

ABSTRACTS

Abstracts for Free Paper Session:

CORONARY ARTERY DISEASE AND CARDIAC SURGERY

1.

Association of lower total bilirubin level with statin usage: Results from the United States National Health and Nutrition Examination Survey 1999-2008KL Ong¹, BJ Wu¹, BM Cheung², PJ Barter^{1,3}, KA Rye^{1,3,4}¹Lipid Research Group, Heart Research Institute, Sydney, NSW 2042, Australia²Department of Medicine, University of Hong Kong, Hong Kong, China³Department of Medicine, University of Sydney, NSW 2006, Australia⁴Department of Medicine, University of Melbourne, VIC 3010, Australia

Objective: A low circulating level of bilirubin is associated with increased cardiovascular risk. As statins can stimulate heme oxygenase-1, which increases bilirubin production, we investigated the relationship between total bilirubin level and statin usage.

Methods: Data from 3290 subjects with self-reported history of hypercholesterolemia, diabetes, or cardiovascular diseases (CVDs) in the United States National Health and Nutrition Examination Survey (NHANES) 1999-2008 were analyzed.

Results: In NHANES, subjects taking statins (n=1156) had a lower total bilirubin level than those not taking any lipid-lowering medication (n=2134) after adjusting for age, sex, race/ethnicity, and survey period (adjusted mean = 0.699 vs 0.729 mg/dl respectively, $P=0.001$). The association remained significant after further adjusting for body mass index, smoking, hypertension, history of any CVD, C-reactive protein, glomerular filtration rate, alanine aminotransferase and gamma-glutamyltransferase levels ($P=0.002$), but was attenuated after further adjusting for glycosylated hemoglobin, insulin resistance index, and LDL cholesterol ($P=0.043$). The use of lovastatin, rosuvastatin, and cerivastatin was significantly associated with lower total bilirubin level in the full adjustment model ($P=0.001$, 0.028, and 0.004 respectively).

Conclusion: The use of statins was associated unexpectedly with lower total bilirubin level. This could be explained at least partly by the effect of statin treatment on glycemia and LDL cholesterol. Further studies are needed to investigate whether the decrease in total bilirubin level could contribute to the residual risk in subjects treated with a statin.

2.

Associations of polymorphisms in apolipoproteins with baseline lipids and response to rosuvastatin in Chinese patients with and without familial hypercholesterolaemia

M Hu, VWL Mak, EWM Poon, & B Tomlinson. Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Hong Kong SAR

Purpose: To evaluate associations of apolipoprotein E (*APOE*) and *APOA5* genotype with baseline lipid levels and response to rosuvastatin in Chinese patients with hypercholesterolaemia.

Methods: A total of 386 patients with hypercholesterolaemia, including 166 with familial hypercholesterolaemia (FH), with good adherence to rosuvastatin 10 mg daily, were genotyped for the *APOE* rs7412 and rs429358 and *APOA5* -1131T>C polymorphisms. The lipid profile was examined before and after at least 4 weeks of therapy.

Results: The genotype distributions of *APOE* and *APOA5* polymorphisms examined were similar in patients with and without FH. FH patients were younger and had less metabolic syndrome features than non-FH patients. In non-FH patients, individuals carrying the e2 allele had lower and those carrying the e4 allele had higher LDL-cholesterol levels than subjects with the e3/e3 genotype but this was not statistically significant (3.59 ± 1.25 vs. 4.17 ± 0.97 vs. 4.28 ± 0.91 mmol/L, $P>0.05$). However, an opposite association between *APOE* polymorphisms and LDL-cholesterol levels was observed in patients with FH (e2-carriers vs. e3e3 vs. e4-carriers = 6.97 ± 1.81 vs. 6.57 ± 1.55 vs. 5.72 ± 1.27 mmol/L, $P=0.005$). The *APOA5* -1131C variant allele was significantly associated with increased baseline triglyceride levels in both FH and non-FH patients (In FH: TT vs. TC vs. CC = 1.48 ± 0.94 vs. 1.98 ± 1.20 vs. 2.53 ± 1.12 mmol/L, $P=0.003$; in non-FH: TT vs. TC vs. CC = 1.93 ± 1.40 vs. 1.97 ± 0.85 vs. 3.43 ± 3.22 , $P=0.001$). Neither *APOE* nor *APOA5* polymorphisms showed a significant effect on the lipid response to rosuvastatin although in non-FH patients, e2 carriers tended to have a greater LDL-cholesterol reduction whereas e4 carriers had the poorest response (e2-carriers vs. e3e3 vs. e4-carriers = $57.2\pm 18.6\%$; $53.5\pm 12.8\%$; $50.0\pm 12.6\%$, $P<0.05$ for trend).

Conclusions: This study demonstrates different associations of *APOE* polymorphisms with baseline LDL-cholesterol concentrations in Chinese patients with different phenotypes of FH and non-FH and confirms the strong relation between the *APOA5* polymorphism and baseline triglyceride levels in Chinese patients.

3.

The impact of Lifestyle Changes on Atherogenic Process in 3-Gorges Territories of Yangtze River.Yip WC Thomas¹, Chook P¹, Hu YJ², Wu MJ³, Li L³, Chen XB⁴, Gan YG⁵, Ding XB⁶, Wei AN⁷, Chan YK¹ and Woo KS¹.The Chinese University of Hong Kong¹, The Second Affiliated Hospital Chongqing University of Medical Sciences², Centre for Disease Prevention and Control of Wu Shan³, Kai County⁴, Fu Ling⁵ and Chongqing⁶.

Background: 3-Gorges reservoir dam project was completed in 2008, entailing a huge resettlement of over 1 million population in 1996-2008, with mass changes in occupations and lifestyles (physical activities and dietary habits).

Purpose: To evaluate the impact of such sudden lifestyle changes on atherogenic process in 3-Gorges population.

Methods: 475 subjects (age 49.4 ± 9.9 yr, 31% males) living in 3 Gorges territories (Wu Shan, Kai County and Fuling) were studied and followed up for 3 years (2006-2008). 243 stayed in farming (F-F group), 146 remained as non-farming residents (R-R group) and 86 persons gave up farming but still resided in 3-Gorges territories (F-R group). The 3 groups were carefully matched for age, gender and traditional atherosclerotic risk factors. Carotid intima-media thickness (surrogate atherosclerotic marker, IMT) was measured by high resolution ultrasound at baseline and 3 years, using an automatic edge-detection and IMT measurement software (CV 1%, R=0.99).

Results: Body mass index (BMI) was slightly higher in F-R at baseline ($P<0.001$), fasting glucose and carotid IMT were higher ($P<0.001$) in R-R group at 3 years ($P<0.001$) compared with other 2 groups. At 3 years significant increases were seen in BMI, diastolic blood pressure (DBP), high density lipoprotein cholesterol (HDL-C) and fasting glucose in F-F group, low density lipoprotein cholesterol (LDL-C) and HDL-C in F-R groups, systolic blood pressure (SBP) and fasting glucose in R-R group (all $P<0.001$), but decrease in LDL-C in R-R group ($P<0.001$). 3 years mean carotid IMT increased in all 3 groups, but was greater ($P<0.001$) in R-R group (increase of 0.23 ± 0.03 mm³, $P=0.0001$) and F-R group (increase of 0.22 ± 0.03 mm³, $P=0.0001$) than F-F group (increase of 0.16 ± 0.02 mm³, $P<0.0001$).

	F-F Group (n=196)		F-R Group (n=110)		R-R Group (n=80)	
	Baseline	3yr	Baseline	3yr	Baseline	3yr
Age (Year)	49.5±8.5	5.25±8.6*	49.7±10.1	52.8±10.0*	49.3±7.3	52.4±7.9*
BMI (Kg/m ²)	23.0±3.1	24.1±2.9*	24.4±3.5 [†]	24.8±3.7	23.9±4.3	24.3±4.7
SBP (mmHg)	123±19	128±20	126±23	128±18	123±21	131±24*
DBP (mmHg)	80±12	84±12*	79±12	82±10	79±13	81±14
Waist-hip Ratio	0.84±0.06	0.85±0.07	0.87±0.06	0.87±0.06	0.86±0.11	0.85±0.12
LDL-C (mmol/L)	2.6±0.8	2.7±0.9	2.7±0.9	3.0±0.8*	2.8±1.0	2.6±0.9*
HDL-C (mmol/L)	1.2±0.3	1.3±0.4*	1.1±0.3	1.2±0.3*	1.2±0.3	1.2±0.4
Glucose (mmol/L)	5.2±1.1	5.7±1.4*	5.6±1.2	5.3±2.1	5.8±1.3	6.2±2.1* [‡]
IMT (mmx10 ³)	7.02±1.29	7.19±1.31**	6.96±1.12	7.17±1.11**	6.97±0.84	7.23±0.93** [‡]

Compared with baseline: * $P<0.001$; ** $P<0.0001$ Compared between group: [†] $P<0.001$

Conclusion: Sudden lifestyle changes in non-farming 3 Gorges residents were associated with greater impact on atherogenic process independent of traditional risk factors, with implication in atherosclerosis prevention.

4.

Copeptin: An ultra early prognostic marker for acute myocardial infarction

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Background: Precise risk stratification is essential for the selection of early invasive and pharmacoinvasive treatment in acute myocardial infarction (AMI) patients. An emerging biomarker - copeptin, which is the C-terminal part of vasopressin prohormone, appears to be an independent prognostic marker including mortality for AMI patients.

Objective: This study aims to evaluate the prognostic value of copeptin at the acute post AMI period, and to assess the clinical role of copeptin in guiding the treatment strategy as a tool in risk stratification.

Methods: In this single-centre observational study, we studied 54 consecutive post-AMI patients. Endpoints were captured in day 7 after AMI. Copeptin level was analyzed retrospectively from archive by commercial kits after calibration. The AMI patients were grouped according to the administrative level of copeptin - high copeptin and low copeptin group, in which their baseline characteristics and clinical endpoints were compared. The primary endpoint is the composite cardiovascular endpoints of death, cardiogenic shock and refractory ventricular tachycardia/ventricular fibrillation (VT/VF). Other endpoints of interests are incidence of non-refractory VT/VF between the two groups; individual outcome analysis and a comparison with TIMI risk score.

Results: Baseline characteristics between the high and low copeptin group showed no statistically significant difference ($p>0.1$). The primary composite cardiovascular endpoint of death, cardiogenic shock and refractory VT/VF was observed in 75% patients in high copeptin group and was observed in 19.6% patients in low copeptin level group ($p=0.0038$). In individual outcome analysis, cardiogenic shock is significantly higher in high copeptin group ($p=0.0038$). Death and refractory VT/VF increased in high copeptin group but are statistically insignificant ($p>0.1$). Secondary endpoint showed non refractory VT/VF was more often observed in high copeptin group ($p=0.0118$). 62.5% of patient identified as low or intermediate risk by TIMI Score were found to be high risk by copeptin assay.

Conclusion: Copeptin may be a good biomarker for risk stratification in AMI management. It has strong association with cardiogenic shock and may be able to predict cardiogenic shock in acute phase of post AMI patients. High copeptin level is associated with non refractory VT/VF. Early invasive or pharmacoinvasive treatment strategy may be indicated in patients with high copeptin level but further confirmation with a larger, multicenter study is essential.

ABSTRACTS

Abstracts for Free Paper Session:

5.

Monocyte Platelet Aggregate: A novel pathology-based prognostic maker for acute myocardial infarction with integrated assessment on inflammation, thrombosis and antiplatelet treatment failure

H LAM, CK CHAN, WH LEUNG, SF YIP, PW YAM, KL CHUI, YH CHAN, KK YEUNG, YH WONG, WF LEUNG, LL IP, WK CHAN, WK LAI, ML WONG, CS LAM, KF TSE, YM YEUNG, L CHOW

Department of Medicine and Geriatrics and Department of Pathology, Tuen Mun Hospital, Tuen Mun, Hong Kong

Background: Risk stratification is important in the management of acute myocardial infarction (AMI). During AMI, degranulated platelets adhere to the monocytes and form monocyte platelet aggregate (MPA). The level of MPA can therefore reflect pathological change and indicate degree of inflammation and thrombosis in AMI. Being an *in vivo* platelet function assessment tool, measurement of MPA may further evaluate the effect of antiplatelet treatment resistance.

Objective: To evaluate the prognostic value of MPA in AMI patients.

Methods: In this single-centre prospective observational study, we recruited 29 consecutive AMI patients and 19 healthy controls. Blood samples in the first 24 hrs of AMI and Day 5 after dual antiplatelet treatment were taken with written consent from patients. MPA in circulating blood was identified by CD14-FITC and CD41-PE positive population and its level was analyzed using flow cytometry. In wave one analysis, patients with high MPA was compared with that of low MPA, in which the grouping cut-off was set by the uppermost limit of the healthy subjects. In wave two analysis, patients with rising trend of MPA after dual antiplatelet treatment and patients with decreasing trend of MPA after dual antiplatelet treatment were compared. The baseline characteristics and clinical endpoints between any of the two groups in wave one and two analysis were compared. The endpoint is composite cardiovascular endpoints of death, recurrent ACS, cardiogenic shock, heart failure and ventricular tachycardia/ventricular fibrillation in post AMI day 30.

Results: MPA level in AMI patients (mean= 33) were significantly higher than healthy subjects (mean=25). ($p<0.05$). In wave one analysis, high MPA group ($n=9$) and low MPA ($n=20$) group reaching the endpoint were 55% ($n=5$) and 30% ($n=6$), respectively. ($p=0.2$). In wave two analysis, rising MPA group ($n= 12$) showed 58.3 % ($n=7$) patients reaching endpoint. Decreasing trend MPA group ($n=9$) showed 11.1% ($n=1$) patients reaching endpoint. Rising MPA group showed a trend of more post MI complications compared to decreasing MPA group but statistically it was not significant ($p=0.06$).

Conclusion: MPA may be a potential prognostic marker for AMI patients but a larger scale study was needed. There is a trend that high MPA and rising MPA in AMI patients will have more post MI complications.

6.

Thrombolytic Therapy in Patients with ST-elevation Myocardial Infarction in a University Hospital in Hong Kong: Demographics, Intracranial Haemorrhage and Other Outcomes

Simon CC LAM, Stephen Wai Luen LEE, Michael PH CHAN, Kelvin KW CHAN, Jojo SH Hai, Frankie CC TAM, Michael KL WONG, Shun Ling KONG, Raymond HW CHAN.

From the Division of Cardiology, Department of Medicine, the University of Hong Kong, Queen Mary Hospital, Hong Kong SAR, China.

Introduction: Thrombolytic therapy remains an important reperfusion strategy for eligible patients with acute ST-elevation myocardial infarction (STEMI). Commonly used thrombolytic agents are streptokinase and fibrin-specific agents (FSA), including tenecteplase (TNK-tPA) and alteplase.

Method: A total number of 342 Patients who received thrombolytic therapy for management of ST-elevation myocardial infarction in 2001 to 2009 were analyzed. Cases were identified through Hospital Pharmacy Record, Hospital Authority Clinical Management System (CMS) and Acute Myocardial Infarction Clinical Pathway. Clinical records were retrieved. Data were analyzed using software SPSS 16.0.

