. Pretreatment with either protein kinase Akt inhibitor or inhibitors of phosphatidylinositol 3-kinase (PI3-kinase), wortmannin and LY294002, attenuated the protective effect of AVE3085 on vasorelaxation. Inhibition of PI3-kinase/Akt also decreased eNOS phosphorylation at serine-1177 that was enhanced by AVE3085.

Conclusions: AVE3085 attenuates homocysteine-induced coronary endothelial dysfunction with PI3-kinase/Akt pathway involved. This study suggests that eNOS enhancers may have potential clinical applications in controlling homocysteine-associated vascular injury and cardiovascular disease.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC SURGERY

38.

Surgical Treatment of Tricuspid Regurgitation After Mitral Valve Surgery

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Purpose: Functional tricuspid regurgitation (TR) occurs in patients with rheumatic mitral valve disease even in those who had mitral valve surgery. The aim of this study was to analyze TR in a group of patients who underwent successful mitral valve surgery.
Methods: From September 2003 to September 2008, 45 patients with TR after mitral valve replacement and underwent second operation for TR were enrolled in this study. In those, 43 patients (95.6%) had right heart failure symptoms (edema of lower extremities, ascites, hepatic congestion, etc.) and 40 patients (88.9%) had atrial fibrillation. Twenty-six patients (57.8%) were in New York Heart Association (NYHA) functional class III, and 19 (42.9%) in class IV. Previous operations included: 41 for mechanical mitral valve replacement (91.1%), 4 for bioprosthetic mitral valve replacement (8.9%), and 7 for tricuspid annuloplasty (15.6%).
Results: All patients received medications to improve the heart function. The tricuspid valves were repaired with Kay's (7 cases, 15.6%) or De Vega technique (4 cases, 8.9%). Tricuspid valve replacement was performed in 34 cases (75.6%). One patient (2.2%) died. Postoperative low cardiac output (LCO) occured in 5 patients and treated successfully. Postoperative echocardiography showed obvious reduction of right atrium and ventricle. Comparing with the preoperative data (33.7±6.2mm), the anteroposterior diameter of right ventricle decreased to 23-41mm (25.5 ±7.1mm) (P<0. 05).
Conclusion: TR after mitral valve replacement in rheumatic heart disease is a serious clinical problem. If occurs or progresses late after mitral valve surgery, tricuspid valve annuloplasty or replacement may be indicated with satisfactory.

39.

Inhibition of Vasoconstriction by Amlodipine in Human Internal Mammary Arteries Used as Bypass Grafts

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Purpose Graft spasm remains challenging in coronary artery bypass grafting (CABG) surgery. We investigated the inhibitory effect of a clinically used dihydropyridine calcium antagonist amlodipine on the vasoconstriction mediated by a number of important spasmogens potassium chloride (KCl), human urotensin-II, and thromboxane mimetic U46619 in human internal mammary artery (IMA) from patients undergoing CABG.
Methods Isolated IMA rings (n = 78, taken from 42 patients) were studied in organ baths in two ways: the relaxing effect of amlodipine on vasoconstrictor-induced precontraction by KCl, hU-II, and U46619 and the depressing effect of amlodipine on the contraction.
Results Amlodipine caused full relaxation in KCl (98.0 ± 2.1%)- , hU-II (98.5 ± 2.4%)- , and in U46619-contracted (96.3 ± 1.3%) IMA rings (n = 8) with 15.5-fold higher potency to KCl than to hU-II (EC50: -8.17 ± 0.28 vs. -6.98 ± 0.01 log M, p < 0.001) and 19.5-fold that to U46619 (EC50: -8.17 ± 0.28 vs. -6.88 ± 0.08 log M, p < 0.001). Pretreatment of IMA with plasma-concentrations of amlodipine (-6.6 log M) significantly depressed subsequent contraction to KCl (from 20.8 ± 2.5 mN to 7.6 ± 3.0 mN, P = 0.004), hU-II (from 14.1 ± 4.2 mN to 3.8 ± 2.0 mN, P = 0.026), but did not affect the contraction to U46619.
Conclusion We conclude that in human IMA, amlodipine has a selective inhibitory effect on the vasoconstriction mediated by a variety of vasoconstrictors. Thus, amlodipine may be useful in patients undergoing CABG for treatment and prevention of graft spasm.

40.

Outcome of Thoracic Organ Transplantation for Adults with Congenital Heart Disease

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Background: Transplantation can be an option of treatment in adult patients with congenital heart disease (CHD) who develop severe cardiopulmonary dysfunction. We describe the outcome of patients who had undergone heart (HTx) or heart-lung transplantation (HLTx) in Hong Kong.
Methods: We performed a retrospective review of seven adults (4 males) with CHD who had HTx or HLTx between 1995-2009, and compared the two groups.
Results: Median age at transplantation was 30 years (range 23-47 years) with a median follow-up of 3.3 years (range 1-8 years). There were four HTx which constituted 4% of all HTx recipients in Hong Kong. The diagnoses were: Tetralogy of Fallot (n=2), pulmonary atresia and ventricular septal defect (n=1), transposition of great arteries after Mustard operation (n=1). There were three HLTx which accounted for all HLTx in this locality. All three patients had Eisenmenger syndrome (two ventricular septal defects, one atrial septal defect). There was one early mortality (4 weeks) after HLTx due to graft versus host disease complicated with fungal septicemia. All patients after HTx survive and are in NYHA class I-II except one who has neurological sequelae after resuscitated cardiac arrest before HTx. Complications of HTx patients included bleeding, antibody mediated rejection, moderate to severe acute cellular rejection, right ventricular dysfunction which resolved after appropriate therapies. One patient after HLTx had refractory chronic lung rejection and was in NYHA class III. She died 6 years 11 months after HLTx while waiting for lung retransplantation. The other surviving HLTx patient is in NYHA class I with persistent bilateral pleural effusion treated with diuretic.
Conclusion: HTx or HLTx can be considered in selected adult patients with CHD with reasonable outcome. From our observation, HTx patients appear to have better survival compared to HLTx patients, which concurs with the experiences of other centers.

41.

Surgical Results of Pulmonary Valve Replacement after Repair of Tetralogy of Fallot

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Purpose: To evaluate the results of pulmonary valve replacement (PVR) in patients with severe pulmonary regurgitation (PR) after tetralogy of Fallot (TOF) repair in Hong Kong.

Methods: Medical records of patients requiring PVR after repair of TOF in our center between January, 2002 and December, 2008 were reviewed.

Results: Over a six years period, 17 patients (10 male, 7 female) required PVR for severe PR after previous complete repair of TOF. The mean age of PVR was 23.72 +/- 13.03 years and the mean time interval between the initial repair for TOF and PVR was 18.48 years +/- 9.15 years. Indications for PVR were symptomatic severe PR in three patients and asymptomatic progressive right ventricular dilatation in the remaining 14 patients. There was no in-hospital mortality. The mean post-operative duration of stay in the intensive care unit was 1 day. The mean hospital stay was 12.37 +/- 7.74 days.

Conclusion: With the advances of surgical techniques and peri-operative care, the early mortality of TOF repair in patients beyond infancy has become very low and many patients survive to adulthood. Many of these patients develop chronic PR requiring PVR. Our results showed that PVR for severe PR after previous complete repair of TOF is a safe procedure and patients may benefit from PVR with improved right ventricular function

ABSTRACTS

Abstracts for Free Paper Session:

42.

Aortic dissection, Intramural hematoma and Penetrating atherosclerotic ulcer: A 10 years' experience from a regional hospital

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Purpose: Aortic dissection carries high morbidity and mortality. Variants of aortic dissection include intramural hematoma and penetrating atherosclerotic ulcer which share similar clinical presentation and management. The aim of this study is to investigate the difference in clinical characteristics between aortic dissection, intramural hematoma (IMH) and penetrating atherosclerotic ulcer (PAU).

Methods: Retrospective review was performed to the 153 patients admitted to our hospital with the Clinical Management System (CMS) diagnosis of 'dissecting aortic aneurysm' from the year 2000 to 2009. All computer tomography (CT) and transesophageal echocardiogram (TEE) reports were reviewed to differentiate between aortic dissection, intramural hematoma (IMH) and penetrating atherosclerotic ulcer (PAU).

Results: The disease was male predominant (66%) with the mean age of 68.4 years old. 141 (92.2%) patients had hypertension. There were 88 (57.5%) cases of aortic dissection, 62 (40.5%) cases of IMH, and 3 cases of PAU. Analysis was mainly performed on aortic dissection and IMH. In aortic dissection, 46 cases (52.3%) were type A and 42 cases (47.7%) were type B. In IMH, 25 cases (40.3%) were type A and 37 cases (59.7%) were type B. 30 cases (34.1%) proceeded to surgery in aortic dissection and 10 cases (16.1%) proceeded to surgery in IMH. The difference in the rate of surgical treatment was significant (P=0.014). Complications including in-hospital mortality occurred in 41 cases (46.6%) of aortic dissection, compared with 16 cases (25.8%) of IMH (P=0.01). The most common complications were hemopericardium, acute renal failure and cerebrovascular accident. The rate of in-hospital mortality was also significant more in aortic dissection (24 cases, 27.3%), compared with IMH (7 cases, 11.2%) (P=0.017).

Conclusion: The rate of complication, in-hospital mortality and surgery were significantly more in aortic dissection when compared to intramural hematoma. Prompt recognition for the type of aortic dissection is essential for risk stratification and outcome improvement.

43.

Predicting surgical outcome with computed tomography of right ventricle (CTRV) in patients with late tricuspid regurgitation

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Objective: Isolated tricuspid regurgitation can progressively worsen years after left sided heart valves surgery. Surgical repair or replacement became inevitable when severe symptoms appeared. Prognostic factors are lacking in the literature, especially relating right heart function to this right sided heart valve surgery. This study aimed to predict surgical outcome by using right ventricular function obtained from computed tomography.

Methods: Patients underwent isolated tricuspid surgery were enrolled. All of them had routine workup and CTRV assessment before operation. Primary end-point was survival and symptomatic improvement at 1 year follow up.

Results: From Jan 2005 to June 2008, 24 patients had either isolated tricuspid repair or replacement done. There were 12 patients in the favorable group (survivor with at least 1 NYHA class improvement) and 12 in the unfavorable group (non-survivor or survivor with no symptomatic improvement). All the baseline characteristics, echocardiogram data and surgical details were comparable between the 2 groups. Only CTRV parameters including end-systolic volume (ESV), indexed end-systolic volume (iESV), end-diastolic volume (EDV) and indexed end-diastolic volume (iEDV) were significantly different between the 2 groups. Patients had iESV > 88ml/m^2 or iEDV > 188ml/m^2 pre-operatively likely to have unfavorable surgical outcome.

Conclusions: Right ventricular function from CT can predict surgical outcome in patient underwent isolated late tricuspid regurgitation. Operation should not be delayed until severely dilated right ventricle in order to have favorable surgical outcome.

ABSTRACTS

Abstracts for Free Paper Session:

MISCELLANEOUS

44.

Pulmonary Arterial Hypertension: Characteristics of Patients

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Purpose: Pulmonary arterial hypertension (PAH) is characterized by increased pulmonary vascular resistance and arterial pressure that can lead to right heart failure and death. Recently, there were significant changes in diagnosis and management of PAH. However, the treatment results were still unsatisfactory. Before further trails to study different combination of drugs, we need to have better understanding of the characteristics of the patients with PAH.

Methods: Retrospective study. All patients who were admitted to Queen Elizabeth Hospital with the diagnosis of World Health Organization group I PAH or with confirmation of group I PAH by cardiac catheterization during the period from 01/01/2008 to 01/03/2010 were included. Queen Elizabeth Hospital was one of the territory referral centre in Hong Kong. All the pediatric patients with age <18 were excluded.

Results: A total of 15 patients were admitted to our hospital with the diagnosis of Group I PAH in the study period. 4 of them were newly diagnosed. 93% (14/15) patients were female. The mean age was 44 years old, ranged from 27 years old to 77 years old. 2 cases were idiopathic PAH, 2 cases were associated with drugs (ex-IVDA, history of use of metaphetamine), 2 cases were associated with connective tissue disease (scleroderma, SLE), 6 cases associated with congenital systemic-to- pulmonary shunts and 3 cases with unknown association (patients refused further workup). 9 cases had right heart catheterization with mean PA pressure ranged from 27 to 70 mmHg, mean PA pressure of all 9 cases was 48mmHg. Drugs related PAH seemed to have higher mean PA pressure (58,70mmHg) and lower cardiac index (1.47/1.29L/min/m2 vs 2.84L/min/m2 in other associations). No cases showed vasoreactivity. 5 patients were in NYHA functional class (FC) II on diagnosis, 5 patients in FC III and 2 patients in FC IV. Only 1 patient received Ca blocker but not in the therapeutic high dose. 6 patients received one of the PAH targeted therapy and 1 patient received more than 1 PAH targeted therapy, 4 patients with home O2 therapy, 7 patients received warfarin and 6 cases had diuretic. 1 patient had history of atrial septotomy and 1 patient was waiting for lung transplant. There were 3 patients died in the study period, 1 died of right heart failure with convulsion, 1 because of pulmonary artery dissection and the cause of the remaining one was unknown.

Conclusion: PAH is not an uncommon disease and it causes significant morbidity and mortality especially in the young age group. The most common association of PAH was congenital heart disease, but the drug related PAH was also a concern to us. The patients with drug associated PAH likely to have higher mean PA pressure and lower cardiac index which might signify poorer prognosis. Patients usually presented late to medical profession (functional class III/ IV) which affected the prognosis as well. We need to have more health care promotion especially on prevention of drug abuse in the hope to decrease the drug associated PAH and could start PAH targeted therapy earlier in the disease process of the other group 1 PAH.

Pitfall: Bias might be due to retrospective data collection from the electronic registry, data may not be totally accurate in term of diagnosis coding.

45.

A Profile Of Pulmonary Thromboembolism - A Retrospective Study

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Purpose : Pulmonary Thrombo Embolism (PTE) is a potentially fatal condition, but an eminently identifiable and treatable medical emergency. This retrospective analysis was undertaken to study the profile of PTE patients ie risk factors, clinical picture and in hospital outcome.