Results: 266 patients (77.78%) and 76 patients (22.22%) were given Streptokinase and Fibrin-specific agents (TNK-tPA/Alteplase) respectively. The median door-to-needle time and pain onset-to-needle time was 68 minutes and 3 hours 27 minutes respectively. The overall rate of intracranial haemorrhage was 1.46% (5 out of 342). The rate of intracranial haemorrhage of Fibrin-specific agents (TNK-tPA/Alteplase) and Streptokinase was 5.26% (4 of 76) and 0.38% (1 of 266) respectively ($p=0.002$ Odds Ratio 14.71). Rate of intracranial haemorrhage was significantly higher in patients with admission systolic blood pressure \geq 160mmHg ($p=0.043$ Odds ratio 5.33). Higher rates of intracranial haemorrhage were observed in sub-groups of Age \geq 75, Female, History of Stroke/Transient Ischaemic Attack ($p=0.0114$, 0.266, 0.155 respectively). Streptokinase was associated with more adverse events (34.96%) at time of thrombolytic administration which included hypotension, bradycardia and allergic reactions ($p=0.000$). The success rate of reperfusion was higher with TNK-tPA (78.67%) compared to Streptokinase (71.97%), but not reaching statistically significant level ($p=0.246$).

Conclusion: This study showed that the rate of intracranial haemorrhage was much higher statistically with FSA than streptokinase. However the rates of successful reperfusion after thrombolysis in STEMI were only marginally better by FSA (tenecteplase and alteplase) than by streptokinase, and the difference was statistically insignificant. These findings warrant extreme caution to be taken when selecting thrombolytic agents in Chinese patients with STEMI.

7.

Evaluation of platelet inhibition with point-of-care device VerifyNow in local Chinese patients with acute coronary syndrome treated with clopidogrel and prasugrel: a single centre cohort study

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Purpose: Clopidogrel has been used widely in the treatment of acute coronary syndrome but there is increasing evidence concerning its limited antiplatelet activity especially in Asian population. Prasugrel has been shown to have superior efficacy in platelet inhibition compared to clopidogrel and it has been translated to improved clinical outcomes but increase bleeding risk.

Methods: From December 2010, Chinese patients admitted with acute coronary syndrome who are clopidogrel or prasugrel naïve were treated with either loading dose of clopidogrel 300mg or 600mg, or prasugrel 60mg at physicians' discretion according to usual practices. Antiplatelet effects were evaluated by VerifyNow P2Y₁₂ at 4 hours and 24 hours post-loading.

Results: 20 patients' results are included so far, 5 patients received clopidogrel 300mg, 10 patients received clopidogrel 600mg and 5 patients received prasugrel 60mg. There is no significant difference in diagnosis, baseline clinical characteristics between all groups. Mean platelet reactivity units (PRU) at 4 hours and 24 hours in clopidogrel 300mg group are 338 and 315 respectively, in clopidogrel 600mg group 352 and 321 respectively, in prasugrel 60mg group 37 and 16 respectively. PRU in prasugrel group is significantly lower than that in clopidogrel 300mg and 600mg group ($p<0.005$) while there is no difference between clopidogrel 300mg and 600mg group. The percentage of clopidogrel hyporesponsiveness (as defined by PRU $>$ 240) are 92.9% at 4 hours and 84.6% at 24 hours while percentage of prasugrel hyporesponsiveness is 0% at both 4 and 24 hours.

Conclusions: A loading dose of prasugrel 60mg in local Chinese patients with acute coronary syndrome has significantly more potent antiplatelet effect than loading clopidogrel 300mg or 600mg. The proportion of clopidogrel hyporesponsiveness in Chinese patients is high. Further studies are necessary to delineate whether such dramatic difference will translate into superior clinical efficacy or increase bleeding risk of prasugrel and these may influence our decision on antiplatelet agents when treating our Chinese patients.

8.

Endothelial Nitric Oxide Synthase Enhancer Reverses ADMA-induced Endothelial Dysfunction in Human Internal Mammary Artery

Chao Xuan¹, Xiao-Yan Bai¹, Xiao-Cheng Liu¹, Qin Yang^{1,2}, & Guo-Wei He^{1,3}

¹TEDA International Cardiovascular Hospital, Medical College, Nankai University, Tianjin, China; ²The Chinese University of Hong Kong, Hong Kong, China; ³Providence Heart and Vascular Institute, Starr Academic Center, and Department of Surgery, Oregon Health and Science University, Portland, Oregon, U.S.A.

Purpose Endogenous nitric oxide (NO) synthase inhibitor asymmetric dimethylarginine (ADMA) is a cardiovascular risk factor. Increased ADMA levels are associated with reduced nitric oxide synthesis. AVE3085 is a novel endothelial NO synthase (eNOS) enhancer. This study tested the hypothesis that AVE3085 may improve the endothelial function altered by ADMA in the human artery.

Methods Isolated human internal mammary artery (IMA) rings ($n = 44$, taken from 20 patients undergoing coronary artery bypass grafting surgery) were studied in myograph. Cumulative concentration-relaxation curves to acetylcholine (ACh, -11 to -5 log M) were established in precontraction induced by U46619 (-8 log M). Protein expressions of eNOS were also determined by Western blot.

Results The maximal relaxation to ACh ($35.3 \pm 5.0\%$ in control) was significantly attenuated by ADMA ($12.7\% \pm 2.3\%$, $P < 0.05$). Compared to ADMA alone, ADMA+AVE3085 significantly increased the relaxation ($23.4 \pm 2.8\%$, $P < 0.05$). The eNOS expression (0.36 ± 0.03) was significantly decreased by ADMA (0.05 ± 0.04 , $P = 0.014$) and markedly restored by AVE3085 (0.29 ± 0.008 ; $P = 0.012$).

Conclusion The results demonstrate that the NO enhancer AVE3085 may restore the endothelium-dependent relaxation reduced by ADMA through up-regulation of eNOS expression in the human artery. This may provide new therapeutic insights in clinical situations with endothelial dysfunction associated with eNOS down-regulation.

ABSTRACTS

Abstracts for Free Paper Session:

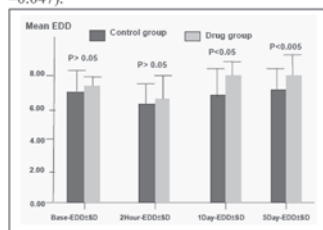
9.

The Relationship Between Postoperative Pain and Arterial Endothelial Function and the Impact of Analgesic Therapy after Non-cardiovascular Surgery.Wu Meng Jun¹, Chook Ping², Hu Yan Jun¹, Wei An Ning¹, Yin Yue Hui¹, Woo Kam Sang².The Second Affiliated Hospital, Chongqing University of Medical Sciences¹ and The Chinese University of Hong Kong².

Purpose: Perioperative cardiovascular complications occur frequently, and arterial endothelial function is a surrogate prognostic atherosclerotic factor. The purpose of present study is to evaluate the relationship between postoperative pain and changes of endothelial function, and the impact of analgesic therapy after noncardiovascular surgery.

Methods: 120 patients (age 57.7 ± 10.9 year) undergoing abdominal operation (10 laparoscope and 110 laparotomy surgeries) were randomly assigned to routine intravenous fentanyl and droperidol (drug group, n=60), or on demand analgesic therapy (control group, n=60). Endothelium-dependent dilation (EDD) of brachial artery (measure by ultrasound) and pain visual analogue score (VAS) were evaluated at 1 day preoperative, 2 hour, 1 day and 5 days after anesthesia recovery.

Results: EDD of both groups at 2 hour after anaesthesia recovery decreased significantly ($P=0.002$ & $P=0.005$) compared with the other three time points (figure), while VAS increased significantly ($P<0.05$). VAS of drug group were lower than those of control group at 2 hour (2.8 ± 1.9 - versus 3.8 ± 2.2 , $P=0.013$) and 1 day postoperative (1.6 ± 1.4 versus 2.3 ± 1.8 , $P=0.031$). EDD of drug group (7.9 ± 1.2 & 7.3 ± 1.39) were higher than the control group (7.1 ± 1.5 & $6.7 \pm 1.6\%$) at postoperative day 1 ($P=0.048$) and day 5 ($P=0.003$) respectively. VAS ≥ 5 were independently associated with postoperative EDD $< 7\%$ (OR = 2.7, 95% CI 0.9 ~ 5.0, $P=0.041$). At 2 hour after anesthesia recovery, VAS < 5 of drug group were independently associated with EDD $\geq 7\%$ (OR=2.5, 95% CI 1.0 ~ 6.0, $P=0.047$).



Conclusion: Reduced postoperative vascular endothelial function is closely related to postoperative pain, and arterial endothelial function can be improved by routine analgesic treatment after non-cardiac surgery.

10.

The Impact of Noncardiovascular Surgery on Reactive Hyperaemia and Arterial Endothelial FunctionYan Jun Hu^{1*}, MD; An Ning Wei¹, MD; Ping Chook², MD; Yuehui Yin¹, MD; Meng Jun Wu¹, MPhil; Kam Sang Woo², MD. ¹The Second Affiliated Hospital, Chongqing University of Medical Sciences, and ²The Chinese University of Hong Kong

Background: Vascular reactivity is a surrogate atherosclerosis marker predictive of cardiovascular outcome. Noncardiovascular surgery is associated with perioperative cardiovascular complications in high risk patients.

Purpose: To evaluate the impact of noncardiovascular surgery on reactive hyperaemia and arterial endothelial function, and the relationships between invasive versus minimally invasive surgery and endothelial dysfunction.

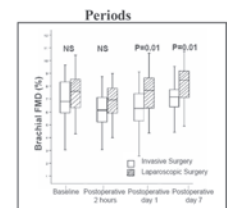
Methods: We evaluated prospectively 106 patients undergoing general anaesthesia abdominal surgery (71 laparotomy, 35 laparoscopic surgery), with measurement of pain visual analogue scale (VAS). Brachial endothelium-dependent flow-mediated dilation (FMD) endothelium-independent dilation (nitroglycerin-induced dilation, NTG) and reactive hyperaemia were measured by high resolution B-mode ultrasound at preoperative day 1 (baseline), postoperative 2 hours, day 1 and day 7.

Results: Blood pressures and heart rate were significantly higher at postoperative 2 hours. VAS were higher ($P<0.01$), reactive hyperaemia and FMD were significantly lower ($P<0.001$) at postoperative 2 hours and day 1 compared with baseline and postoperative day 7.

FMD at postoperative day 7 recovered to baseline level. Patients undergoing laparoscopic surgery had less FMD reduction at day 1 ($7.3 \pm 1.7\%$) and day 7 ($7.9 \pm 1.5\%$), compared with laparotomy surgery ($6.4 \pm 1.7\%$ and $7.0 \pm 1.5\%$ respectively) ($P=0.01$) (Figure 1). NTG was stable throughout. On backward multivariate linear regression analysis, FMD was independently related to age and VAS (model $R=0.486$, F value=6.4, $P<0.001$).

Conclusion: Reactive hyperaemia and arterial endothelial function are significantly reduced in the early postoperative period, but recover in one week, with implication for postoperative cardiovascular complications.

Figure 1. FMD in Perioperative



11.

Suxiao Jiuxin Wan (速效救心丸) Induces Potent Vasorelaxation in Human Internal Mammary ArteryXiao-Yan Bai¹, Ping Zhang², Qin Yang³, Xiao-Cheng Liu¹, Song Jin Xiong⁴, Li Huang Liu², Lei Wang⁴ & Guo-Wei He^{1,5}

¹TEDA International Cardiovascular Hospital, Medical College, Nankai University, Tianjin, China; ²Tianjin Zhongxin Pharmaceutical Group Co., Ltd, Tianjin, China; ³The Chinese University of Hong Kong, Hong Kong, China; ⁴TEDA School of Biological Sciences and Biotechnology, Nankai University, TEDA, Tianjin China; ⁵Providence Heart and Vascular Institute, Starr Academic Center, and Department of Surgery, Oregon Health and Science University, Portland, Oregon, U.S.A.

Purpose: Graft spasm remains challenging in coronary artery bypass grafting (CABG) surgery. We investigated the inhibitory effect of the compound Chinese medicine - suxiao jiuxin wan (速效救心丸) on the vasoconstriction mediated by potassium chloride (KCl) and U46619 in human internal mammary artery (IMA) segments from patients undergoing CABG.

Methods: Isolated IMA rings (n = 60, taken from 24 patients) were studied in myograph in two ways: the relaxing effect of suxiao jiuxin wan on vasoconstrictor-induced precontraction by KCl and U46619 and the depressing effect of suxiao jiuxin wan on the contraction. Protein expressions of eNOS were also determined by Western blot.

Results: Suxiao jiuxin wan caused full relaxation in KCl ($99.3 \pm 10.6\%$, n=6)- and U46619 ($100.0 \pm 5.9\%$, n=6)-contracted IMA rings with similar potency (EC_{50} : -0.27 ± 0.21 vs. -0.18 ± 0.21 log mg/ml, $p > 0.05$). Pretreatment of IMA with plasma-concentrations of suxiao jiuxin wan (1 mg/ml), calculated from the plasma concentration of its major component borneol, significantly depressed the maximal contraction to KCl (from 35.8 ± 6.0 mN to 12.6 ± 5.6 mN, $P = 0.03$) and U46619 (from 19.4 ± 2.9 mN to 5.7 ± 2.4 mN, $P = 0.007$). Pretreatment of IMA with suxiao jiuxin wan (10 mg/ml) abolished the subsequent contraction to both KCl and U46619. The eNOS expressions in IMA had no significant differences between the control and suxiao jiuxin wan (1 mg/ml) pretreated group. However, no eNOS expression was detected in suxiao jiuxin wan (10 mg/ml) pretreated group.

Conclusion: We conclude that suxiao jiuxin wan has a potent inhibitory effect on the vasoconstriction mediated by a variety of vasoconstrictors in human arteries such as IMA. Thus, use of suxiao jiuxin wan is in favor of treating and preventing vasospasm in CABG and in patients with coronary artery disease.

12.

Left ventricular assist device - a surgical treatment for end-stage heart failure - a case series in Hong KongCKL Ho, K Fan¹, WK Au¹, LC Cheng¹. Department of Cardiothoracic Surgery, Queen Mary Hospital,¹ Cardiac Medical Unit, Grantham Hospital.²

Purpose: To introduce an advanced non-transplant surgical treatment for patients suffering from end-stage heart failure (ESHF). Left ventricular assist device (LVAD) implantation for ESHF was accepted as an effective therapy worldwide as a bridge to transplant or even a destination therapy. Recently it has been introduced in Hong Kong as a choice of therapy for patients awaiting heart transplant.

Methods & Results: From August 2010 to March 2011, 3 patients with ESHF were selected for LVAD implant. Continuous-flow Heartmate II device was used in all 3 patients. After implantation, all 3 patients improved from NYHA class IV to class I clinically; they were all ambulatory and returned to the society readily. The selection criteria, contra-indications, peri-operative and post-operative management would be discussed.

Conclusions: Though LVAD implant is a newly introduced therapy for ESHF in Hong Kong, so far the clinical results are satisfactory. With further accumulation of clinical experiences, the outcome of patients will be improved and more patients can be benefitted from this kind of therapy.

ABSTRACTS

Abstracts for Free Paper Session:

13.

A Clinical Analysis of 40 Cases of Prosthetic Valve Endocarditis

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Purpose: To analysis the clinical characteristics of prosthetic valve endocarditis.

Methods: The study population comprised 40 consecutive patients who fulfilled the modified Duke criteria for prosthetic valve endocarditis from May 2005 to May 2008 at our institution. Data were collected retrospectively on demographic characteristics, presenting signs and symptoms, results of laboratory and microbiological investigations, echocardiographic findings, treatment modality (antibiotic regimen, valve surgery), and clinical outcomes.