Methods From June 2002 to August 2009, 81 patients of PTE hospitalized formed the study population.

Results The mean age was of 49.02 + 14.71 years and out of 81, 42 were females. Diagnosis of PTE was based on clinical findings, ECG, Echocardiography, Chest x-ray, D-dimer and CT chest. Risk factors were hypertension 28.39%. Diabetes mellitus 28.39%, Smoking 19.75%, DVT 18,75%, post operative state 13.58%. Cardiopulmonary diseases 12.34%, prior PTE 8.64%, Malignancy 6.17%, fracture / trauma 4.93%. Most common symptoms were dyspneoa 96.29% followed by lower limb swelling 38.27%, chest pain 37.03%. cough 25.92%. Signs were tachypnoea 87.65%, raised JVP 64.19%, tachycardia 54.32% and rates 41.97%. Well's score was done in 76 patients, showed moderate probability in 64.47% and high probability in 30.26%. ECG showed sinus tachycardia in 43.20% STQ3T3 in 26.33% and RBBB in 18.5%. Echo showed RA/RV dilatation in 77.77%. PAH in 75.30%, RV dysfunction is 19.75% and PA thrombus in 12.34%. D-dimer was done in 43 patients showed significant elevation in 97.67%. CT chest done in 54 pateints out of which 48 pateints (88.88%) had features of PTE 30 (37.03%) patients were thrombolysed, 2 (2.46%) received IVC filter, 12 (14.81%) expired in the hospital and 69 (85.18%() patients were discharged on oral anticoagulation.

Conclusion : Well's score was useful in assessing the probability of PTE. The mortality rate was high which highlights the importance of prevention and early detection of PTE.

46.

Effect of Hypoxia-Reoxygenation on Endothelial Canonical Transient Receptor Potential Channels

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[3]TEDA International Cardiovascular Hospital, Medical College, Nankai University, Tianjin, China

Purposes: The importance of canonical transient receptor potential channels (TRPCs) has been revealed in endothelial intracellular Ca^{2+} ($[Ca^{2+}]_i$) regulation and therefore in vascular endothelium physiology. Whether TRPCs are affected by ischemia-reperfusion / hypoxia-reoxygenation has been poorly studied. Therefore, in this study, we investigated the role of endothelial TRPCs in vasorelaxation and the effect of hypoxia-reoxygenation (H-R) on these channels.

Methods: Primary cultured porcine coronary endothelial cells (PCECs) were used for patch-clamp study. Endothelium-dependent relaxation to bradykinin (-10~-6.5 LogM) was studied in porcine coronary small arteries (diameter 600 to 800 μm) in a myograph.

Results: Bradykinin-induced vasorelaxation in coronary arteries was attenuated by pre-incubation with TRPCs inhibitor SKF96365 (10 μM) (86.9±4.1% vs. 94.4±2.8%, $p<0.05$). Similar reduction ($p<0.05$) was also observed in the vessels pre-incubated with the specific TRPC3 inhibitor, Pyr3 (3 μM). H-R (60-30min, PO_2<10 mmHg) markedly reduced the vasorelaxation to bradykinin (70.3±6.4% vs. 88.9±3.5% in normoxia control, $p<0.05$) and such reduction was restored (96.4±1.8%) by pre-incubation with TRPC3/6/7 activator 1-oleoyl-2-acetyl-sn-glycerol (OAG, 100 μM). In primary cultured PCECs, the cation current elicited by bradykinin was inhibited by exposure to H-R (8.6±0.4 vs. 14.0±1.5 pA/pF in control, $p<0.01$). Pyr3-sensitive TRPC3 current was reduced from 6.3±0.6 pA/pF to 3.8±0.3 pA/pF after H-R exposure ($p<0.01$).

Conclusions: TRPCs, including TRPC3, play an important role in endothelium-dependent relaxation in porcine coronary arteries. H-R inhibits the channel activity of TRPCs and the associated endothelial function. These results suggest that TRPCs may become an important and novel pharmacological target for endothelium protection in ischemic coronary disease.

ABSTRACTS

Abstracts for Free Paper Session:

47.

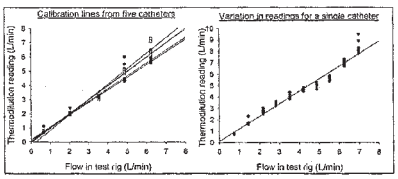
Measurement of errors associated with using Pulmonary Artery Thermodilution Catheters.

XX Yang; LA Critchley, Department of Anaesthesia and Intensive Care, The Chinese University of Hong Kong, Hong Kong

Purpose: Thermodilution cardiac output lacks precision, and has a quoted error (95% confidence interval for reading variation) of ±20%. This lack of precision, and uncertainty about its true value, causes difficulty when thermodilution is used to validate new cardiac output technology. Our aim was to reappraise the precision error of thermodilution.

Methods: A test rig consisting of 1.6cm diameter plastic tubing, a water reservoir (10-litres), a high volume water pump with flow regulator and ports to insert thermodilution catheters into a flow chamber was assembled. Flow in the test rig was measured using an externally placed transonic flow probe and flow meter. The meter was first calibrated by timing the filling of a glass cylinder. Circulating water temperature was 36.5°C. Five Baxter (Edwards Lifesciences, US) 7Fr thermodilution catheters, connected to a Siemens SC9000 cardiac output monitor, were tested. Thermodilution cardiac out readings were made by injecting 5ml of ice cold water. The calibration of each catheter was compared by plotting the test rig reading against the thermodilution reading. Flow rates from 0 to 8 L/min were used and a calibration (regression) line drawn for each catheter. Inter reading variability was measured by taking ten readings at flows from 0 to 8 L/min for one catheter.

Results: The calibration of the catheters varied from an offset of -9.5% to +5.2%. At a flow rate of 5 L/min the thermodilution reading ranged from 4.6 to 5.2 L/min. The estimated precision error at this flow was ±8.0% (Figure). The inter-reading variability (coefficient of variation) was 4.8%, with an estimated precision error of ±9.6% (Figure)



Conclusion: This study showed that individual Baxter catheter could vary significantly in their calibration, introducing measurement errors of ±8.0%. Individual reading could also vary as much as ±9.6%. The combined error was ±12.5% (adding variances). Considering that the study was a well controlled laboratory bench experiment, and additional in-vivo errors related to pumping nature of the heart (rather than steady-flow), physiological / respiratory variations in cardiac output and the clinical setting are not included, it would not be unreasonable to suggest that up to ±20% is still a realistic estimate of the error for thermodilution measurement. Our data was limited to only 5-catheters and steady-state in-vitro testing.

48.

The effect of retinoid acid signaling on the embryonic cardiac development and regulation of cardiac related tbx1 and tbx20 expression

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Objectives: To explore the effect of insufficient retinoid acid (RA) signaling on the early embryonic cardiac development, especially on the regulation of cardiac related transcriptional factors *tbx1* and *tbx20* expression.

Methods: We designed morpholino antisense oligonucleotides (MO) targeting zebrafish *raldh2* gene to knock-down its expression and constructed *raldh2*-EGFP plasmid to verify the effectiveness and specificity of *raldh2*-MO. The embryonic cardiac phenotype and cardiac function were analyzed and compared between wild-type and *raldh2*-MO group. Then, we described the expression pattern of *tbx1* and *tbx20* gene in zebrafish embryos, and the regulation of their expression when *raldh2* gene was knocked down.

Results: *Raldh2*-MO microinjection could effectively knock-down *raldh2* gene expression, the mortality and abnormal embryo rate rose with the increase of *raldh2*-MO dosage. *Raldh2*-MO embryos exhibit abnormal cardiac phenotype, including swollen pericardial cavity, tubular heart, incomplete D-loop, abnormal atria and ventricle development, blood regurgitation, slow blood flow and weak heart beat. The results of whole-mount *in situ* hybridization of *tbx1* and *tbx20* probes revealed that these genes had distinct expression patterns, tbx1 expressed in cardiac outflow tract, otic vesicle and pharyngeal arch, while *tbx20* expressed in cardiac outflow tract and atrium, branchio motor neuron, tegmentum and retina but both of them expressed in the embryonic heart. In *raldh2* knock-down embryos, *tbx1* and *tbx20* expression were down-regulated in the heart to some extent.

Conclusions: RA signaling plays a critical role in several key stages of cardiac development. The expression of *tbx1* and *tbx20*, which play important roles during embryogenesis, can be regulated by RA signaling during cardiac development, and the underlying mechanism still needs further investigation.

49.

Ethanol and its metabolites induce cytotoxicity and H3 lysine9 epimutation in cardiac progenitor cells

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Purpose: This study was to investigate the effect of ethanol and its metabolites on acetylation of H3 lysine9 and the mRNA expression of heart development-related genes Gata4, Mef2c, Tbx5 in cardiac progenitor cells.

Methods: We use cardiac progenitor cells as our study object and apply MTT assay to select the intervention concentrations, Western-bloting to acetylation of histone H3 lysine9, Real-time PCR to expression of genes .

Results: MTT assay show that low concentration groupes of 50 mmol/L ethanol、4 mmol/L acetaldehyde、4 mmol/L acetate didn't affect the proliferation of cells compared with control ($P>0.05$) ,but high concentration groupes of 200mmol/L ethanol, 12mmol/L acetaldehyde, 16mmol/L acetate affected the proliferation about 30% ($P<0.05$) .We reveal that low concentration groupes of ethanol, acetate respectively increased 2.4, 2.2-fold acetylation of H3 lysine9 ($P<0.05$) ,but the heart development-related genes had no significant change ($P>0.05$). High concentration groupes of ethanol , acetate respectively increased 5.3, 5.6-fold acetylation of H3 lysine9 and the expression of heart development-related genes GATA4, Mef2c increased as compared with control or the corresponding low concentration groups ($P<0.05$) .whether low or high concentrations acetaldehyde all had a negligible effect on the acetylation of H3 lysine9 and the expression of heart development-related genes ($P>0.05$).

Conclusions: High concentrations of ethanol and its metabolites all have a cytotoxicity effect to cardiac progenitor cells. Ethanol and acetate induce H3 lysine9 epimutation which maybe one of the pathogenesis of CHD caused by alcohol.

50.

Temporal regulation of p300 on heart development-related genes during mouse cardiogenesis

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([1]Department of Heart Centre, [2]Pediatric Institute, Children's Hospital of Chongqing Medical University, Chongqing, P.R.China)

Purpose: This study was to observe temporal expression of heart-specific transcription factors (TFs) GATA4, Nkx2.5, MEF2c and Tbx5 and the changes of histone acetylation on these genes promoter region during mouse embryonic heart development. And this study was also to investigate if histone acetyltransferase p300 directly controlled dynamic expression of heart-specific transcription factors. These lay the foundations to further clarify the relations between them and congenital heart diseases.

Methods: The whole hearts from embryonic mice on embryonic days (E)10.5 and 16.5 were collected accordingly, and then total RNA was extracted. Heart-specific transcription factors (TFs) GATA4, Nkx2.5, MEF2c and Tbx5 mRNA from mouse myocardium at differential embryonic days during cardiac development were analyzed by quantitative (Q)-PCR. The levels of histone H3 acetylation on these heart-specific TFs promoter and transcription factor binding sites of p300 to these genes were identified by chromatin immunoprecipitation assays (ChIP).

Results: The present study furnishes a comparative temporal expression map of cardiac transcriptional factors, during murine heart development (E10.5 and E16.5). The mRNA levels of these genes present dynamic change. On E10.5, the expressions of Gata4 and Mef2c were remarkable lower than those on E16.5($P<0.05$). While Nkx2.5 and Tbx5 gene expression levels were remarkable higher on E10.5($P<0.05$). Accordingly, Chromatin immunoprecipitation (ChIP) analysis revealed there exist obviously difference on levels of histone H3 acetylation of these heart-specific TFs promtor between E10.5 and E16.5. Those changing trend was consistent with that of heart-specific TFs mRNA expression between E10.5 and E16.5. Meanwhile, binding of p300 to Gata4, Nkx2.5, Mef2c and Tbx5 promoter was detected by ChIP assay.

Conclusion: Data suggest that heart-specific TFs expression could be regulated by promoter activation through histone H3 acetylation activation, which might be dependent on the cooperation with co-activator p300. These results implicate p300 is an important component of heart development and provides an insight into the mechanisms of the dynamic expression of cardiac transcriptional factors during mouse cardiogenesis.

ABSTRACTS

Abstracts for Free Paper Session:

51.

Curcumin down-regulates the expression of cardiac-specific genes by reducing the acetylation level of histone H3

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([1]Department of Heart Centre, [2]Pediatric Institute, Children's Hospital of Chongqing Medical University, Chongqing, P.R.China)

Purpose: As a critical histone acetylase (HAT) and transcriptional coactivator, p300 plays an important role in regulation of gene expression. However, the relationship of histone acetylation mediated by p300 and cardiac-specific genes remains unclear. In this study, we supposed to investigate the relationship between histone hypo-acetylation and the expression of cardiac-specific genes and to clarify the regulation mechanism.

Methods: Cardiac specific genes which combined with p300 protein physically were identified by chromatin immunoprecipitation (ChIP). Primary cardiocytes were cultured in vitro and treated by curcumin, then total RNA and nuclear proteins were extracted to detect the HAT activity, histone acetylation, the cardiac-specific genes expression and structure of chromatin

Results: Gel electrophoresis of PCR production after ChIP showed that GATA4, Nkx2.5 and Mef2c were combined with p300 protein physically. HAT assay showed that the HAT activity of curcumin group was inhibited significantly compared with the other two groups in a dose- and time-dependent manner and the optimum condition was 30uM and 24h. After treatment with the optimum condition, the acetylation of histone H3 was reduced markedly than the other two control groups ($P<0.05$). Accordingly, the expression of cardiac-specific genes GATA4, Nkx2.5 and Mef2C, were down-regulated significantly in curcumin group ($P<0.05$) analyzed by Q-RT-PCR. And the result of ChIP certified that the acetylation level of histone binding with promoter regions of cardiac-specific genes was reduced markedly.