Result: The mean age at presentation was 40 ± 11 years, with a slight male preponderance. There were 38 (95%) patients with involvement of a mechanical prosthesis; the majority (65%) had late prosthetic endocarditis. General fatigue (83%), fever (64%), major vessel embolism (61%), and anemia (44%) were the most frequently manifestations. Major complications occurring during the acute infective phase were also recorded, including renal dysfunctional(75%), such as renal infarction, glomerulonephritis, nephropostasis, New York Heart Association class III–IV heart failure (66%), and neurological complication (22%). Twenty-three cases (58%) had positive culture results with 36 causative pathogens, including 18 Gram-Negative bacillus(7 were *Acinetobacter*, 4 were *Citrobacter rodentium*, 3 were *Pseudomonas aeruginosa*, 3 were *enterobacter cloacae*, 2 were *Burkholderia cepaci*), 10 coagulase-negative *Staphylococcus*, 3 *staphylococcus aureus*, 3 fungi, 2 *Enterococcus faecalis*, and 1 *Streptococcus*. All patients underwent transthoracic echocardiography, but only 8 (20%) had further evaluations with transesophageal echocardiography. More than half of patients detected prosthetic valve vegetations. Twenty-seven prosthetic valve endocarditis (68%) developed peri-annular complications (16 leakage, 6 abscesses, 4 dehiscence, 1 perforation of cardiac valve). The overall hospital mortality was 20% (8 patients), in spite of intensive managements.

Conclusion: Prosthetic valve endocarditis is associated with a high mortality despite diagnostic and therapeutic improvements. The spectrum of microorganism is quite different from that of native valve endocarditis. Early diagnosis, bacterial culture and transesophageal echocardiography may be essential for prosthetic valve endocarditis.

ABSTRACTS

Abstracts for Free Paper Session:

ARRHYTHMIA, CARDIAC PACING AND HEART FAILURE

14.

The efficacy of warfarin versus aspirin for stroke prevention among local Chinese population with atrial fibrillation and CHADS2 Score 1

Dr. Lai Sze Wah, Caritas Medical Centre
Dr. Cheung Ling Ling, United Christian Hospital

Background- Atrial fibrillation (AF) is the most commonly encountered cardiac arrhythmia, occurring in 1-2% of the general population. It was associated with 5-fold increase in risk of ischaemic stroke/ TIA. In patients with CHADS2 score 1, warfarin or aspirin are equally recommended as a measure of stroke prophylaxis. In Asian population, it was said that warfarin use was associated with substantially higher bleeding complications. The purpose of this study is to evaluate whether aspirin has similar efficacy as compared to warfarin for stroke prophylaxis and to compare their respective bleeding complication risk.

Method- This is a retrospective cohort study. The study recruited patients diagnosed to have atrial fibrillation with CHADS2 score 1 between 2004 and 2006. The primary outcomes were the occurrence of ischaemic stroke or TIA, systemic embolic event and total cardiovascular mortality. The secondary outcomes were bleeding complications including haemorrhagic stroke.

Results- Totally 252 non-valvular atrial fibrillation patients with CHADS2 score 1 were recruited. There were 102 patients in the warfarin group whereas 118 patients in the aspirin group. All patients taking warfarin had INR maintained between 1.5-3.0 (mean =2.1). During the follow up period (median=57.8months), the incidence of ischaemic stroke among patients taking aspirin was significantly higher compared with patients taking warfarin using Kaplan Meier analysis (Log rank $\chi^2 = 6.1$, $p = 0.01$, Hazard ratio 3.0). The incidence of major bleeding including haemorrhagic stroke was not significantly different between the 2 groups; 6.9% (7/102) in the warfarin group, 5.9% (7/118) in the aspirin group ($p=0.76$). However, minor bleeding was more common among patients receiving warfarin; 17.6% (18/102) in warfarin group, 8.5% (10/118) in aspirin group ($p=0.05$).

Conclusion- Warfarin was better than aspirin in preventing ischaemic stroke among patients with atrial fibrillation and CHADS score 1 without significantly increasing major bleeding complications.

15.

Clinical Profile of patients having acquired Torsades de pointes in a regional hospital

KY Lo, CS Yue, KF Leung, CK Chan, Raymond CY Fung, TS Chung, LL Cheung, KT Ho. Division of Cardiology, Department of Medicine and Geriatrics, United Christian Hospital, Hong Kong.

Purpose: The acquired form of Torsades de pointes (TDP) is a rare but potentially catastrophic emergency (in hospital setting). Acquired long QT syndrome is usually caused by drugs, electrolyte disturbance and bradycardia. Limited data are available in our community. We sought to review the clinical profile of patients diagnosed to have TDP in our hospital.

Methods: This was a single-center retrospective study. Patients with diagnosis of TDP were identified through the hospital's computerized data base system (CDASE). TDP was defined as polymorphic VT with prolonged corrected QT interval (QTc) (more than 470ms and 480ms in males and females respectively). Demographic and medication history, presentation, ECG features and outcomes were retrospectively analysed.

Results: Twenty-one patients (13 females, mean age 73 years, range 54-87 years) were identified from year 2004 to 2010. Structural heart disease was not uncommon in this group of patients (ischaemic heart disease, history of heart failure and poor LV systolic function in 34%, 48% and 19% of patients respectively). The mean QTc on presentation was 552±60ms (range 470-720ms) with 17 patients having a QTc > 500ms. Most patients presented with cardiac arrest (29%), syncope (43%) or palpitation (24%). Contributing factors included drug-induced TDP in 67% of cases, significant bradycardia and electrolyte disturbance in 48% and ischaemia in 19% of cases. Most patients (67%) had multiple contributing factors. QTc at baseline (mean = 464ms, range 400-560ms) was prolonged in 43% of cases with 4 cases having a QTc > 500ms. Eight patients (38%) required implantation of permanent pacemaker or implantable cardioverter defibrillator eventually. After a mean follow-up period of 20±22months, cardiac death occurred in 4 cases (19%).

Conclusion: Multiple risk factors for TDP were identified in our group of patients including baseline long QTc, use of QT-prolonging drugs, heart diseases, electrolyte disturbance and bradycardia. Early recognition and correction of reversible causes may help to reduce the incidence of TDP.

16.

Single Center Prospective Cohort Study of Catheter Ablation of Atrial Fibrillation

C.P. Chan; J.Y.S. Chan; H.C.K. Chan; Y.K. Ko; J.W.H. Fung; C.M. Yu. Division of Cardiology, Department of Medicine and Therapeutics, Prince of Wales Hospital, The Chinese University of Hong Kong

Purpose: Anti-arrhythmic 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 and assess the efficacy of ablation procedure by using different ablation catheters.

Methods: This study evaluated 95 consecutive patients (61 men, age 58.2±10.2 years, LA size 44±6 mm, LVEF 0.57±0.10) with AAD refractory symptomatic AF (67 patients had paroxysmal AF, 28 patients had persistent AF) were studied. Ablation procedure was undergone by one of the following techniques: (1) Ablation Frontiers Cardiac Ablation System (n=35) or (2) Ensite NavX system in combination with irrigation ablation catheter (n=60). 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 60.8±13.5 months before index procedure. During the follow-up time of 16±3 months, 70.1% of patients with paroxysmal AF and 53.6% of patients with persistent AF remained free from recurrence of AF after single procedure. Also 62.9% of patients who underwent ablation by Ablation Frontiers and 66.7% of patients who underwent ablation by using irrigation catheter were free of symptomatic AF (P=NS). About 15.7% of patients are taking AAD after single procedure. Major adverse events occurred in 3.2% 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 with paroxysmal AF after a single procedure. The clinical efficacy of using different ablation catheters was similar and the procedural risk was low.

17.

Electrocardiographic effects and plasma concentrations of flecainide and propafenone in healthy Chinese subjects

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Purpose: Flecainide and propafenone are antiarrhythmic drugs for the management of supraventricular and ventricular arrhythmias mainly through their effects on sodium channel blockade but additional mechanisms might be involved. We assessed the electrocardiographic (ECG) changes in healthy Chinese subjects after taking single oral doses of flecainide and propafenone and examined the relationship of these with the plasma concentrations.

Methods: Plasma concentration-time profile and ECG changes at 3 h and 12 h after administration of a single oral dose of flecainide (100 mg) or propafenone (150 mg) in 15 or 30 healthy Chinese male subjects were evaluated.

Results: At 3 h after dosing, flecainide significantly prolonged PR (160.8±23.1 vs. 146.8±23.6 msec, $P<0.05$) and QRS duration (96.5±7.9 vs. 93.6±8.5 msec, $P<0.05$) compared to baseline. The prolongation of the PR interval persisted for 12 h after dosing (153.9±21.5 msec at 12 h, $P<0.05$ vs. baseline). Propafenone prolonged the PR interval at 3 h (167.8±25.7 vs. 157.5±23.6 msec, $P<0.05$), but not at 12 h after dosing. Neither flecainide nor propafenone prolonged QTc, QTd and JTc intervals. The drug concentrations at 3 h tended to be related to the ECG effects of flecainide ($r=0.387$, $P>0.05$) and propafenone ($r=0.181$, $P>0.05$).

Conclusions: In healthy subjects, PR prolongation persisted for 12 h after a single dose of flecainide 100 mg but not for propafenone 150 mg, which may be related to the shorter half-life of propafenone. Plasma concentrations of flecainide and propafenone showed a tendency to be related to the ECG changes induced by the two drugs, but this was not significant possibly due to the small sample size.

ABSTRACTS

Abstracts for Free Paper Session:

18.

Axillary Vein is a Better Access than Subclavian vein or Cephalic vein With Respect to Long-term Pacemaker Lead Survival

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Purpose: To investigate the relationship between venous access and long-term pacemaker lead failure (PLF)

Methods: This is a retrospective cohort study. Case records of 409 patients (221 women, mean age 72.2±10.5 years) undergoing pacemaker implantation in 2 hospitals in the period between January 2000 and December 2004 were reviewed. PLF was defined as abnormal impedance and/or high pacing threshold and/or low sensing threshold leading to replacement or abandonment of the lead.

Results: A total of 682 (274 atrial and 408 ventricular) leads were implanted with contrast-guided axillary vein puncture (AP, 252), subclavian vein puncture (SP, 212) or cephalic vein cutdown (CP, 218). Over a mean follow-up of 73.7±33.2 months, 25 PLF were documented. Three (1.2%) were in AP group, 9 (4.1%) were in CP group and 13 (6.1%) were in the SP group. Using Cox regression, only the use of AP (RR=0.25, 95% CI 0.07-0.92; p=0.037), but not the other variables (age, sex, aetiology of bradycardia, cardiac chamber of lead implantation, lead size, lead material and lead fixation mechanism) was an independent predictor of PLF. With Kaplan-Meier analysis, AP results in significantly less PLF than SP (p=0.013) or CP (p=0.047).

Conclusions: The use of AP is an independent predictor of PLF. AP results in less PLF than SP or CP.

20.

Single Center Prospective Cohort Study of Performance of Attain StarFix Left Ventricular Lead in Patients Receiving Cardiac Resynchronization Therapy

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Purpose: Cardiac Resynchronization Therapy (CRT) is established treatment for patients with symptomatic heart failure. In spite of the advancement of implantation equipments and improved implantation technique, stability of left ventricular (LV) pacing lead is still the major obstacle to success. The aim of this study was to assess the performance of Attain StarFix LV lead (model 4195) and compared this lead performance to other passive LV leads (model 4194 and model 4193).

Methods: This study evaluated 175 consecutive patients (98 men, age 69.6±10.7 years) who had undergone CRT implantation were studied. Three different types of LV leads were implanted during index procedure (1) model 4195 (n=82), (2) model 4193 (n=61) and (3) model 4194 (n=32). Pacing threshold, impedance, sensing and number of dislodgement were analyzed at implant, 3 months, 6 months, 12 months, 18 months and 24 months.

Results: During the follow-up time of 24 months, pacing threshold of these leads were 1.4 V@ 0.5 msec (model 4193), 1.2V @ 0.5 msec (model 4195) and 1.1V @ 0.5 msec (model 4194) (p=NS). R wave were 14.8mV (model 4193), 16.5mV (model 4195) and 14.9 mV (model 4194) (p=NS). Lead impedance were 570 ohms (model 4193), 560 ohms (model 4195) and 550 ohms (model 4194) (p=NS). Numbers of lead dislodgements were: model 4193 = 3%, model 4195 = 1% and model 4194 = 3% (p=NS). No major complication was recorded during implantation.

Conclusion: Among patients who underwent CRT implantation, StarFix LV lead had an excellent performance and there was high rate of successful implantation. Its active fixation mechanism may lead to better stability when it compared to other LV leads and it did not associated with extra-procedural complication.

19.

Multi-Disciplinary Service for Patients Having Pacemaker Implantation

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Introduction: Pacemaker Integrated Service (PIS) is a multi-disciplinary team approach for patients following implantation of pacemaker or implantable cardioverter defibrillator. With cardiac rehabilitation model applied, the service was provided at in-patient and out-patient phase. The aims of the service were to enhance patients' knowledge and self-management skills, as well as to improve their physical and psychosocial well-being.

Methods: The first initiative in PIS was the out-patient pacemaker workshops launched in May 2007. Each workshop consisted of 2 sessions with various disciplines including nurses, occupational therapists, physiotherapists and social workers were involved. The workshop was held at least 8 weeks post-implantation. In-patient PIS was started in May 2010. Patients requiring pacemaker implantation would be recruited into Phase I PIS. Assessment, counseling, exercise, advice on activities of daily living, stress management and precautions following implantation were provided at both phases. At the early discharge period, community nursing service was arranged for wound care, monitoring of drug compliance and reinforcing self-management at home. At present, PIS was offered to patients received implantation for the first time.

Results: Two hundred and ninety-three patients (151 males, 52%) received at least one service in PIS. Among them, 81% of patients received pacemaker implantation. One hundred and eighty-four patients with mean age of 71 years (SD=9) with 279 attendances were made to the multidisciplinary workshops. Fifty-five patients (26 males, 47%), mean age of 75 years (SD=9), were referred for Phase I PIS. Thirty-seven patients received home-based care offered by community nurses. Three patients were found with shoulder stiffness during workshop were referred to physiotherapists for further management. Phase II cardiac rehabilitation was provided to 8 patients due to their underlying heart disease.

Conclusion: Pacemaker Integrated Service was developed to support patients with pacemaker and implantable cardioverter defibrillator implantation. Outcome measures to evaluate the effectiveness and benefits of the program will be further explored.

21.

Left Ventricular Remodeling After Long-term Right Ventricular Pacing is Predicted by Electrical and Mechanical Dyssynchrony, but not Pacing Site

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Purpose: Long-term right ventricular apical (RVA) pacing has been shown to cause adverse left ventricular (LV) remodeling and clinical outcomes. This is a retrospective cohort study on the predictors of LV remodeling after long-term RV pacing.

Methods: One hundred and two patients (54M, mean age 73.5±13.0, 50 RV septal and 52 RVA pacing) undergoing pacemaker implantation for atrio-ventricular block from January 2003 to June 2008 were studied. LV remodeling was assessed by echocardiography performed at least 18 months after implantation. Clinical outcomes including all-cause mortality, heart failure, ischaemic stroke and atrial fibrillation were analyzed. Electrical dyssynchrony (E_{dy}) was measured by QRS duration during pacing. Mechanical dyssynchrony (M_{dy}) was measured by standard deviation of time to peak systolic velocities of 12 LV segments from echocardiography during pacing.

Results: There was no difference in all clinical outcomes between RV septal and RVA pacing groups (Mean follow-up 38.4±17.7 months). With multivariate stepwise regression, only E_{dy} (p=0.002) and M_{dy} (p=0.016) but not pacing site (RVA or RV septal), were independent predictors for LV remodeling indices, namely LV ejection fraction (LVEF), end-systolic volume (LVESV) and end-diastolic volume (LVEDV). The presence of 2 positive criteria ($E_{dy}<150$ ms, $M_{dy}<33$ ms) compared to 1 or no positive criteria, resulted in significantly less adverse LV remodeling: LVESV (20.1±7.8vs33.7±16.9vs42.5±21.6ml, p=0.003), LVEDV (51±12.9vs75.5±25vs86.9±26.9ml, p<0.001) and LVEF (61.3±7.1vs56.1±8.3vs52.6±10.9%, p=0.02).

Conclusions: E_{dy} and M_{dy} were independent predictors for LV remodeling after long-term RV pacing. They may be targets for pacing site optimization.

ABSTRACTS

Abstracts for Free Paper Session:

22.

A New Era in extracorporeal membrane oxygenation management

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Purpose: To review the results of extracorporeal membrane oxygenation (ECMO) in our center.

Method: A retrospective review of medical records of patients who received ECMO support between Nov 2009 to Nov 2010 was performed.

Results: Between Nov 2009 to Nov 2010, ten patients (5 male, 5 female) received ECMO support. The indications for ECMO support include acute myocarditis (3 patients) and post cardiac surgery low output syndrome (3 patients), post-heart transplant right ventricular failure (2 patients), restrictive or dilated cardiomyopathy (2 patients). Four patients had bleeding complications requiring re-exploration and haemostasis. One patient had intracranial haemorrhage. The average duration of ECMO support was 5.4 days. Six patients were successfully weaned off ECMO support and were discharged without neurological deficit.

Conclusion: With the modern advances in medical equipments, better ECMO circuits and intensive care support, ECMO has become increasingly employed as a method of temporary support for patients with low cardiac output due to acute myocarditis, cardiomyopathies or after cardiac surgery.

23.

Fulminant Myocarditis: Uncommon Presentation of Influenza A (H1N1) 2009 Rescued by Veno-arterial Extracorporeal Membrane Oxygenation. A Case Report

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Fulminant myocarditis is an uncommon but potentially lethal complication of influenza which may require mechanical circulatory support. Case reports on Influenza A (H1N1) 2009 associated fulminant myocarditis were scarce and successful use of extracorporeal membrane oxygenation (ECMO) as the only mechanical circulatory support was not reported in the literature.

We described a 56-year-old man presented with 3 days history of fever, generalized malaise and progressive shortness of breath after recent travel to Mainland China. He was in cardiogenic shock with blood pressure 90/60mmHg, sinus tachycardia with rate up to 157 beats per minute, oliguria, cold periphery, lung field congestion and diffuse infiltrates on chest X-ray as well as left ventricular ejection fraction of around 20% on echocardiogram. Electrocardiogram showed 0.5-1mm ST elevation over inferior leads, poor R wave progression and early repolarization changes over anterior leads. Coronary angiogram showed only non-critical lesion over left anterior descending artery with TIMI 3 flow. Troponin was elevated from 0.13 to 3.53ng/ml. Nasopharyngeal aspirate was positive for RT-PCR for Influenza A (H1N1) 2009. Although endomyocardial biopsy was normal, overall clinical picture was still compatible with the diagnosis of fulminant myocarditis. Venoarterial extracorporeal membrane oxygenation (VA-ECMO) system had been set up for mechanical circulatory support via right common femoral artery and right common femoral vein using percutaneous approach. Oseltamivir, broad spectrum antibiotics and methylprednisolone was given and his cardiac function significantly improved. He had successfully weaned off all inotropes and ECMO was off after 41 hours. He then received a short course of rehabilitation and was discharged on Day 17 with echocardiogram before discharge revealed normalized left ventricular ejection fraction at 55%.

To the best of our present knowledge, this is the first case of fulminant myocarditis associated with Influenza A (H1N1) 2009 successfully supported by ECMO as the only mechanical circulatory support in the medical literature.

24.

Hemodynamic effects and clinical outcome of Sildenafil therapy on patients with severe pulmonary hypertension secondary to congestive heart failure considered ineligible for cardiac transplantation

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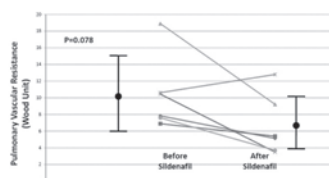
Background: Irreversibly raised pulmonary vascular resistance (PVR > 2.5 Woods unit) is an independent predictor of early mortality in heart transplantation. Heart failure patients (pts) with pulmonary hypertension (PH) with demonstrated reversibility of PVR with nitroprusside infusion has lead to a significant decrease in post-transplant mortality. Use of sildenafil, a phosphodiesterase-5 inhibitor, has been suggested for heart failure pts with PH who would have been excluded from heart transplantation.

Purpose: To assess the effect and outcome associated with sildenafil for treatment of irreversible pulmonary hypertension secondary to congestive heart failure

Methods: A retrospective case series of 6 pts with severe congestive heart failure considered ineligible for cardiac transplantation because of irreversible pulmonary hypertension were reviewed. Right heart catheterization findings and reversibility testing with nitroprusside infusion before and after sildenafil treatment were compared and analyzed.

Results: Six pts (mean age 47.5 ± 8.46 ; men 67%) referred for heart transplantation were found to have severe PH with irreversible PVR after maximum tolerated dose of nitroprusside infusion. The mean dose of sildenafil was 67.5 ± 8.22mg/day. The duration between baseline and follow-up right heart catheterization ranged from 28 to 195 days. There was a definite trend of PVR reduction from 10.38 ± 4.45 to 6.62 ± 3.66 Woods unit (p=0.078). Reversibility of PVR could be demonstrated in 4/5 pts. Two pts subsequently underwent successful heart transplantation. One pt with dilated cardiomyopathy and large ASD improved which allowed successful surgical ASD closure. One pt was delisted from heart transplant list because of continuous improvement in functional class and symptom but one pt died while waiting for heart transplantation. None of the pts developed side effect of sildenafil therapy

Conclusion: Sildenafil is effective in congestive heart failure pts with secondary irreversible pulmonary hypertension in who were otherwise disqualified for heart transplantation. Its beneficial effects in improving functional and hemodynamic status in heart failure pts are encouraging.



ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC INTERVENTION

25.

Evaluation of early Endothelialization of Genous (EPC Capture) Stent by Optical Coherence Tomography

Stephen Wai Luen LEE, Simon CC LAM, Kelvin KW CHAN, Frankie CC TAM, Michael PH CHAN, Michael KL WONG, Anthony YT Wong, Arthur SY Yung, Shun Ling KONG, David CW SIU, Hung Fat TSE, Raymond HW CHAN
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Background: While able to reduce restenosis, drug eluting stents (DES) causes poor stent healing and incomplete endothelialization (after more than 1 year), and leads to the development of late stent thrombosis which could be fatal. The Genous endothelial-progenitor-cell (EPC) capture stents emphasizes on the pro-healing concept with a bio-engineered coating of anti-CD34 antibody in the inner stent surface to capture circulatory EPCs. Documenting endothelialization and stent coverage in vivo have never been possible until the availability of the ultra-high resolution of the optical coherence tomography (OCT). While animal models and autopsy findings are available, in vivo documentation on the extent of neointimal coverage shortly (within one month) after stent implant in human coronary artery has not been reported. This study is the first study conducted to document complete neointimal stent coverage by OCT within 1 month of implantation.

Method: In this prospective, open-label study, 30 consecutive patients with acute coronary syndrome requiring PCI were treated with the Genous stents. Restudy angiograms and OCT analyses were randomised from 15 days to 30 days after the index PCI. All OCT frames and all stent struts would be analysed, targeting on the degree of stent coverage and the neointimal hyperplasia.

Results: All patients had uneventful PCI procedure and were discharged. Good endothelialization has already been documented by 15 days and near complete stent coverage by 28 days.

Conclusion: OCT with its ultra-high resolution represents a new novel imaging technology in evaluation of endothelialization and healing after stenting at a very early stage. The Genous stent allows for very early endothelialization with its pro-healing EPC capturing capacity, as disclosed by OCT.

26.

Two years clinical outcome for the treatment of in-stent restenosis with second generation compared to first generation drug-eluting stent

RCY Fung, CK Chan, CS Yue. Division of Cardiology, Department of Medicine and Geriatrics, United Christian Hospital, Hong Kong

Purpose: The safety and efficacy of first generation drug-eluting stents (DES) in the treatment of in-stent restenosis (ISR) has been verified. In this study, patients with bare metal ISR diagnosed angiographically between 1 Jan 2006 and 1 Dec 2010 were treated with either first generation (sirolimus or paclitaxel) or second generation (zotarolimus or everolimus) DES. Their clinical outcome was compared.

Method: Patients who had bare metal ISR treated with DES in the United Christian Hospital between 1 Jan 2006 and 31 Dec 2010 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 (TLR) and myocardial infarction.

Results: A total of 62 patients were included. Thirty-one patients were treated with first generation (paclitaxel and sirolimus) stents and thirty-one patients were treated with second generation (everolimus and zotarolimus) stents. Their mean follow up duration were 34.6 ± 17.9 and 26.3 ± 20.1 months (P = 0.152) respectively. Baseline characteristics were similar between the two groups, except mean maximal inflation pressure was significantly higher in the second generation stent group (17 ± 5.0 mmHg vs. 15 ± 2.0 mmHg, P < 0.01). The mean maximal inflation pressure was no longer significantly different after adjustment in the multivariate analysis. There were two death (one cardiac and the other non-cardiac) and six nonfatal myocardial infarctions in the first generation DES group. One patient died of acute pulmonary oedema, seven patients developed non-fatal myocardial infarctions and two patients required target lesion revascularization in the second generation DES group. The incidence of MACE between both groups of patients were not significantly different (19.4% vs 32.3%, respectively, P = 0.246).

Conclusion: In this study, two years 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.

27.

Spontaneous Coronary Dissection – A rare but serious illness hitting clean artery

YK Lo, PT Tsui, CL Lau, NY Chan, CC Choy, NS Mok, ST Lau

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Background: Spontaneous coronary dissection (SCD) is rare. The incidence is around one or two cases out of 1000 coronary angiography. It predominantly affects otherwise healthy pre-menopausal woman with little conventional cardiovascular risk factors. Specific risk factors are female sex, pregnancy and estrogen therapy. It can be fatal with diagnosis only at post-mortem. Proximal or distal extension of dissection and thus procedural complication is common during percutaneous coronary intervention (PCI).

Methods: This was a retrospective case series study conducted in cardiac intervention center of Princess Margaret Hospital.

Results: Seven patients (7 female, 1 male) of age 45±7 were identified. Six females were pre-menopausal. Four female patients were taking various health supplements. The only male patient has congenital absence of one upper limb. All of them presented with acute myocardial infarction. Right coronary, left circumflex and left anterior descending artery was the culprit in 5, 1 and 2 patients respectively. Two patients presented with cardiac arrest due to ventricular fibrillation. Diagnosis was made by angiography and 5 cases were confirmed by intravascular ultrasonography. Presence of dissection flap, near normal uninvolved segments and containment of dissection by branching points were tell-tale signs. Conventional cardiovascular risk factors were uncommon: diabetes (0%), hypertension (38%), dyslipidemia (14%), current or history of smoking (29%). PCI was attempted in 6 and extension of dissection was noted in 5. PCI was abandoned in 2 but was successful in remaining 4. Two patients had complete spontaneous healing of SCD. All patients survive without acute clinical complication. One patient suffers from sequelae of hypoxic brain damage related to cardiac arrest at presentation.

Conclusion: SCD is a serious illness and early recognition is critical before PCI. Extension of dissection is very common and it makes intervention much more difficult. Spontaneous complete recovery without intervention is possible.

28.

Left Main Stenting Registry in Teaching Hospital

Dr. KH Kam, Dr. EB Wu, Dr.YS Chan, Prof. G Yip, Prof. YY Lam, Dr. KY Chan, Prof. B Yan, Dr. PW Lee, Dr. CP Chan, Dr. CY Chan, Prof. CM Yu, Division of Cardiology, Department of Medicine and Therapeutics, Prince of Wales Hospital, CUHK, Hong Kong

Purpose: The objective of this registry is to reveal the basic information, clinical outcome, complication and mortality of percutaneous coronary intervention (PCI) of left main coronary artery disease in Teaching Hospital.

Methods: From January 2007 to November 2009, 39 consecutive patients who underwent PCI for left main coronary artery disease were selected and analyzed. Retrospective demographics, procedure information, complication, clinical outcome and mortality of the procedures were retrieved from procedure book.

Results: There were a total of 39 patients undergone the procedures in the above period. The mean age was 71 years old with male to female ratio of 3:1. A quarter had prior myocardial infarction (MI). The average left ventricular ejection fraction (LVEF) was 41%. More than 60% of them underwent procedure because of acute coronary syndrome. The ratio of left main body lesion to bifurcation lesion was 3:2. Drug eluting stents (DES) were used in 74% of cases. Single stent technique was used in 36 cases while T-stenting, crush and minicrush technique were employed in the remaining cases. Intravascular ultrasound was commonly employed (77%) in left main stenting. The mean procedure complication rate was 10% and one half of them were due to left main dissection. In-hospital mortality was 5% whereas all of these cases were performed on compassionate basis. In-hospital rate of non-fatal MI, target vessel revascularization (TVR) and stent thrombosis were zero. The incidence of all-cause mortality, cardiac death, non-fatal MI, TVR and stent thrombosis in one year were 15.4%, 12.8%, 0%, 8% and 2.6% respectively. Major adverse cardiac event (MACE)-free survival in 1 year was 84.6%.

Conclusion: Our local registry showed a better MACE-free survival (84.6% vs. 75.7%) and non-fatal MI rate (0% vs. 7.5%) than the DELFT (Drug Eluting Stent for Left Main) Registry in one year. The 1-year mortality rate using DES (7.7% vs 6.7%) and 1-year TVR rate (8% vs. 10%) were similar to DELFT data.

ABSTRACTS

Abstracts for Free Paper Session:

29.

Optimal Timing on re-Vascularization and Outcome in Acute Coronary Syndromes (OPTIVO-ACS)

Kelvin KW CHAN, Stephen Wai Luen LEE, Michael PH CHAN, Simon CC LAM, Jojo SH Hai, Frankie CC TAM, Michael KL WONG, Raymond HW CHAN. From the Division of Cardiology, Department of Medicine, the University of Hong Kong, Queen Mary Hospital, Hong Kong SAR, China.

Introduction: Several earlier studies have shown that early invasive intervention strategy could improve outcome in patients admitted for non-ST segment elevation myocardial infarction (NSTEMI) and acute coronary syndromes (ACS), especially in some high-risk subsets. However, the optimal timing for arranging such intervention remains uncertain. To determine whether coronary intervention (percutaneous coronary intervention or bypass surgery) performed as early as less than 48 hours after admission for NSTEMI-ACS patients can result in a reduction of major adverse cardiac events (MACE) when compared with delayed intervention done after 48 hours.

Method: Patients admitted to Queen Mary Hospital from the period of 1st January 2004 to 30th June 2009 were identified retrospectively, all with the diagnosis of NSTEMI, unstable angina or acute coronary syndrome. Patients were then separated into 2 main time groups according to their time of receiving coronary intervention, that is <48-hrs time group and >48-hrs time group, for statistical analysis. The primary endpoint was major adverse cardiovascular events (MACE) at 6 months follow-up. MACE was defined as a composite endpoint comprising of death from any cause, myocardial infarction, stroke and urgent target vessel / lesion revascularization.