Conclusion: p300 could combine with cardiac specific genes GATA4, Nkx2.5 and Mef2c and regulate their expression. Inhibiting p300-HAT by curcumin can reduce the acetylation level of histone H3, and down-regulate the expression of cardiac-specific genes, GATA4, Nkx2.5 and Mef2C, by reducing the acetylation level of histone H3 binding to the cardiac-specific gene promoters.

52.

Effects of Hydrogen Sulfide on the Expressions of bax and bcl-2 in Hippocampi of Rats after Cardiopulmonary Resuscitation.

Ji-yan Lin, Hong-yan Wei, Hui Li, Xin Li, Rong Liu, Chun-lin Hu, Guo-qing Huang, Gang Dai, Xiao-xing Liao on behalf of Department of Emergency, the First Affiliated Hospital of Sun Yat-Sen University, Guangzhou, China

Purpose: To examine the expression of bax and bcl-2 in the hippocampi of rats and investigate the effects of hydrogen sulfide (H_2S) on neurons apoptosis after cardiopulmonary resuscitation (CPR).

Methods: There were 160 male SD rats, the 108 rats were initially selected and randomly divided into 3 groups equally. Model of cardiac arrest were induced by transcutaneous electrical epicardium stimulation and standard CPR were offered in all the subjects. After ROSC, the First group were given sodium bisulfide, the second group were given hydroxylamine, and the third group were only given routine CPR. Above-mentioned the three groups were further divided three sub-groups based on the observed end point (1, 3 or 7 days), then each sub-group were divided into two groups equally and given them relevant examination such as Immunohistochemistry or RT-PCR of bax and bcl-2.

Results: (1) Numbers of substitutes and mortality rate after ROSC were no significant difference among the three groups ($P>0.05$). (2) There were significant differences in the serum levels of H_2S among the three groups on 1, 3 and 7 days after ROSC ($P=0.000$). (3) On 1, 3 and 7 days after ROSC, the sum of integrated optical density (IOD) of bax and bcl-2 in the hippocampi CA1area among the three groups had statistic significance ($P<0.05$). And in every group, there were significant differences in the sum of IOD of bax and bcl-2 in the hippocampi CA1area among the three observed end points ($P<0.01$). (4) On 1, 3, and 7 days after ROSC, the expressions of bax mRNA and bcl-2 mRNA in the hippocampi among the three groups had statistic significance ($P<0.01$). And in every group, there were significant differences in the expressions of bax and bcl-2 in the hippocampi among the three observed end points ($P=0.000$).

Conclusion: H_2S may be take part in neurons apoptosis by imbalance of bcl-2/bax.

53.

Change of Hydrogen Sulfide Content in Serum of Rats After Cardiopulmonary Resuscitation

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Purpose: To investigate variation of hydrogen sulfide (H_2S) in serum of rats after cardiopulmonary resuscitation (CPR) and explore its pathophysiological role in CPR.

Methods: The 30 male SD rats were randomly divided into control groups (n=6) and experimental group (n=24), then models of cardiac arrest (CA) were established in rats of experimental group by transcutaneous electrical epicardium stimulation. Blood samples were collected before CA, at 2, 4, 6, 8, 10 and 12h after restoration of spontaneous circulation (ROSC) for testing the serum levels of H_2S, at the same time rectal temperature (Tr), mean arterial pressure (MAP), heart rate (HR) and respiration rate (R) were record. Next to analyze the dynamic variation of H_2S content in serum of the rats after CPR and its correlation of the above-mentioned signs of life.

Results: (1) In experimental group, all of the 24 rats were successfully induced CA and resuscitation; at end points (12h after ROSC) there were 14 rats were alive and their vital signs were stable. There was no death in the control group. (2) The variation trend of H_2S content in serum was different between experimental group and the control ($F=12.226$, $P=0.003$). In experimental group, H_2S content in serum increased dramatically after CPR and reached peak at 6h after ROSC, then return to the similar level of the control group. (3) H_2S content in serum was negatively correlated with Tr (*partial* $r=-0.556$, $P=0.000$) and MAP (*partial* $r=-0.240$, $P=0.002$). But it wasn't correlated with HR and R ($P>0.05$).

Conclusion: Change of H_2S content in serum of rats after CPR may be a manifestation of compensatory responses after ROSC and participate in physiological processes such as body temperature and blood pressure regulation. But as for its precisely mechanisms, it still needs to be studied further.

54.

Long-term enhanced external counterpulsation repairs platelet membrane fluidity and alleviates lipid peroxidation in patients with stable angina pectoris

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Purpose: To explore the effect of long-term enhanced external counterpulsation (EECP) on platelet membrane fluidity (PMF) and lipid peroxidation in patients with stable angina pectoris.

Methods: Long-term EECP was performed on 106 patients with stable angina pectoris, 1 hour once a day for 36 days. Platelets were harvested from all patients pre-EECP (before EECP), during EECP (EECP for 18 hours) and post-EECP (EECP for 36 hours). Fluorescence polarizability P′ was measured by fluorescence spectrophotometer. Meanwhile, the levels of lipid peroxidation and plasma lipids including total cholesterol (TC), triglyceride (TG), low density lipoprotein cholesterol (LDL-C) and high density lipoprotein cholesterol (HDL-C), were measured.

Results: Compared with pre-EECP, PMF was repaired significantly in patients with stable angina pectoris, no matter EECP performed for 18 hours or for 36 hours ((0.337±0.053), (0.257±0.042) vs. (0.543±0.066), respectively, $P<0.05$). Similarly, lipid peroxidation levels were also alleviated obviously ((0.427±0.053) μmol/L, (0.302±0.046) μmol/L vs. (0.712±0.126) μmol/L, respectively, $P<0.05$). Moreover, it seems a more significant change in both PMF and lipid peroxidation when EECP performed for 36 hours than for 18 hours. On the contrary, there was no significant change in the levels of plasma lipids (TC, TG, LDL-C, HDL-C). A direct negative correlation was observed between PMF and the levels of lipid peroxidation.

Conclusion: This result demonstrates that Long-term EECP can alleviate lipid peroxidation and restore or repair PMF in patients with stable angina pectoris, contributing to postponing atherogenesis.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY I

55.

Outcomes in Patients with One-stage Repair of Aortic Coarctation

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Objectives: Review and analyse the clinical applications and follow-up results in the patients of Aortic Coarctation, who underwent one-stage total repair, in order to investigate the optimal surgical approaches and optimal operative age for Aortic Coarctation, and reduce the complication of early and median time and elevate survival rate after repair.

Methods: Review the information for patients since admission, who underwent one-stage total operation in our Center, collect the historical information form and follow-up results combine right statistical method, to measure the correlation factor with survival rate, recoarcation and late follow-up results.