Results: Totally 1,296 patients admitted for NSTEMI-ACS were identified and 164 of them received coronary angiography. Of these, 142 patients had revascularization treatment, in which 128 patients had percutaneous coronary intervention (PCI) and 14 patients had coronary artery bypass graft (CABG). At 6 months, MACE occurred in 1 patient in the <48-hrs time group and 15 patients in the >48-hrs time group (OR 0.083, 95% CI 0.01-0.65, p=0.005). Major secondary endpoints also showed that the outcome was better in patients with age<60 years old (p<0.02) subgroup, as well as a shorter length of hospital stay in the <48-hours group (mean 4.26d vs. 8.21d, p<0.0001).

Conclusion: In patients admitted for NSTEMI-ACS, a strategy of early coronary intervention by either angioplasty or bypass surgery, as short as less than 48 hours after admission, when compared to delayed intervention, reduced MACE at 6 months and the average length of hospital stay for the index hospitalization.

30.

A Case Series of Using Drug Eluting Balloon for In-Stent Restenosis

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Background

The management strategy for in-stent restenosis (ISR) is changing over recent years. Although Drug Eluting Stent (DES) remains the standard treatment for ISR, recurrent ISR after DES implantation is sometimes encountered. Several factors including inadequate drug coverage to the vessel wall in between struts allowing areas for potential cell growth and the inflammation response induced by polymers on DES were postulated for causing restenosis. In addition, double or even multiple metal layers in bifurcation lesion also make branch access difficult and increase procedure complexity. From these points of view, Drug Eluting Balloon (DEB), with paclitaxel coating on angioplasty balloon, provides an alternative treatment option for ISR. Promising results from clinical studies in comparing DEB with angioplasty (PACOCATH-ISR I/II) and DEB with DES (PEPCAD II) support the use of DEB for ISR in terms of better angiographic and clinical outcomes. Moreover, avoidance of prolonged dual anti-platelet therapy following DES implantation makes DEB advantageous to patients with high bleeding risk.

Findings

Our centre has started to use DEB on selected patients with ISR since 2010. A total of 9 patients with 13 lesions were treated. Special consideration of using DEB was taken in one patient with underlying malignancy having ISR six months after Genous Stent in view of high bleeding risk, and in another patient having recurrent ISR over left main coronary artery bifurcation lesion sixteen months after DES implantation. The mean age of patients is 71.1 years (range:57 to 84). Majority of them had cardiovascular risk factors including diabetes (78%), hypertension (100%), hyperlipidemia (44%) and smoking (44%). 3 patients had their ISR manifested as acute coronary syndrome and 1 patient presented with stable angina before ISR being identified. The remaining 5 patients were asymptomatic and the ISR was detected on elective coronary angiography. Among the 13 ISR lesions, 6 of them were recurrent ISR after second stenting with DES and 3 of them were first episode of DES ISR. Average time between DES implantation and index procedure of DEB was 16.1 (range: 7-36) months. The remaining 4 lesions were Bare Metal Stent (BMS) ISR with BMS implanted on average 3.5 (range: 2.5-6.5) months before DEB. The mean reference vessel diameter was 2.87 (range: 2.01 – 3.54) mm. Average DEB size and length were 3.0 (range:2.5 – 3.5) mm and 21.2 (range:15-30) mm respectively. We have re-studied on 6 lesions by coronary angiography at 3.5 (range: 3-6) months after DEB. In-stent lumen loss was 0.29 (range: 0.03 – 0.54) mm. There was no target lesion revascularization (TLR), myocardial infarction, stroke, death or major adverse cardiac events (MACE) in all of the 9 patients during the follow-up period of 5.4 (range: 1-10) months after index procedure of DEB. Angiographic and clinic follow-up is being continued.

Conclusion

DEB provides an alternative treatment option for ISR with potential advantage for recurrent ISR, bifurcation lesions and patients with high bleeding risk. The early angiographic result is satisfactory and the clinical outcome is promising. Longer follow-up period and larger number of patient for study is necessary to warrant its long term efficacy and safety.

31.

Fractional Flow Reserve assessment in Clinical Practice

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Purpose: Fractional flow reserve (FFR) assessment has been proven to be a reliable functional test of coronary stenosis in DEFER and FAME study. We aimed to review the application of FFR assessment in real life clinical practice.

Methods: This is a retrospective cohort study of 101 consecutive patients with FFR assessment before angioplasty. Coronary stenosis with FFR \geq 0.8 would be treated with optimal medical therapy.

Results: 86 males and 15 females of age=62 \pm 10 were recruited. Underlying coronary risk factors were history of smoking (29%), diabetes mellitus (26%), hypertension (41%) and hypercholesterolemia (50%). Prior myocardial infarction was present in 31 (31%) patients. A total of 143 lesions were assessed by measuring FFR. Intracoronary ATP was used in majority of cases to produce maximal hyperemia. Significant drop in blood pressure was documented in all cases during maximal hyperemia. Ninety-three (65%) non-significant lesions were deferred (LAD 43, LCX 31, RCA 19) and 50 (35%) significant lesions (LAD 27, LCX 12, RCA 11) were stented. This cohort was followed for 212 \pm 86 days. None of the patients developed acute myocardial infarction related to deferred lesions.

Conclusion: FFR as a form of functional test could be applied in daily clinical practice and non-ischemic angiographic moderate lesions are common. Deferring stenting non-significant lesions together with optimal medical therapy is safe.

32.

Initial experience of transcatheter aortic valve implantation (TAVI) in Queen Elizabeth Hospital

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Purpose: Surgical aortic valve replacement is the only and the most effective treatment for patients with symptomatic, severe aortic stenosis. However, around 30% of patients declined for surgery because of being high risk or inoperable. In the past decade, transcatheter aortic valve implantation (TAVI) has been developed and used widely over the world to treat this group of patient. TAVI program has been started since December, 2010 in our hospital. The study tried to show the initial experience and outcomes of the patients.

Method: A prospective case series. All the demographic data, presenting symptoms, echocardiogram finding, outcomes were measured and recorded. Chi-square and T-test were used for analysis.

Results: There were all together four patients receiving TAVI in our hospital up till now. Details of demographic and procedure are summarized in table 1. Findings compared between pre- and post- TAVI in table 2. The TAVI procedures were performed under general anaesthesia, with co-operation with cardiothoracic surgeons and anesthetists in our catheterization laboratory. We used Corevalve revalving system® in our procedure. The procedure successful rate was 100%. There was no in-hospital or 30-day mortality. All patients could be ambulatory on post-OT day 2 and they all (100%) showed improvement in function class for at least 1 class 1 month later. No patients suffered from stroke but 2 patients (50%) had permanent pacemaker implanted (one patient had 1st degree heart block pre-OT, resulting in complete heart block after OT and the other patient had paroxysmal atrial fibrillation with borderline pause pre-OT, resulting in atrial fibrillation with LBBB). All patients showed no residual aortic stenosis 1 month after operation. The mean grad of aortic valve and EF were significantly different after TAVI, p<0.05. The quality of life assessment (SF-12) was significantly improved as well.

Table 1:

No	age	gender	Symptom	Euro-score (logistic, %)	IHD +PCI	annulus (mm)	approach	Corevalve ® size
1	81	M	CHF, ACS	9	+ve	26	Axillary	29
2	81	F	Dizziness	10	-ve	23	Femoral	26
3	77	M	CHF	14	-ve	26	Femoral	29
4	81	F	CHF, ACS	29.96	+ve	21	Femoral	26

Table 2 * post: assessment 1 month after TAVI

No	FC(pre)	FC(post)	Mean grad (pre, mmHg)	Mean grad (post, mmHg)	TAVI (leakage)	ECG (pre)	ECG (post)	EF (pre, %)	EF (post, %)
1	III	II	42	9	Mild	AF	AF, LBBB	30	50
2	II	I	66	6	-ve	SR	SR, RBBB	60	70
3	III	I	45	4	-ve	SR, 1 st HB	SR, eccCHB	40	50
4	III	I	40	6	-ve	pAF, 4 secs pause	pAF, LBBB	60	60

Conclusion: TAVI is a feasible and effective way to treat the patients who are symptomatic with severe aortic stenosis and high risk/ inoperable for surgical replacement. The short-term results are quite promising. However, we need to observe and assess the long-term results before considering further expansion of the indication.

ABSTRACTS

Abstracts for Free Paper Session:

BASIC SCIENCE

33.

The Preliminary Study of Ultrasound Evaluation on Animal Experimental Model of Iliac Artery Stenosis in Youth RabbitsJ Guo,¹ XJ Ji,¹ GS Yu,¹ YH Bai,¹ XQ Zhai,¹ Y Tang,² P Zhang,² Y Wang³¹Department of Cardiology, ²Department of ultrasonic, The Children's Hospital of Chongqing Medical University; ³College of Pharmacy of Chongqing Medical University, PR China

Objective: To explore the method of establishing iliac artery stenosis experimental model through balloon injured artery on youth rabbits. And to proof the application value and significance of ultrasonic imaging technology in stenosis of animal models through the measuring of the narrow vascular blood flow parameters by ultrasound.

Methods: 15 New Zealand rabbits of (60±15) days year-old were selected. male and female unlimited, who were divided into 3 groups averagely. In group A, the youth rabbits' iliac artery were damaged by intra-operative balloon expansion. the parameters, including the vascular diameter(D), the thickness of endometriosis(E), the thickness of middle-outer membrane(M-O), and Systolic flow velocity(Vs), the diastolic flow velocity(Vd), resistance index (RI), and Vs/Vd of the corresponding section, were measured by the ultrasound after 4 weeks of the surgery and been compared with the results of pathology testing. In group B, the youth rabbits were pretended to be damaged by ligation of the distal femoral artery. The remaining processing were consistent with group A. Group C was the normal control group.

Results: 1. All rabbits were completed the operation and live to the end of experiment. The average operation time was (30±10)min. 2. Iliac artery stenosis experimental model on youth rabbits was established successfully. Compared with group B and group C, D was decreased in group A, while E,M-O were increased. Vs, Vd and RI were increased obviously in the surgical artery. The diameter of the artery was decreased significantly by pathological HE dyeing with the cells of endometriosis, middle and the outer membrane were hyperplasia obviously. 3. Compared with the group C, The results of measurement by ultrasound and the Pathology testing were both had no obvious statistical significance.

Conclusion: 1. This method successfully established the iliac artery restenosis experimental model on youth rabbits, which can be used for studying of the pathological mechanism of restenosis and the testing of drug intervention. 2. Ultrasonic imaging techniques can be used to evaluate the vascular stenosis noninvasively and dynamically, which has a high consistent with the result of pathology testing, so it is worth to be recommended.

34.

Prednisone Attenuates Coxsackievirus B3-induced Viral Myocarditis in Mice

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Purpose: The goal of this study was to investigate the therapeutic benefits of prednisone on Coxsackie virus B3-induced myocarditis in mice. Discussion the difference between different time of prednisone on viral myocarditis in mice at the medication.

Methods: 173 male 4-week-old Balb/c mice were divided into eight groups randomly, including normal control group; prednisone group; infected control group; group of infected mice with prednisone treatment at early stage; group of infected mice with prednisone treatment at late stage. Prednisone was given 3 or 10 days after viral challenge and treatment lasted for 14 days. The Echocardiograms were examined on days 3, 7, 10, 14, 21, and 30 after virus inoculation. Blood samples were collected for cardiac troponin I detection at the same time. Myocardial inflammation, cell apoptosis and Fas expression were detected by histology and western blot, RT-PCR.

Result: The myocardial histopathological score of mice in each infected group on day 7-10 after infection were significantly higher than that in normal control group, but no significant difference in each infected group. On day 14 after infection, the myocardial histopathological score of mice with Prednisone treatment at early stage were significantly lower than that in other infected groups. H&E staining and transmission electron microscopy revealed significant improvement of quantitative pathological features in the prednisone treatment at early stage. Immunohistochemical microscopy also showed a marked decrease in the level of cardiac cell Apoptosis in the Prednisone-treated group compared to infected animals that did not receive treatment. The differences in cTnI values between the virus-challenged animals and prednisone-treated virus-challenged mice achieve statistical significance, there was a trend toward a decrease in cTnI in the Prednisone-treated mice. RT-PCR and western blotting revealed that the virus induced marked increases in Fas mRNA and protein expression, which could be prevented by treatment with Prednisone.

Conclusion: These results demonstrate that Prednisone reduces the histological and functional severity of CVB3-induced myocarditis, and inhibits apoptosis and Fas expression in the myocardium of CVB3-infected mice especially used in early stage of the disease.

35.

HATs inhibitor, Curcumin, ameliorates the H3K9 hyperacetylation and heart development-related genes over-expression induced by alcohol in cardiac progenitor cells

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Purpose: Our preliminary research showed that alcohol selectively increased acetylation of histone H3 at lysine 9 (H3K9) and augmented the expression of heart development-related genes in cardiac progenitor cells. This may be a mechanism by which the alcohol alters the gene expression in occurrence of CHD. Therefore, the objective of this study is to further explore the possible potential pathway by intervening the regulation of alcohol with curcumin, and to detect that whether curcumin ameliorates the H3K9 hyperacetylation and related genes over-expression induced by alcohol.

Methods: Cardiac progenitor cells were treated with alcohol at 200mM and curcumin was dissolved in the 200mM alcohol at 5, 15, 25μM respectively. Mitochondrial activity (MTT) assay was used to assess the viability of cardiac progenitor cells. Western blot analysis was employed to detect the acetylation of histone H3K9 to select the effective concentration of curcumin. Real-time PCR was applied to measure the expressions of heart development-related genes GATA4, Mef2c and Tbx5.

Results: Alcohol at 200mM reduced cell viability by 28%; curcumin that was dissolved in 200mM alcohol respectively at 5, 15, 25, 35μM reduced cell viability by 30%, 33%, 37%, 52%; curcumin that was dissolved in DMSO at 25μM reduced cell viability by 26%. Alcohol at 200mM increased the acetylation of H3K9 by 2.76-fold (P<0.05) and significantly augmented the expression of GATA4 and Mef2c (P<0.05) compared to control group. Alcohol at 200mM and curcumin at 5, 15μM increased the acetylation of H3K9 by 2.22- and 1.58-fold, respectively (P<0.05). There are no significant difference of the H3K9 acetylation and the expression of GATA4, Mef2c and Tbx5 at alcohol 200mM and curcumin 25μM compared to the control group (P>0.05). time point, the HAT activity and histone acetylation were inhibited by curcumin (P<0.05).

Conclusion: curcumin can ameliorate the hyperacetylation of histone H3 at lysine 9 and the over-expression of heart development-related genes induced by alcohol in the cardiac progenitor cells, which may be one of the pathogenesis that alcohol leads to CHD

36.

The effect of BMP10 and BMP13 in myocardiocytes differentiation of C₃H10T_{1/2} stem cell in vitro

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Purpose: To investigate the effect of BMP10 and BMP13 on stem cells (C₃H10T_{1/2}) differentiating into myocardiocyte-like cells in vitro.

Methods: The cardiac-specific proteins cTnT, Cx43, α-MHC, α-actin and were measured by the Western Blot and immunofluorescence technique and the cardiac-specific gene *GATA4* and *MEF2c* expression were detected by Q-RT-PCR at 1w, 2w, 3w, 4w after the C₃H10T_{1/2} stem cell transfected with pAdEasy-BMP10, pAdEasy-BMP13, AdGFP plasmid. The ultrastructure actin filament and intercalary disc of the cells were detected by electron microscope and masson staining technique after 4 weeks. Then electrophysiologic changes of the C₃H10T_{1/2} stem cells were tested by the whole-cell patch clamp technology.