Results: From November 1999 to November 2009. 121 patients with Aortic Coarctation associated with heart defects underwent one-stage surgical repair in our institution. The age at operation was ranged 5 days to 12 years, the weight was ranged 2.2 kg to 44 kg. Follow-up period was ranged 3 months to 9 years. Aortic Coarctation was associated with patent ductus arteriosus and isolated in 37 patients, Ventricular septal defect was found in 63 patients, of which 27 cases were associated with patent ductus arteriosus. Aortic Coarctation was associated with other complex intra cardiac anomalies in 21 cases. Surgical techniques were as follows: 33 had patch enlargement, 77 had resection with extend end-to-end anastomosis, 11 had subclavian flap aortoplasty. Late survival ratio is 94.2%. Recoarctations were in 17 patients, the rate is 14.04%. Multivariate analysis revealed that early instantaneous peak velocity across the aortic and dysplasia of aorta also the diameter of anastomasis were independent risk factors for recurrent coarctation. No single operation appeared to have a clear superiority

Conclusion: One-stage total repair for Aortic Coarctation is feasible. Late survival rate is deviated remarkable. But improving late outcomes remains a surgical challenge.

56.

Atrioventricular block after transcatheter closure of secundum atrial septal defects using Amplatzer septal occluder in children.

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Objective To determine the incidence, risk factors, prevention and treatment of AVB associated with ASD transcatheter closure using ASO in children.

Methods A total of 450 patients underwent transcatheter ASDs closure using ASO from March 1998 to December 2005 in our institution. The median age was 6.3 years (range, 2.3 to 14years) and median weight was 17.4 kg (range, 9 to 44 kg). Electrocadiographic tracings before procedure and at follow-up visits were reviewed. The risk factors, prevention and treatments of the AVB were analyzed.

Results 14 patients developed various AVB (3.1%), including first degree AVB in 6, second degree AVB in 4 and third degree AVB in 4 patients. All AVBs occurred one to two days after transcatheter occlusion of the ASD. Among 14 patients, new-onset AVBs were found in 12 patients and aggravation of preexisting AVBs were noted in 2 patients. The larger device (24±2 vs 19±3mm, P<0.001) and smaller age (4.3±1.4 vs 7.6±2.3 years, P=0.03) were two risk factors for AVB. Corticosterioid was routinely used for all patients with AVB and removal of the device was implemented for 4 patients with third degree AVB. A vast majority of cases resolved or improved spontaneously, with no recurrence at short-term follow-up.

Conclusions AVB remains the severe complication after interventional catheterization for ASDs using ASO. The larger device and smaller age can be associated with the development of AVB. Selection of the proper ASO may be the most effective measures to prevent AVB after transcatheter closure of ASDs for small children. Most of all AVBs can resume within a short time by giving medical or surgery intervenes as soon as possible.

57.

Transcatheter Embolization of Intralobar Pulmonary Sequestration in Infants

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Purpose: To describe experience with the safety and efficacy of transcatheter embolization technique for the treatment of pulmonary sequestrate (PS) on in infants.

Methods: Between 2008 and 2009, 3 infants (3 males, aged6 to8 months) received the treatment . All had presented with shortness of breath and repeated respiratory infections. The diagnosis of pulmonary sequestration was confirmed by Doppler ultrasonography, contrast-enhanced computed tomography and angiogram . Selective angiography revealed vascular conglomeration and the origin, the diameter and the number of hypertrophic feeding arteries, as well as concomitant venous vessel . AMPLATZER™ Vascular Plug which was 30%~40% larger in diameter than the vessel was implanted to close the aberrant artery supplying the pulmonary sequestration using a 5F catheter via the right femoral artery.

Results: Three infants were considered cured by embolization alone. Two patients implanted one plug for complete closure. Another patient implanted two coils and one plug for complete closure the PS. No residual flow in the pulmonary sequestration was noted after the procedure by ultrasonography and CT. Initial follow-up was performed 1~2 months after the procedure by chest ultrasonography and CT and, thereafter, follow-up was performed after 6 months and then annually. Complete regression was defined as the total disappearance of abnormal lung tissue on CT image.

Conclusion: Our experience indicated that pulmonary sequestration in infants can be cured by transcatheter embolization alone with an AMPLATZER™ Vascular Plug.

58.

Evaluate Heart Function of Adolescent Scoliosis by Tissue Doppler

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Purpose: To evaluate heart function of adolescent scoliosis by tissue doppler.

Methods: Choose 11 adolescent patients with scoliosis diagnosed in our hospital from July 2009 to August 2009, and 14 normal control. Then check the tissue doppler of heart. During the study, we measured the pulse tissue doppler of mitral annulus and tricuspid annulus, then compared the deta between the patients and normal control. Statistical analysis was done by SPSS11.5.

Results: First, mitral annulus. Em of the scoliosis group (0.18±0.03) m/s was less than normal control (0.21±0.03) m/s significantly, P=0.038. ICT/√RR of the scoliosis group (1.83±0.18) was much larger than normal control (1.35±0.24) . Also, IRT/√RR of the scoliosis group (2.38±0.64) much larger than normal control (1.07±0.18) , and Tei index of the scoliosis (0.40±0.09) much larger than normal control (0.23±0.03), P<0.05. The results of tricuspid annulus were similar with mitral annulus. Em of scoliosis group (1.99±0.22) VS normal control (1.56±0.3), IRT/√RR of scoliosis group (1.99±0.61) VS normal control (1.09±0.4), Tei index of scoliosis group (0.42±0.13) VS normal control (0.25±0.06), P<0.05. There' s no statistical difference of Am, Sm and Em/Am between the two groups.

Conclusion: The heart function of left and right ventricles decreased in adolescent scoliosis.

ABSTRACTS

Abstracts for Free Paper Session:

59.

The successful transcatheter ablation of fascicular potential in pediatric patients with left posterior fascicular tachycardia

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Objective: To simplify the methods of transcatheter mapping and ablation in the pediatric patient with left posterior fascicular tachycardia.
Method: While in sinus rhythm, the fascicular potential can be mapped from the posterior septal region. When the fascicular potential occurs 20 milliseconds later than the bundle of His' potential, apply radiofrequency. If the electrocardiogram displays an incomplete left posterior fascicular block, the correct region is identified and ablation can continue. If the electrocardiogram does not change, stop the ablation.
Result: 15 pediatric patients were ablated successfully, and their electrocardiograms all displayed an incomplete left posterior fascicular block after ablation. All patients had no recurrences in the three to twelve months follow-up period. In one case, the electrocardiogram did not change after applying radiofrequency and the ventricular tachycardia remained; however, on second attempt after remapping, the electrocardiogram did change. The radiofrequency was continued for 90 seconds and ablation was successful. This case had no recurrences at 6 months follow-up.
Conclusion: Transcatheter ablation of the fascicular potential in pediatric patients with left posterior fascicular tachycardia can simplify mapping, reduce operative difficulty and produce a distinct endpoint for ablation.

60.

Long-term Results of Correction of Tetralogy of Fallot and Evaluation

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Purpose: To investigate the long-term results of correction of tetralogy of fallot, analyze the influence of transannular patchs on outcomes and study the different variables on cardiac function performed by echocardiography and cardiac magnetic resonance imaging (CMR).

Methods: Fifty-eight tetralogy of Fallot repaired before January 1998 were sampled and divided transannular patch group and non transannular patch group. The basic conditions besides the health status before and after operation such as cardiac function, echocardiography, CMR, electrocardiogram and the methods of operation were investigated.

Results: The follow range are (10-17) years and mean follow years 12.3 years. Cardiac function beyond NYHA II is 24.1%, right ventricular (RV) dilation occupy 89.7%, pulmonary regurgitation (PR) 51.7% and right ventricle ejection fraction (RV-EF) ≤40% has 40%. The health condition is not satisfied. The values of right ventricle and diastolic volume index (RV-EDVI), right ventricle end systolic volume index (RV-ESVI), forward pulmonary flow volume in transannular patch group are higher than those in nontransannular patch group. Tei index and systolic time interval (STI) have no statistics significance different respectively compared with CMR EF.

Conclusion: Long term repaired tetralogy of Fallot may suffer from RV dilation, RV dysfunction, significant PR and should be paid more attention. Transannular patch has influenced RV-EDVI, RV-ESVI and forward pulmonary flow volume and need more study. Tei index and STI have equal effect compared with CMR EF evaluated on repaired tetralogy of Fallot.

61.

Research of N-terminal Pro-brain Nitric Peptide for Congenital Heart Disease with Pulmonary Hypertension

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Objective: To investigate whether serum N-terminal Pro-Brain Nitric Peptide (NTpro-BNP) levels could reflect the severity of pulmonary arterial hypertension in children with congenital heart disease (CHD).
Methods: We performed a retrospective study to determine if serum NTpro-BNP levels varies by pulmonary artery systolic pressure (PASP) by catheterization. The population included a group of 27 pediatric patients from 2006 to 2009. All patients were diagnosed with CHD of left to right and had serum NTpro-BNP and catheterization. Exclusion criteria were impaired renal function (serum creatinine level >115 μmol/L), decreased left heart function (LVEF <50%), and stenosis of outlet of right ventricle. Serum NT-proBNP were measured using the electrochemiluminescence immunoassay. Statistical analysis of the linear correlation of NT-pro BNP and PASP were carried out.
Results: The NT-proBNP concentration can reflect the degree of PASP (r=0.58, AP=0.001). Using serum NT-proBNP concentration ≧134pg/ml as the cut point for diagnosing slight and medium PAH, the sensitivity was 90%, the specificity 86%, and ≧499.0pg/ml as the cut point for diagnosing serious PAH, the sensitivity and specificity was 64% and 82% respectively.
Conclusion: We concluded that serum NT-proBNP levels parallel changes with PASP. Serum NT-proBNP could be a useful marker to monitor disease severity in pediatric pulmonary hypertension.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY II

62.

Hypertension characteristic analysis of 52 children patients

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Purpose: Through retrospective analysis the children cases with hypertension, to study hypertension distribution in children, clinical feature, the reaction of drug treatment and the influence to cardiac structure and function.

Methods: Choose 52 hypertention children in-patient, then summarize and analyze the basic information, primary symptom, clinical diagonis, primary in-patient department, cause of hypertention, information of hypertensive encephalopathy , peak blood pressure and decline after treatment, cardiac involvement, et al.

Results: During the 52 children, BMI in 4 patients larger than 24, 34 patients came from town and countryside. Primary symptoms were various. Only 26.92% children were found hypertention in out-patient department. Incharged in department of pediatric cardiology primarily only occupied 1/3. Nephrogenic hypertention was the main cause, occupied 63.38%. Hypertensive encephalopathy happened in 15 patients, and 66.67% were renal failure. Peak systolic pressure of vasculopathy group(183.44±31.83 mmHg)and renal failure with hypertensive encephalopathy group (187±22.33 mmHg)was higher than other groups(152.61±24.6 mmHg)significantly, similar with diastolic pressure, $P<0.05$. The decline deviation of peak systolic pressure in renal failure with hypertensive encephalopathy group(56.56±19.03 mmHg)was larger than vasculopathy group(35.44±25.37 mmHg)significantly,$P<0.05$. The peak systolic pressure of normal heart group(146.09±23.20 mmHg)was much lower than thickened cardiac wall group(178.5±34.16 mmHg)and cardiac dilated group(177.07±24.12 mmHg), similar with diastolic pressure,$P<0.05$. The follow-up period of cardiac dilated group(15.68±12.62m)was longer than normal heart group(3.17±2.95m)and thickened cardiac wall group (4.32±3.86m).

Conclusion: This study was accord with the distribution featrues of children hypertention, to check children blood pressure should be routine. The blood pressure in patients with vasculopathy or renal failure usually reached higher remarkbaly. Patients with vasculopathy were less sensitive to pharmacotherapy. Patients with renal failure were easy with hypertensive encephalopathy. Hypertension could induce cardiac wall thickened, then cardiac dilated by time longer. So, can not ignore the children hypertension, it should be discovered and treated earlier.

63.

Cited2 mutation associated with congenital heart disease

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Purpose: To explore gene mutation of Cited2 coding strand in Chinese patients with congenital heart disease (CHD).

Methods: DNA was abstracted from the blood samples of 120 nonhomologous and various CHD patients and 100 healthy children. The coding regions of Cited2 was amplified by PCR and compared to the Gene Bank after sequencing to identify the mutations. The families of the samples who have Cited2 mutations were investigated as well. ClustalW software was amplified for conservative analysis of the altered amino acids.

Result: 3 new mutations of Cited2 coding strand were found in 4 CHD patients. 2 point mutations were first identified respectively in two patients, one patient with mirror image dextrocardia and tetralogy of Fallot (c.550>A), another with aortic stenosis (c.574 A>G). Apart from this, the same deletion (c.573-578del6) was first detected in other two patients, one patient with ventricular septal defect and atrial septal defect, anothor with aortic stenosis and pulmonary stenosis. All the mutations resulted the protein changes (p.Gly184Ser; p. Ser192Gly; p. Ser192fs). All the changes were not detected in the control group.

Conclusion: This study show for the first time that there are 3 brand-new gene mutations of Cited2 in Chinese CHD patients with a broad phenotype spectrum. Serine-glycine rich junction (SGJ) is considered as the mutation hot spot. Cited2 mutations may be one of the causative impact in development of CHD in human.

64.

A Gril with Primary Carnitine Deficiency
Rare Treatable Cause of Paediatric Dilated Cardiomyopathy and Delayed Development

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Dilated cardiomyopathy is the commonest form of cardiomyopathy in paediatric age group. Despite that an underlying pathology can be found occasionally, specific treatment is rarely available, leading to high morbidity and mortality.

We describe a 4-year-old girl with primary carnitine deficiency, presenting with gross motor delay and dilated cardiomyopathy (DCM), who responded to carnitine therapy. The patient presented to us with heart failure requiring multiple medication including diuretics and angiotensin-converting enzyme inhibitor. Inotropic support was also required for the initial period before stabilization. Her echocardiography on presentation showed markedly dilated ventricles and poor contractility compatible with DCM. There was also significant trabeculation of the left ventricle, which initially raised the suspicion of left ventricular non-compaction. Investigation for underlying medical condition was performed, including extensive metabolic workup. Serum carnitine profile subsequently showed very low serum carnitine and acylcarnitine level, together with evidence of renal carnitine wasting, which was suggestive of primary carnitine deficiency. The diagnosis was confirmed by genetic testing, showing a compound heterozygous mutation (R254X/W275X) affecting the organic cation transporter protein (OCTN2). The patient was treated with high dose oral carnitine, slowly titrated up to 120mg/kg/day. Dramatic improvement was noted with resolution of clinical symptoms and improvement in gross motor function. Echocardiographic parameters were normalized five months after commencement of carnitine treatment and all other cardiac medications were weaned off subsequently.