Results: Cells began to stretch after transfection, the refractivity of cells enhance conspicuously, cells trend become unanimous and the connection between cells were compact. At week 3 and 4, cTnT, Cx43, α-MHC and α-actin were detected in pAdEasy-BMP10 and pAdEasy-BMP13 group but not found at week 1 and 2 (p<0.05). In AdGFP and control group we could not found any cardiac-specific proteins at week 1, 2, 3, 4. The expression of *GATA4* and *MEF2c* in BMP10 could be detected in all groups, but more in pAdEasy-BMP13 and pAdEasy-BMP10 plasmid transfection group than in AdGFP plasmid transfection and control group (p<0.05). Myocardiocytes ultrastructure actin filament and intercalary disc could be detected by electron microscope and masson staining technique at 4 week. The super activation delayed rectifier K⁺ current (IKur), the inward rectifier K⁺ current (IKir) and Ca²⁺ (L-type calcium ion) current can be tested at 4 week in pAdEasy-BMP10 and pAdEasy-BMP13 group but could not found in AdGFP and control group.

Conclusion: BMP10 and BMP13 probably promote the differentiation of C₃H10T_{1/2} stem cells into myocardiocytes.

ABSTRACTS

Abstracts for Free Paper Session:

37.

BMP13 on C3H10T1 / 2 Cells to Improve Cardiac Function in Myocardial Infarction Rats

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Objective: To investigate the bone morphogenetic protein 13 (BMP13/GDF6) could promote C3H10T1/2 cell differentiation into cardiomyocytes in microenvironment and improve the cardiac function of the rats after myocardial infarct (MI).

Methods: MI and sham operation were established Sprague Dawley (SD) male rats. Totally 56 rats were divided into 4 groups: sham operation group (8 rats), MI group (16 rats), MI+GFP group (16 rats), MI+BMP13 group (16 rats). Left ventricular (LV) function were assessed by echocardiography on day baseline and 4 weeks after operation. After measuring body weight once a week, 4 weeks after completion of cardiac function test, rats were sacrificed to take the heart. Masson's staining compared the differences in infarct size of heart. Cell growth observed by fluorescence microscopy in frozen sections, immunofluorescence detection cardiac-specific structural protein α -MHC and cTNT of cells were implanted in each group.

Results: Each C3H10T1/2 cells had about 60% of cells expressed green fluorescence. Cells grew well in 1, 2, 3 weeks after implantation, very few cells surviving in 4 weeks. On day 4 weeks of experiment, in addition to the sham group, the other three groups compared with baseline LVEDD significantly expanded, but among the three groups no significant difference ($P > 0.05$). LVESD, MI + BMP13 group and MI + GFP group compare with MI group were reduced ($P < 0.05$), and MI + BMP13 group compared with MI + GFP reduced more significantly ($P < 0.05$), the same as LVFS. Implanted cells in group MI + GFP and MI + BMP13 had cardiac cell-specific structural protein α -MHC and cTNT expression by immunofluorescence.

Conclusion: C3H10T1/2 cells can grow and differentiation into cardiomyocyte-like cells in micro-environment of myocardial infarction; it can also improve cardiac function in myocardial infarction rats; it can be strengthened by transfection BMP13. Differentiation of implanted cells and improve cardiac function in myocardial infarction rats are not necessarily consistent.

38.

Hypo-acetylation of histone disturbs the development of heart

Huichao Sun^{1,2}, **Jie Tian**¹, Jing Zhu², Tiewei Lv¹ (¹Department of Heart Centre, ² Pediatric Institute, Children's Hospital of Chongqing Medical University, Chongqing, PR China)

Purpose: Previous studies indicated that histone acetylation was involved in regulation of heart development-related genes expression in vitro. However whether hypoacetylation of histone in vivo could affect the development progress of heart or lead to congenital heart disease is not clear.

Methods: ICR pregnant mice were treated with curcumin, a specific inhibitor of histone acetylase (HAT), during the heart development (E7.5-16.5). At different time point (E10.5, E14.5 and E17.5), the pregnant mice were killed and the embryonic hearts were selected. Then histological analysis was used to examine the cardiac abnormalities, Q-RT-PCR were used to detect the expression of heart specific genes, Western Blot and HAT activity assay were used to determine the effects of curcumin on histone acetylation.

Results: The experimental data showed that curcumin could increase abortion and embryonic death ($P < 0.05$). The HE stained sections showed that the embryonic heart of curcumin group was underdevelopment: the ventricular myocardium wall was thinned, ventricular chamber was dilated and trabeculation was reduced. Results of Q-RT-PCR showed that: on E11.5 the expression of GATA4 (2.86 ± 0.24), Mef2c (2.87 ± 0.12) and Nkx2.5 (8.59 ± 0.89) in curcumin group was decreased by 0.27-, 0.13-, and 0.47-fold respectively compared with control groups ($P < 0.05$); on E14.5 their expressions were still decreased by 0.28-, 0.38-, and 0.47-fold respectively ($P < 0.05$). However no difference of Mef2c expression was observed on E17.5. Interestingly, at all the three time point, the HAT activity and histone acetylation were inhibited by curcumin ($P < 0.05$).

Conclusion: Histone hypoacetylation can disturb the normal development of embryonic heart. However histone acetylation is not the only one factor which affects heart development. There may be complex compensatory mechanisms in epigenetics during the heart development.

39.

Trichostatin A promotes cardiomyocyte differentiation of rat mesenchymal stem cells after 5-azacytidine induction or during co-culture with neonatal cardiomyocytes

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Purpose: This study was to investigate the effect of trichostatin A (TSA), a histone deacetylase (HDAC) inhibitor, on cardiac differentiation of rat bone marrow mesenchymal stem cells (MSCs) in vitro.

Methods: Rat MSCs were isolated and divided into 6 groups: 1) control; 2) treatment with 5-azacytidine (5-aza, 10 μ M) for 24 hrs; 3) treatment with TSA (100, 300, and 500 nM) for 48 hrs; 4) treatment with 5-aza for 24 hrs followed by 48 hrs of incubation with TSA; 5) co-culture with neonatal cardiomyocytes (CMs); and 6) treatment with TSA for 48 hrs then co-culture with CMs.

Results: HDAC activity was significantly inhibited in TSA-treated cells with the maximal inhibition after 24 hrs of exposure to TSA at 300 nM. No changes in HDAC activity were observed in control, 5-aza-treated or co-culture groups. Following 7 days of differentiation, the expression of early cardiac transcription factors GATA-4, NKx2.5, and MEF2c, and cardiac troponin T (cTnT) was increased by 6-8 times in the cells in 5-aza-treated, co-culture, or TSA-treated groups over control as determined using real-time PCR, immunofluorescence staining, and Western blotting. However, the percent cTnT-positive cells were dramatically different with 0.7% for control, 10% for 5-aza-treated, 25% for co-culture, and 4% for TSA-treated group (500 nM). TSA treatment of the cells pre-treated with 5-aza or co-cultured with CMs dramatically increased the expression of GATA-4, NKx2.5, and MEF2c by 35-50 times over control. The cTnT protein expression was also significantly increased by over 3-fold by TSA treatment (500 nM) in both 5-aza-treated and co-culture group over control. The percent cTnT-positive cells in both 5-aza-pre-treated and co-culture groups were significantly increased by TSA treatment after one week of differentiation by up to 19.8% and 30.2%, respectively.

Conclusion: These data suggested that TSA enhanced the cardiac differentiation of MSCs after 5-aza induction and during co-culture with CMs through a mechanism beyond the inhibition of HDAC activity.

40.

Increased endogenous sulfur dioxide alleviates pulmonary vascular collagen remodeling in rats with monocrotaline-induced pulmonary hypertension

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Purpose: The present study is aimed to explore the role of sulfur dioxide (SO_2) in the regulation of pulmonary vascular collagen remodeling induced by monocrotaline (MCT) and its regulatory mechanisms.

Methods: Rat model of MCT-induced pulmonary hypertension was developed. L-aspartate- β -hydroxamate (HDH) and SO_2 donor were administered to rats to evaluate effect of SO_2 on pulmonary vascular collagen remodeling. Endogenous sulfur dioxide pathway, including SO_2 concentration and glutamate oxaloacetate transaminase enzyme (GOT) activity and mRNA levels, and collagen metabolism were evaluated. Transforming growth factor (TGF- β)-1-stimulated cultured pulmonary arterial fibroblasts (PAFs) were used to further its mechanism studies.

Results: After 3-week treatment, rats showed a significant pulmonary hypertension and pulmonary vascular structural remodeling in association with an enhanced SO_2 /GOT pathway. After HDH treatment, mean pulmonary artery pressure further increased and pulmonary vascular structural remodeling together with collagen accumulation was markedly aggravated in association with a decreased SO_2 production. Meanwhile, procollagen I and III mRNA in lung tissue and pulmonary artery were both increased; Lung tissue MMP-13, TIMP-1 and MMP-13/TIMP-1 ratio decreased; TGF- β 1 protein and mRNA in lung tissue and pulmonary artery were both increased. On the contrary, after SO_2 donor treatment, pulmonary vascular structural remodeling attenuated, pulmonary artery collagen synthesis was inhibited and collagen degradation was improved, and TGF- β 1 of lung tissue and pulmonary artery were also decreased. PAFs in the TGF- β 1 group exhibited morphological transforming features and an increasing content of collagen type I accumulated around nucleus. However, when those PAFs were pretreated with SO_2 and then treated with TGF- β 1, their collagen I expressions were inhibited. The phosphorylation of p38 induced by TGF- β 1 was inhibited when PAFs were pretreated with SO_2 and then treated with TGF- β 1.

Conclusion: Upregulation of endogenous sulfur dioxide pathway played a protective role in pulmonary artery collagen remodeling induced by monocrotaline. The mechanisms might involve inhibition of TGF- β 1 expression and activation of p38 signaling pathway.

ABSTRACTS

Abstracts for Free Paper Session:

41.

Effects of ulinastatin on injury of neurons in hippocampus CA1 area and cardiac dysfunction after cardiopulmonary resuscitation in rabbits

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Purpose: To investigate whether ulinastatin can reduce the systemic inflammatory response, improve cardiac dysfunction and reduce injury of neurons in hippocampus CA1 area after ROSC.

Methods: Cardiac ventricular fibrillation was induced by alternating current in 24 New Zealand rabbits, which were randomly divided into Control and ulinastatin treated group after ROSC. Dynamic observation of the effects of ulinastatin on the levels of plasma inflammatory cytokines TNF- α , IL-6, cardiac function including FS, EF and E/A, and neuron injury in hippocampus CA1 area after ROSC were performed.

Results: Plasma inflammatory cytokines TNF- α and IL-6 in Control group peaked at 8h after ROSC, the levels were 441.60 ± 169.89 ng/ml and 622.00 ± 111.18 ng/ml respectively and reduced to 283.33 ± 32.01 ng/ml and 587.00 ± 102.50 ng/ml at 16h. The levels of TNF- α and IL-6 at each time interval in ulinastatin group were significantly lower than the Control group ($P < 0.05$). At 4h after ROSC, FS, EF and E/A in Control group were $26.20 \pm 3.35\%$, $33.00 \pm 2.12\%$ and 1.34 ± 0.12 respectively. EF, E/A in ulinastatin treated group were higher than the Control group at 4h, 8h and 12h after ROSC. FS Values after ROSC 4h, 8h were higher than the Control group ($P < 0.05$). At 72h after ROSC, the number of dynamic neurons in CA1 area of Control group was 13.22 ± 0.97 , less than the ulinastatin group 16.89 ± 1.45 , $P = 0.003$, and the number of apoptotic neurons in hippocampus CA1 area in Control group was 15.67 ± 1.37 , while in ulinastatin group was 13.67 ± 1.03 , $P = 0.019$.

Conclusions: Ulinastatin can decrease plasma inflammatory cytokines TNF- α and IL-6, improve cardiac dysfunction and have protective effects on neurons in hippocampus CA1 area after ROSC in New Zealand rabbits.

42.

The preventive effect of inhibiting nuclear factor kappa-B activity on the aorta endothelial cells in rats with high lipid diet

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Purpose: To examine the effect of pyrrolidine dithiocarbamate (PDTC) on the aorta endothelial cells in rats with high lipid diet.

Methods: 18 Sprague Dawley rats were randomly divided into three groups: high lipids group, PDTC and high lipid group (PDTC group) and normal control group. The aortas were harvested for histomorphometry and transmission electron microscope 12 weeks after the induction of high plasma lipid. The nuclear factor κ B (NF- κ B) activity was measured by use of electrophoretic mobility shift assays (EMSA) in aortas. The levels of tumor necrosis factor- α (TNF- α) and interleukin-6 (IL-6) in serum were measured by use of radio-immunity and the level of soluble thrombomodulin (sTM) in serum was measured by use of enzyme linked immunosorbent assay (ELISA).

Results: There was obvious necrosis or apoptosis for aorta endothelial cells in high lipids group, but this phenomenon was no clear in PDTC group. The level of sTM in the PDTC group was significantly higher than that of normal control group and was lower than that of high lipids group ($P < 0.05$). The activity of NF- κ B and the levels of IL-6, TNF- α were evidently higher in high lipids group than normal control group and PDTC group. There was a positive relation between the NF- κ B activity and the levels of TNF- α , IL-6 and sTM ($P < 0.05$).

Conclusions: These results indicate that PDTC can protect aorta endothelial cells by inhibiting the activity of NF- κ B and the inflammatory response in rats with high lipid diet.

PAEDIATRIC CARDIOLOGY I

43.

Prenatal diagnosis of congenital heart diseases (CHD) by fetal echocardiography: A multicenter study

Chen Chu, Yonghao Gui, Yingliu Yan, The collaborative research group on prenatal diagnostic strategy of CHD in China

Objective: To evaluate the diagnostic accuracy and investigate the significant parameters in fetal echocardiography on prenatal diagnosing CHD.

Method: A multicenter prospective study was carried out at fifteen obstetrics or children's hospitals in nine areas of China from October 2008 to October 2010. Pregnant women received fetal echo examinations and were followed. After delivery their babies received neonatal echo examinations. If the fetuses were induced delivered for heart malformation, autopsies were made to identify the diagnosis of CHD. The accuracy of prenatal diagnosis was evaluated, and parameters in fetal echo in gestational 18~24 weeks were analyzed.

Results: In the study period totally 6485 women were included and followed after delivery. 131 fetuses/babies were diagnosis CHD due to the results of neonatal echo or autopsies, including 75 minor malformations (isolated septal defects, pulmonary stenosis) and 56 major malformations (more severe, complex or multiple malformations). The sensitivity and specificity of fetal echo were 49.24% and 99.32% respectively in diagnosis of total CHD, 92.86% and 99.84% in major CHD, and 16% and 99.5% in minor CHD. In fetal echo findings, the abnormality rates of four-chamber, ventricular outflow tract and three vessels views, abnormal umbilical vessels and gastriole location were different between normal and major CHD groups. Fetal left ventricular, aortic and pulmonary arteries' diameters, angles of cardiac axis also showed significant differences. However no differences in fetal echo parameters were found between normal and minor CHD groups.

Conclusions: The prenatal diagnostic accuracy of major CHD was satisfactory however prenatal diagnosing minor CHD remained difficult. Selected parameters in fetal echo could contribute to diagnose major CHD prenatally.