This case illustrated the importance of making the diagnosis of primary carnitine deficiency as one of the rare treatable causes of paediatric dilated cardiomyopathy.

65.

Mid- to Long-term follow-up of interventional therapy of post-operation residual ventricular septal defect

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Purpose: To evaluate the effect of transcatheter closure of post-operational residual ventricular septal defect (VSD) and analyze the mid- to long-term follow-up results.

Methods: From Sep.2002 to Dec. 2008, 7 patients (5males and 2 females), aged 8.8y±3.7y, weighing 26.4kg±8.4kg, underwent interventional therapy were prospectively analyzed, in which 5cases were post-operation of membranous VSD, 2 cases were post-surgery of Tetralogy of Fallot (TOF).

Results: 6 patients (85.7%) were implanted with the device successfully. The diameter of VSD detected from right ventricle side by angiography was 4.4mm±1.3mm (1.9~5.6mm), averagely 5.1mm±2.3mm below the aortic valve. The selected device diameter was 7.8mm±2.7mm (4～12mm). The interventional therapy was abandoned in one patient because complete atria-ventricular block occurred during the procedure. The patients were followed up for 3 to 77 months. One patient had incomplete atrioventricular dissociation with interference after intervention therapy, and recovered with steroid treatment one week later. Mild aortic regurgitation occurred in one patient, which almost disappeared after 18 months follow-up. Two patients had residual shunt after procedure, which disappeared after 3 months. The echocardiography detected no device shift or thrombosis on the device's surface. During the scheduled mid- to long-term follow-up, all patients were doing well. No episode of endocarditis, procedure-related death or swoon was recorded.

Conclusion: The interventional therapy is a safe, feasible and effective procedure to close the residual shunt of VSD. The mid- to long-term follow-up results of these cases are promising.

ABSTRACTS

Abstracts for Free Paper Session:

66.

Retrospective analysis of the transcatheter closure of congenital heart disease in 302 cases

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Purpose: To analyze the effects and complications during and after the transcatheter closure of congenital heart disease in 302 cases.

Method: 302 cases [125 males and 177 females,age from 1 month to 14 years: (4.4±3.2) years] ,including 183 cases with PDA,69 with ASD and 50 with VSD ,underwent the transcatheter closure and were followed-up for 6 months to 3 years after the procedure.

Result:

group	N	average age (y)	average weight (kg)	successful Rate (%)	Morbidity and complications	3months-6 years Follow-up
PDA	183	3.5±3.0	12.8±6.5	99.4% (182/183)	2.2% (4/183)*Residual shunts in 3 cases *Hemolysis in 1 case	*Residual shunts in1 case *enlarge heart in 2 cases
ASD	70	5.3±2.8	17.6±6.3	100% (70/70)	4.3% (3/70) *Residual shunts in 2 cases *A-V Block(Ⅱ°)in 1 case	*A-V Block(Ⅰ°)in 1 case
VSD	50	5.5±3.1	17.9±8.0	98% (49/50)	10% (5/10) *Residual shunts in 1 case *A-V Block(Ⅲ°)in 1 case *CLBBB in 3 cases	*Residual shunts in 1 case *CLBBB in 1 case

Conclusion: In our study the transcatheter closure of PDA and ASD are safe and effective.The incidence rate of arrhythmia after the procedure in group VSD could be found higer than the group PDA and ASD.It is important to monitor the patients with EKG continuously after the VSD procedure.Corticosteroid and myocardial nutrition can be used in early stage to reduce the incidence of arrhythmia.

67.

Outcome of Surgical Repair of Coronary Artery Fistulas in Children

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Purpose: Coronary artery fistulas (CAF) are rare congential malformations that can be seen in 0.06% of children undergoing echocardiography and 0. 13%-0.22% of adults undergoing coronary angiography. There are no good large, complete, long-term comparative studies of a significant number of patients. Our aim of this article is to attempt to review the limited information and the outcome of surgical repair of the rare malformations in our center.

Methods: we review the clinical characteristics and surgical outcome of thirteen patients with CAF in our center from 1993-2009. The median age was 26 months (2 months, 150 months). Six patients were male and seven were female. All patients were first diagnosed with CAF by echocardiography, eight of them were undergoing angiography. Only two patients were asymptomatic. Surgical repair include ligation, stitch and patch repair, ten patients had cardiopolmunary bypass. Four patient with aneurysm underwent coronary artery plasty at the same time. No anticoagulant drugs were used.

Result: The longest follow up was 16 years, median was 5 years. NO surgical death and late death, TEE showed no residual fistulas right after operation. Two patients were found fitulas in different site by echocardiography in CCU, and both had successful second operation. No recurrent fitulas, no progressive dilation of coronary arteries, no AMI in follow up.

Conclusion: we suggested that all patients with CAF should be treated. Surgical repair is a safe and effective treatment for children. According to our current follow up, patients can live an event-free life in a long time after surgery.

68.

Minimally Invasive Transthoracic Device Closure of Ventricular Septal Defect without Cardiopulmonary Bypass: A New Hybrid Technique and Multi-center Experience

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Objective: To introduce a new minimally invasive technique of perventricular closure of ventricular septal defect (VSD) without cardiopulmonary bypass under transesophageal echocardiography (TEE) guidance and summary the clinical experiences and mid-term follow-up results.

Methods: A total of 408 cases in 4 centers, 5 months to 15 years (3.1 1.7 years), underwent perventricular device closure, with a body weight of 4.5 to 26 kg (13.6 55kg). A small inferior sternal incision was made. A single purse-string suture was placed on the right ventricular free wall and a guidewire was inserted through the right ventricle cavity across VSD to the left ventricle under TEE guidance. A delivery sheath was introduced over the guidewire to the left ventricle cavity. And then a proper sized device was delivered and released under TEE monitoring on the beating heart.

Results: 393 cases of this group were successfully closed (96.3%) and the other 15 cases (3.7%) converted to traditional open head repair. 213 (54.2%) were implanted a symmetrical device and 180 (45.8%) were closed with asymmetrical ones. 387 cases (96.5%) received no transfusion or blood products. New tiny or mild tricuspid regurgitation (TR) was found in 13 cases (3.3%), but no worsening regurgitation in those with existed TR. Incomplete right bundle block from ECG happened in 11 cases (2.8%). Most discharged 3 to 5 days after operation. All cases were follow-upped for 3 months to 2 years, without residue shunt, new or aggravating aortic regurgitation, obstruction of left or right outflow tract and device dislocation.

Conclusion: Minimally invasive perventricular device closure of VSD off CPB is a simple, effective and safe intervention under guidance of TEE. It is agreeable to considerable VSD clients and clinically valuable to be promoted. Long-term follow-up is necessary.