44.

Flow-mediated vasodilation as a predictor for therapeutic response to midodrine hydrochloride in children with postural orthostatic tachycardia syndrome

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Purpose: The study was designed to explore the predictive value of flow-mediated vasodilation (FMD) as a therapeutic predictor for children with postural orthostatic tachycardia syndrome (POTS) treated by midodrine hydrochloride.

Methods: Seventy-eight children diagnosed as POTS by head-up test (HUT) or head-up tilt test (HUTT) were enrolled. All the 78 children received midodrine hydrochloride (2.5 mg per day) and were followed up by clinic visit or by telephone after one-month therapy. Flow-mediated vasodilation (FMD) of brachial artery was measured using colored Doppler vascular ultrasound for each participant. Symptom scoring was applied to evaluate therapeutic effect of midodrine hydrochloride on POTS. Symptom scoring, FMD values and HUT/HUTT outcome were investigated before and after treatment. A receiver operating characteristic (ROC) curve was used to explore the predictive value of FMD for therapeutic response to midodrine hydrochloride in children with POTS.

Results: In patients, the symptom scores, the increased beats of heart rate during HUT and the FMD were all reduced significantly after treatment of midodrine hydrochloride. Midodrine hydrochloride was effective in 64 of them (82%). ROC curve on predictive value of FMD showed that AUC was 0.815 (95%CI: 0.707, 0.923; $P < 0.05$); an FMD of 9.69% as cutoff value resulted in both high sensitivity (73.4%) and specificity (85.7%).

Conclusion: FMD can be considered as an indicator for predicting efficacy of midodrine hydrochloride for treating children with POTS. FMD of 9.69% taken as a cutting value resulted in both high sensitivity and specificity.

ABSTRACTS

Abstracts for Free Paper Session:

45.

Implantable cardioverter defibrillator (ICD) in children and young adults: experience in Hong KongTC Yung,¹ KS Lun,¹ K Fan,² LC Cheng³¹Department of Paediatric Cardiology, Queen Mary Hospital; ²Cardiac Medical Unit, Grantham Hospital; ³Cardiothoracic Surgical Department, Queen Mary Hospital, Hong Kong

Introduction: ICD therapy is increasingly used in children and young adults. The purpose of this single centre study in Hong Kong is to evaluate the indications, underlying heart disease, efficacy, outcome and complications involved with ICD therapy in this group of patients.

Methods and Results: The hospital records of all patients aged ≤ 30 years who underwent ICD implantation were reviewed retrospectively. From 1996 to 2010, 11 patients (mean age 15.6 years, range 4 years 8 months to 29 years) underwent ICD placement. The ICD was implanted for aborted cardiac arrest (5), syncope (5) and primary prevention of sudden cardiac death (1). The underlying cardiac diseases were congenital long QT syndrome (3), idiopathic ventricular fibrillation (1), hypertrophic cardiomyopathy (3), dilated cardiomyopathy (1) and post-operative Tetralogy of Fallot (3). Ten patients had the ICD system implanted transvenously, and 1 had the ICD lead placed subcutaneously. Two youngest patients had the generator placed at the abdominal position. The mean follow-up duration was 4 years 2 months, range 7 months to 14 years. Three patients received appropriate shocks for ventricular arrhythmias at a mean duration of 6 months after ICD implant. One patient had anti-tachycardia pacing for fast ventricular tachycardia. Complications occurred in two patients. They had inappropriate shocks because of sinus tachycardia and lead fracture in one, and atrial fibrillation in the other. Three patients required reintervention: generator replacement in two, generator plus ICD lead replacement in the other. One patient died because of congestive heart failure 9 months after ICD implant, otherwise there was no ICD or arrhythmia related mortality.

Conclusions: The mid term outcome of ICD therapy for prevention of sudden cardiac death in children and young adult is good. ICD implant procedure is safe in this age group.

46.

Follow Up the Arteria Carotis Communis in Kawasaki Disease with High-Frequency Ultrasonography

XQ Zhai, XJ Ji, GS Yu, YH Bai, et al.

Department of Cardiology, The Children's Hospital of Chongqing Medical University, PR China

Purpose: To study the value of detecting the carotid intima media thickness (C-IMT) and buffering function, including cross-sectional compliance (CSC), volumic distensibility (VD), arterial stiffness index (ASI), in children with Kawasaki disease in acute stage and long-term stage with high-frequency ultrasonography.

Methods: 50 patients received ultrasonography, including 15 patients with Kawasaki disease in acute stage (group I), 18 patients with Kawasaki disease in long-term (group II) and 17 normal children (control group).

Results: C-IMT and ASI of acute stage group and long-term group were significantly higher than that of control group ($P < 0.05$). VD of acute stage group and long-term group was significantly lower than that of control group ($P < 0.05$). CSC of long-term group was lower than control group and acute stage, but there is no significant difference between acute stage group and control group. C-IMT negatively correlated with VD ($r = -0.301$, $P = 0.034$), and positively correlated with ASI ($r = 0.289$, $P = 0.042$).

Conclusion: There were increased C-IMT and abnormal Buffering Function in the acute stage and long-term of Kawasaki disease. It is feasible to detect the change of arteria carotis communis anterior with high-frequency ultrasonography.

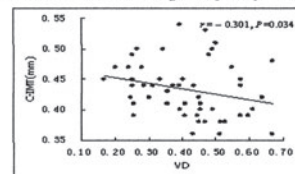


Figure 1 Scatter plots showing a negatively correlation between C-IMT and VD.

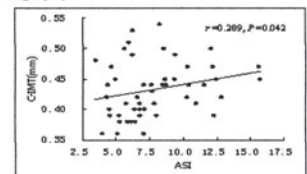


Figure 2 Scatter plots showing a positive correlation between C-IMT and ASI.

47.

Application of Modified Blalock-Taussig Shunts in Infants with Complex Congenital Heart Malformations and Outcomes of Follow-up

WQ Tan

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OBJECTIVE: The modified Blalock-Taussig shunt (MBTS) is believed to be a low-risk management option for palliation in patients with severely cyanotic heart anomalies in advanced heart centers in western countries. In mainland of China, MBTS is considered an important procedure to save lives of baby patients with cyanotic CHD. But the morbidity and mortality associated with MBTS remains challenge in developing countries. We will estimate this procedure by retrospectively analyzing patients' data and follow-up outcomes. **METHODS:** 88 patients with severely cyanotic complex heart anomalies underwent modified Blalock-Taussig shunts (MBTS) in our hospital between October 2000 and December 2010. The mean age was 2.5 ± 1.1 m (1d~6.2m). The mean weight of the babies was 5.0 ± 2.1 kg (2.3kg~9.5kg). The cardiac anatomy was as follows: pulmonary atresia with intact ventricular septum in 14, pulmonary atresia with ventricular septum defects in 34, tricuspid atresia in 9, tetralogy of Fallot in 6, complex single ventricle physiology in 14, transposition of great artery with pulmonary stenosis in 10, and transposition of great artery with left ventricular maldevelopment in 1. All patients were severely cyanotic, and preoperative prostaglandin E1 was needed in 72 patients to ensure ductus patent and maintain oxygen saturations prior to the shunt operation. The shunts were accomplished with 3.0mm polytetrafluoroethylene grafts in 2 patients, 3.5 mm in 16, 4 mm in 44, 5mm in 18 and 6mm in 8. **RESULTS:** The mean duration of mechanical ventilation was 1.8 ± 2.8 days (4h~5.5d). The mean cardiac intensive care unit stay was 6.2 ± 8.5 d (2d~12d). The mean hospital stay was 10.7 ± 8.7 d (7d~18d). There were 7 deaths (7.9%), doubted immediate post-operative shunt block in 4, severe hypoxidosis in 1 and sudden death in 1, severely arrhythmia in 1. Oxygen saturation increased from 60.2% preoperatively to 77.3% postoperatively. Four patients had shunt block, additional shunt was created respectively. There was 3 late death. Follow-up of 65 patients revealed satisfactory systemic oxygen saturation of $77 \pm 10\%$ (63~92%). So far, 48 patients received further treatment which included 4 TOF correction, 22 Rastelli, 16 GLENN and 6 FONTAN. **CONCLUSIONS:** With an encouraging early shunt patent rate and oxygen saturation increasing, we can now adopt MBTS as an alternative in patients with severely cyanotic heart anomalies. Modified B-T shunt is a good palliation for patients with cyanotic heart anomalies, which can increase pulmonary blood flow. Excellent surgical skills and perioperative treatment contribute to good operation results, and to low morbidity and low mortality.

48.

Analysis and comparison changes of complication in the children with ventricular septal defect between the homemade and the imported devices using interventional treatment.

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Objective: To analyze and compare the changes of electrocardiogram (EKG) and differences of arrhythmia and the residual shunt by interventional treatment in the children with congenital membranous ventricular septal defect (VSD) between the homemade and imported devices.

Methods: To observe and record the changes of EKG closely in the 396 children cases with VSD using transcatheter occlusion treatment, by the homemade devices 210 cases, by the imported devices 186 cases.

Results: There are no significant differences in the all data of the EKG and pacing factor and arrhythmia in the two groups between the homemade and imported. The EKG changes of the arrhythmia were occurred in the 131 cases (33.1%) of the all. The EKG changes of the arrhythmia were occurred in the 39 cases (30%) of the aneurysm of membranous septum VSD, χ^2 value: 7.1, $P < 0.01$. The EKG changes of the arrhythmia occurred in the 24 cases (41.4%) of the aneurysm of membranous septum VSD by homemade devices occluded. The EKG changes of the arrhythmia occurred in the 24 cases (41.4%) of the aneurysm of membranous septum VSD by imported devices occluded. χ^2 value: 4.6, $P < 0.01$. The residual shunt occurred in the 2 cases in the 58 cases of the aneurysm of membranous septum VSD by the homemade devices occluded. The residual shunt occurred in the 8 cases in the 22 cases of the aneurysm of membranous septum VSD by imported devices occluded. χ^2 value: 15.6, $P < 0.01$. The complete and severe atrioventricular block (AVB) occurred in the 3 cases in every group. All AVB cases used treatment of albumen and nourishing myocardium etc., among that the temporary pacing catheter were put in 4 cases.

Conclusion: The homemade devices cause obvious lessens of the arrhythmia and the residual shunt than the imported devices in the occlusion of aneurysms of membranous septum VSD. Arrhythmia was common complication after close procedure, in which it induced complicated and severe AVB, no matter imported or homemade devices. It takes attention carefully in the operate. To observe and deal with changes of EKG in time and efficient could decrease and relieve incidence of arrhythmia and improve successful rate of the occlusion procedure.

ABSTRACTS

Abstracts for Free Paper Session:

49.

Hemofiltration of Blood-Primed Solution in Paediatric Cardiac Surgery

H Zhong

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Objects: We tested the hypothesis whether hemodiafiltration of the blood-primed solution is sufficient for reaching a physiologic state and investigated the effects on hemodynamics and respiratory function in 40 patients undergoing cardiac surgery. **Methods:** The study population undergoing heart surgery were divided into two groups. The study group (n=20) used hemodiafiltrated stored blood in the CPB circuit for twenty minutes and the control group (n=20) used the non ultrafiltration blood. Data were obtained from the priming blood before and after hemodiafiltrated blood prime. Blood gas test results, C-reactive protein, interleukin (IL)-8 were documented preoperatively and the cardiac function was measured by echocardiogram.

Results: The measured substrates changed to normal values after ultrafiltration of the blood prime (PH from 6.89 ± 0.22 to 7.40 ± 0.57 , BE from -16.12 ± 0.98 mmol/l to $+0.31 \pm 2.4$ mmol/l, potassium from 10.33 ± 2.13 mmol/l to 4.27 ± 0.93 , glucose from 13.9 ± 1.72 mmol/l to 10.61 ± 1.89 mmol/l). Interleukin-8 (IL-8) decreased from 78.4 ± 6.1 pg/ml to 64.3 ± 48.1 pg/ml, $P=0.036$). The duration of mechanical ventilation was significantly shorter in study group than in control group (21.3 ± 7.5 hours vs 34.0 ± 12.6 hours, $P=0.024$). 4 hours after CPB, the systolic, diastolic and end systolic BP were significantly increased in the study group comparing the control group ($P=0.02$, 0.003 , 0.001). Contractility improved greatly (-0.28 ± 0.13 vs -0.01 ± 0.21 , $P=0.002$) in study group from the terminal of CPB to 4 hours after surgery, but did not change during the same period in the control group (-0.26 ± 0.12 vs -0.26 ± 0.16 , $P=0.33$). **Conclusion:** The usefulness of hemofiltrated stored blood for CPB priming may confer an advantage in maintaining more physiological conditions and prevent lung and heart dysfunction in pediatric open heart surgery.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY II

50.

Clinical Investigation of Anthracycline-induced Cardiotoxicity in Children Cancer Survivors

HY Deng, YJ Gao, Y Gao, XC Liang, XJ Ma, GY Huang. Department of Cardiology, Children's Hospital of Fudan University, Shanghai, China

Purpose: This study aimed to determine whether latent cardiac dysfunction is present in children who were treated with anthracycline because of leukemia or lymphoma and screen for risk factors of cardiac abnormalities.

Patients and Methods: Serial echocardiogram data of 110 children cancer survivors who received anthracycline treatment and finished all chemotherapy were retrospectively reviewed. Measurements of these patients were compared with those of normal children at the same age. Associations between age at diagnosis, cumulative dose of daunorubicin (DNR), sex, length of follow-up, and deviations from normal values in M-mode echocardiograms were evaluated using multivariate linear regression analysis.

Results: Compared to age-matched normal children, cancer survivors who received anthracycline had thinner left ventricle posterior wall (LVPW), increased left ventricular internal dimension at end-systole (LVID_s) and heart rate (HR), decreased left ventricular internal dimension at end-diastole (LVID_d), fractional shortening (FS), ejection fraction (EF), cardiac output (CO) and ratio of mitral E velocity to mitral A velocity (MEV/MAV). Thirty-five of the patients (32%) had EF below 60%. Survivors who received DNR cumulative doses above 210 mg/m² had a 5.6-fold excess risk of reduced EF (95% CI, 1.5 to 31.2) compared with those received less than 210 mg/m². DNR cumulative dose was correlated with dilated LVID and reduced FS and EF.

Conclusions: Our data suggested that patients received anthracycline therapy had decreased heart function and DNR cumulative dose was an independent risk factor for dilated LVID and reduced FS and EF. Survivors treated with DNR doses above 210 mg/m² are at higher risk for reduced EF and dilated left ventricle who need long-term follow-up and pay more attention to prevent cardiomyopathy.

52.

Hydrogen sulfide stimulates pulmonary smooth muscle cell apoptosis in rats with increased pulmonary blood flow-induced pulmonary hypertension

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Purpose: The present study aimed at exploring the effects of hydrogen sulfide (H₂S) on pulmonary vascular smooth muscle cell (PVSMC) apoptosis in increased pulmonary blood flow-induced pulmonary hypertension in rats.

Methods: Aorta-vena cava shunting operation was performed on rats of 4 week-shunting group, 4 week-shunting+PPG group, 11 week-shunting group and 11 week-shunting+NaHS group to established model of high blood flow-induced pulmonary hypertension. For 4 week-shunting+PPG group, PPG was given daily for 4 weeks after the operation and for 11 week-shunting+NaHS group, NaHS was given daily for 11 weeks after the operation. Pulmonary artery pressure was detected and PVSMC apoptosis was measured. The protein expressions of Bcl-2, Fas and caspase-3 in pulmonary arteries were detected by immunohistochemical method.

Results: There was no significant difference in mean pulmonary artery pressure (mPAP) between 4-week-control group and 4-week-shunting group. Compared with rats of 4-week-shunting group, the mPAP in rats of 4-week-shunting+PPG group was significantly high. However, mPAP of 11-week-shunting+NaHS group was significantly low as compared with 11-week-shunting group. Lung tissue H₂S concentration in rats was significantly increased after 4-week of shunting but decreased after 11-week of shunting procedure. Administration with NaHS increased lung tissue H₂S concentration of 11-week-shunted rats. Compared with 4-week-control group, the positive rate of apoptosis in PVSMCs, Fas expression and caspase-3 expression were significantly decreased but expression of Bcl-2 protein significantly increased in 4-week-shunting group. Compared with 4-week-shunting group, the positive rate of apoptosis, and expression of Fas and caspase-3 protein in PVSMCs was significantly decreased but expression of Bcl-2 protein significantly increased in 4-week-shunting+PPG group. Compared with 11-week-control group, the positive rate of apoptosis in PVSMCs and expression of Fas and caspase-3 protein were significantly decreased but expression of Bcl-2 protein significantly increased in 11-week-shunting group. Compared with 11-week-shunting group, the positive rate of apoptosis and expression of Fas and caspase-3 in PVSMCs significantly increased but expression of Bcl-2 protein significantly decreased in 11-week-shunting+NaHS group.

Conclusion: H₂S obviously induced PVSMC apoptosis in high pulmonary blood flow induced pulmonary hypertension.

51.

Analysis of the high risk factors and prognosis on coronary aneurysms secondary to Kawasaki disease

Xinfeng Bai, Jie Tian, Jing Zhang, (Department of Cardiology, Children's Hospital of Chongqing Medical University, Chongqing, PR China)

Purpose: In this work, to investigate the risk factors and prognosis on children with coronary aneurysms(CAA) secondary to Kawasaki disease(KD).

Methods: we analyzed the clinical data including test results, therapeutic methods and prognosis of 3906 KD cases from two prospective: (1) First, we analyzed the clinical data of the 3720 nonCAA cases and 186 CAA cases, including the gender, age, the days of fever, CRP, ESR, CK-MB and Albumin with SPSS 18.0 and performed single factor analysis of χ^2 test of count data and of t test of measurement data. (2) For the second, we sampled 46 CAA cases of the 186 CAA cases randomly, and performed the χ^2 test of recovery situation in 1 month, 3 month, 6 month, 1, 2, 3, 4, 5 years and larger than 5 years and analyzed the long term clinical effect of different IVIG doses with SPSS, based on different age periods of children.

Results: following factors: gendered male, age younger than 1 year or older than 5 year, fever ≥ 10 days, CRP > 40 mg/L and ESR > 50 mm/h are statistically significant ($\chi^2 = 4.11-25.934$, $P < 0.05$). But WBC, PLT, albumin and CK-MB are not statistically significant ($\chi^2 = 3.554-0.448$, $P > 0.05$). CAA retraction duration of different sizes of CAA had significant statistics differences ($\chi^2 = 23.373$, $P < 0.05$), but CAA retraction duration of different age of CAA groups had no significant statistics differences ($\chi^2 = 9.556$, $P > 0.05$). Different dosage of IVIG had no significant statistics differences among different sizes of CAA ($P > 0.05$).

Conclusion: Male, age 1-5Y, fever ≥ 10 d, CRP > 40 mg/L, ESR > 50 mm/h are in connection with production of CAA. But WBC, PLT, albumin and CK-MB are not statistically significant. The retraction time of small CAA, middle CAA and GCAA are gradually extended. Different dosage of IVIG make no different effects during the recovering of small CAA, middle CAA and GCAA.

53.

Extracorporeal life support in the paediatric population

FHF Tsang, KT Chau*, LC Cheng. Department of Cardiothoracic Surgery and * Department of Paediatric Cardiology, Queen Mary Hospital, Hong Kong.

Purpose: To review the results of paediatric extracorporeal life support (ECLS) in Hong Kong.

Method: A retrospective review of medical records of patients under 18 years old who underwent ECLS between Nov 2000 to Nov 2010 was performed.

Results: Between Nov 2000 to Nov 2010, fourteen paediatric patients (4 male, 10 female) received ECLS support. The indications for ECLS support were acute myocarditis (8 patients), dilated cardiomyopathy (2) and post cardiac surgery low output syndrome (4 patients). Seven patients had cardiac arrest requiring active resuscitation before ECLS support. Nine patients had bleeding complications requiring re-exploration and haemostasis. One patient had intracranial haemorrhage. The average duration of ECMO support was 5.77 days. Eight patients were successfully weaned off ECMO support and were discharged without neurological deficit.

Conclusion: ECMO is an effective form of temporary support for patients with low cardiac output as a result of acute myocarditis, dilated cardiomyopathy or post-cardiac surgery.

ABSTRACTS

Abstracts for Free Paper Session:

54.

Improvement of Left Ventricular Function after Aortic Valve Repair in Pediatric Patients. Follow-up Study Using the Novel 2D Strain Method

YP Mi

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Objectives: To evaluate the outcome and regional and global left ventricular (LV) function after aortic valve repair in children with congenital aortic valve disease.

Methods: 32 consecutive patients aged 1.96 years undergoing aortic valve repair due to valve stenosis (AS group, n=21) or aortic regurgitation (AR group, n=11) were prospectively studied over a follow-up time period of 12 month in regard to change and adaptation of myocardial function using conventional and novel echocardiographic methods including two-dimensional (2D) strain echo. Conventional and 2D strain echo studies were performed and analysed off-line using commercially available software (EchoPac 6.1.0, GE).

Results: The peak aortic valve gradient decreased from 62.04 ± 30.34 mmHg before surgery to 22.80 ± 14.13 mmHg 2 weeks after surgery and 35.73 ± 22.11 mmHg 12 months after surgery ($p=0.01$). The degree of AR was decreased significantly to grade 0 in 20 children and grade I in 12. There was a significant reduction of thickness of interventricular septum (IVS) and posterior wall resulting in improvement of LV mass index ($p=0.007$, $p=0.043$ and $p=0.001$, respectively). Significant reduction of myocardial thickness was in found especially in the IVS in the AS group ($p=0.008$) and the significant reduction of LV end-diastolic dimension (EDD) was found in the AR group ($p=0.007$). 2D strain analysis demonstrated that the global peak strain, global systolic strain rate and global early diastolic strain rate improved significantly for all the patients during the study period after aortic valve repair ($p<0.001$, $P=0.037$ and $P=0.018$, respectively). The global strain and strain rate correlated significantly to IVS thickness ($r=0.002$ and $r=0.003$), LV mass index ($r=0.02$ and $r=0.015$) and EDD ($r=0.26$ and $r=0.005$).

Conclusion: Aortic valve repair surgery in pediatric patients results in improvement of aortic valve function in the majority of the studied patients and therefore improvement of global and regional systolic and diastolic LV parameter. The improvement of systolic myocardial deformation indicate significant functional and morphological remodelling.

55.

Surgical Strategy and Outcome for Transposition of Great Arteries with Intact Ventricular Septum

TT Zhang

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Objective: we report our experience to surgical strategy, perioperative management and outcome of transposition of the great arteries with intact ventricular septum (TGA/IVS), to investigate the optimal surgical strategy with different operative ages and preoperative left ventricular functions.

Methods: Between June 2005 and October 2010, 53 patients with transposition of great arteries with intact ventricular septum who underwent arterial switch operation (ASO) in our center were included. Hospital charts, echocardiographic data and operative reports of all patients were reviewed. Demographics and perioperative variables were recorded.

Results: Of the 53 patients in our study 29 patients were younger than 3 weeks (group A) with median age of 10.7 ± 1.3 days (range, 2–21 days), they all received primary ASO; 24 patients older than 3 weeks (group B) with median age of 153.2 ± 340.6 days (range, 25–1469 days). 18 patients underwent primary ASO (group B1) and 6 patients received rapid two-stage ASO (group B2). There were 3 (5.67%) early death. coronary artery malformation was the only risk factor associated with early mortality. Two patients required postoperative extracorporeal membrane oxygenation (ECMO) support who were both older than 3 weeks and underwent primary ASO, finally they were survived to discharge. Early and mid-term Follow-up about left ventricular function and development, there are no significant differences between groups.

Conclusion: Preoperative assessment about LV function is very important. Late presenters with TGA/IVS, who have LV degeneration on echocardiography or LV/RV ratio <0.65 during surgery measure should be subjected to LVT in order to avoid low cardiac output syndrome and potential ECMO use. There are no significant differences among groups on LV function in early and mid-term Follow-up.

56.

Three-Dimensional Mechanical Dyssynchrony and Myocardial Deformation of the Left Ventricle in Patients with Tricuspid Atresia after Fontan Procedure

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Objective: The contributory role of mechanical dyssynchrony in ventricular dysfunction is increasingly recognized. This study tested the hypothesis that dyssynchronous ventricular contraction occurs in Fontan patients with functional single ventricles and is related to indices of myocardial deformation and global ventricular function.

Methods: Twenty Fontan patients, aged 23.5 ± 7.1 years, with tricuspid atresia and 20 age-matched controls were studied. Three-dimensional echocardiography was performed for determination of left ventricular (LV) volumes and systolic dyssynchrony index (SDI), while speckle tracking was used to assess LV longitudinal, circumferential, and radial myocardial deformation. The average septal and LV posterior wall calibrated integrated backscatter (cIB) intensity was measured as an index of myocardial fibrosis.

Results: Compared with controls, patients had significantly greater SDI ($p<0.001$). The prevalence of LV mechanical dyssynchrony ($SDI > 5.74\%$) in patients was 55% (95% CI, 32% to 77%). The LV global systolic longitudinal, radial, and circumferential strain (all $p<0.001$), longitudinal systolic ($p<0.001$) and early diastolic strain rate ($p<0.001$), and circumferential systolic ($p<0.001$) and early diastolic strain rate ($p=0.009$) were significantly lower, while the average cIB was higher in patients than controls ($p<0.001$). Patients with LV dyssynchrony (n=11) had significantly lower global LV longitudinal strain ($p=0.017$), reduced LV ejection fraction ($p=0.002$), and higher average cIB ($p=0.027$) than those without (n=9).

Conclusions: A high proportion of patients with tricuspid atresia after Fontan operation exhibits LV mechanical dyssynchrony, which may in part be related to myocardial fibrosis and has implications on myocardial deformation and global ventricular function.

57.

Percutaneous balloon aortic valvuloplasty with rapid ventricular pacing in the right ventricle in managing congenital aortic stenosis in infants

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Purpose: To evaluate the efficacy and technique of percutaneous balloon aortic valvuloplasty (PBAV) in managing congenital aortic stenosis (AS) in infant.

Methods: Two infants (14-month and 36-month old respectively) underwent the procedure through the retrograde femoral route. A bipolar pacing catheter was placed in the right ventricle and rapid ventricular pacing was performed to stabilize the balloon when the midpoint of the inflated balloon was located at the level of the valvular aortic plane.

Results: The ratio of balloon diameter to annulus diameter was 0.83 and 0.8 respectively. Peak-to-peak systolic pressure gradient (PG) across aortic valve dropped from 80mmHg and 90mmHg to 20mmHg and 18mmHg respectively after balloon valvuloplasty. A follow-up of 3 months to 1 year by echocardiography showed that PG was 38mmHg and 43mmHg respectively, and aortic regurgitation was not significant.

Conclusion: PBAV was a method of choice in managing congenital AS in infants with satisfactory short and midterm results. Rapid ventricular pacing is an effective method to stabilize the balloon during aortic valvuloplasty and decrease the incidence of complications.

ABSTRACTS

Abstracts for Free Paper Session:

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 data between the patients and normal control. Statistical analysis was done by SPSS11.5.

Results Firstly, 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/\sqrt{RR} of the scoliosis group (1.83 ± 0.18) was much larger than normal control (1.35 ± 0.24). Also, IRT/\sqrt{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/\sqrt{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.

59.

Left Cardiac Sympathetic Denervation for Catecholaminergic Polymorphic Ventricular Tachycardia in a Chinese Child

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Catecholaminergic-polymorphic ventricular tachycardia (CPVT) is a rare but potentially lethal arrhythmia in children and it usually presented as syncope or sudden cardiac death related to exertion or emotion. The management of CPVT is difficult and beta-blockers are the cornerstone of therapy. Some patients continue to have syncope or documented exercise induced ventricular tachycardia despite on maximum dose of beta-blocker. Implantable cardioverter-defibrillator (ICD) may be necessary for those with recurrent cardiac arrest and complications of ICD are not uncommon. Few patients with CPVT have been treated successfully by left cardiac sympathetic denervation (LCSD). We would like to present a Chinese boy with this rare disease treated successfully by LCSD and the possible mechanisms of LCSD were also discussed.

60.

The Early Outcomes of Trans-Right Ventricle Pulmonary Valve Perforation and Balloon Valveplasty Procedure for Pulmonary Atresia with Intact Ventricular Septum

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【Abstract】 Background For patients with pulmonary atresia with intact ventricular septum, percutaneous radiofrequency-assisted valvotomy and balloon dilation is the first choice for most patients. Lacking of the radiofrequency perforation equipment in China, we first report an alternative hybrid procedure: trans-right ventricle pulmonary valve perforation and balloon valveplasty. **Objective** To evaluate the early outcomes of trans-right ventricle pulmonary valve perforation and balloon valveplasty procedure for pulmonary atresia with intact ventricular septum. **Methods** 6 patients with pulmonary atresia with intact ventricular septum were undergoing trans-right ventricle pulmonary valve perforation and balloon valveplasty procedure from January 2010 to December 2010. The mean body weight of the 6 patient was (3.8 ± 1.6) kg, and the mean saturation was (71 ± 10) %. The mean age was (56 ± 45) days. All the 6 patients had tripartite right ventricles and the z score of the tricuspid valve ranged from $-2 \sim -2.2$, with the mean value (-0.4 ± 1.5). We evaluate the early outcomes of the hybrid procedure. **Results** There was no procedure-related death and no procedural complications. The mean size of the largest balloon was (7.3 ± 1.2) mm, and the mean ratio of the size of the balloon and pulmonary valve ring was (1.0 ± 0.1). The mean saturation was (89 ± 5) % postoperatively; the mean ventilation time was (3.2 ± 1.0) days and mean ICU stay time was (16 ± 5) days. The mean pressure gradient between right ventricle and main pulmonary artery was (19 ± 11) mm Hg. The mean ratio of forward flow from right ventricle and from the ductus in pulmonary artery was (0.35 ± 0.06). All the 6 patients were followed up (4 ± 3.6) months and 1 cases required balloon valveplasty reintervention 2 weeks after the hybrid procedure. The mean saturation on last follow-up was (85 ± 6) %, higher than the saturation before procedure ($t=-2.66$, $p=0.045$); the mean pressure gradient between right ventricle and main pulmonary artery was (45 ± 42) mm Hg. 4 patients had pulmonary regurgitation, 3 of whom were mild and 1 was moderate. The z value ranged from $-1 \sim -2$ (0.5 ± 1), much improved compared with that before procedure ($t=-3.36$, $p=0.02$). **Conclusion** Our results showed this technique was effective in selected cases of pulmonary atresia with intact ventricle septum with normal sized right ventricle. The hybrid procedure had less pulmonary regurgitation and could improve the size of the right ventricle.