

Journal of the Hong Kong College of **CARDIOLOGY**



Including Abstracts of
Twenty-Second Annual Scientific Congress
Hong Kong College of Cardiology
6 June 2014 – 8 June 2014
Hong Kong

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Double Site Left Heart Endocarditis With Ventricular Outflow Tract Mural Vegetation

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From Department of Cardiology, Abderrahmen Mami University Hospital, Ariana Faculty of Medicine, Tunis El Manar University, Tunisia

IBN ELHADJ ET AL.: Double Site Left Heart Endocarditis With Ventricular Outflow Tract Mural Vegetation.

A 39-year-old man was admitted for a febrile congestive heart failure. Echocardiography revealed large vegetations on the mitral and aortic valves associated to a large mobile vegetation attached to the left ventricular outflow wall. Three days after the initiation of an intensive medical and antibiotic therapy, he underwent a double prosthetic valve replacement because of massive mitral regurgitation with cardiac heart failure. Culture of the vegetations identified a streptococcus. Long term outcome was uneventful. Bacterial inoculation of the parietal endocardium in valvular endocarditis is extremely rare and was probably due to lesions caused by previous regurgitation in our patient. (*J HK Coll Cardiol* 2014;22:1-4)

Multivalvular endocarditis, Mural vegetation

摘要

患者，男性，39歲。入院時診斷為發熱性充血性心力衰竭。超聲心動圖示：二尖瓣贅生物和主動脈瓣贅生物遷延附於左心室流出道心壁上可移動的心壁贅生物。給予患者積極內科治療及抗生素治療三天後，因二尖瓣大量返流伴心力衰竭，患者接受二尖瓣和主動脈瓣人工瓣膜置換術。瓣膜贅生物培養分離菌為鏈球菌屬。後期隨訪未見異常。瓣膜性心內膜炎疾病中有關細菌定植於頂葉心內膜的報導極其少見，本例中可能是由於該患者先前的返流所造成損傷引起的。

關鍵詞：多瓣膜心內膜炎，附壁贅生物

Introduction

Despite great improvements in general health care and antibiotic therapy, the incidence of infective endocarditis (IE) has not changed during the past decades.¹ The involvement of two valves occurs much less frequently, and triple or quadruple valve involvement is extremely uncommon.² Rarely, it may also develop on mural endocardium or manifest as endarteritis with a higher risk of embolic complications.

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Received November 2, 2013; revision accepted January 27, 2014

Case Report

A 39-year-old man with a blurred history of rheumatic heart disease was admitted to our department for a febrile congestive heart failure. He reported fever, night sweating and edema since two weeks. His body temperature was 38.5°C. On physical examination, heart rate was 115 beats/minute, blood pressure was 110/50 mmHg and respiratory rate was 30 breaths/minute. On cardiac auscultation, a hard holosystolic murmur was heard at the apex, and a hard diastolic murmur was best heard along the left sternal border. Crackles were noticed on pulmonary auscultation. Hepatomegaly associated with hepatojugular reflux, splenomegaly and bilateral leg edema were also found. Electrocardiogram showed a sinus tachycardia with left atrial and diastolic ventricular hypertrophy.

Cardiomegaly with right atrial enlargement, double density of left atrial enlargement and hilar overload were found in on chest X-ray. Laboratory analysis showed a white blood cells count of $11700/\text{mm}^3$, a C-reactive protein of 50 mg/l , hemoglobin was 12.6 g/dl and a renal function was normal. Trans-thoracic echocardiography revealed large vegetations on the mitral and aortic valves (Figures 1 and 2) with a large defect on the anterior leaflet of the mitral valve (Figures 3a and 3b), severe mitral and aortic regurgitations. A voluminous mobile vegetation measuring 15 mm attached to the left ventricular outflow wall (Figures 4 and 5) was also noticed. Left ventricle was dilated with left ventricular ejection fraction of 53% . Trans-esophageal echocardiography confirmed these data.

The diagnosis of multivalvular infective endocarditis (MVE) with mural involvement was made. HIV serology tests were negative. A silent left parieto-occipital mycotic aneurysm was found on computed tomography scan.

The patient underwent, after 3 days of intensive medical and antibiotic therapy (Ampicillin and gentamicin), a double mitral and aortic valve prosthetic replacement associated with the resection of the mural vegetation. On intervention both mitral and aortic valves showed diffuse fibrous thickening. Multiple vegetations were found on the mitral and aortic valves associated

with a large perforation of the anterior mitral leaflet. Jet lesions were found on the left outflow ventricular tract with a long friable vegetation attached to the septal wall. Histological study of the resected valves confirmed the diagnosis of acute IE complicating rheumatic valve disease. Culture of the vegetations identified a methicillin sensitive streptococcus oralis requiring 40 days of adapted antibiotic therapy. Three years later he is still doing well without any pathologic echoes in the left ventricle.

Discussion

Among patients with infective endocarditis, the prevalence of MVE is 15% .³ Mortality rate is higher in patients with multi-foci infection that may require early surgical treatment to prevent complications.⁴

Mural vegetations in the course of IE are extremely rare. They are commonly supposed to be associated to congenital heart diseases with vegetations around septal defects and in the area of jet stream impact. Itoh et al⁵ reported a right-sided IE combined with mitral involvement in a patient with ventricular septal defect.

Hypertrophic cardiomyopathy can also be responsible of mural involvement. Pachirat et al⁶

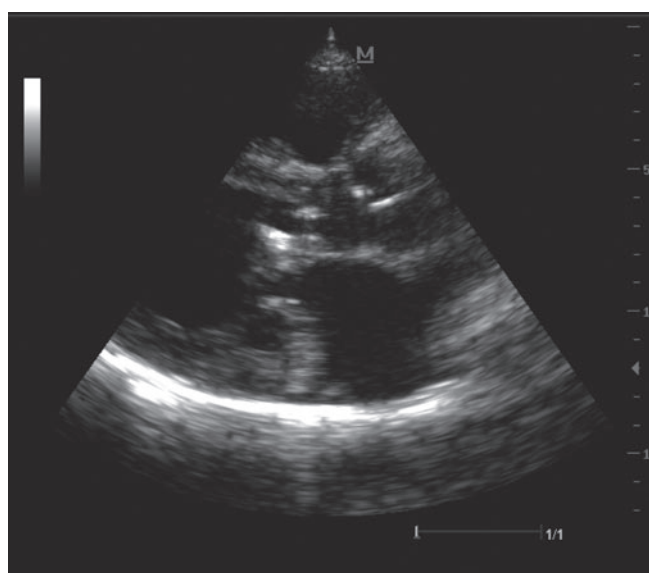


Figure 1. Para-sternal left axis view: large vegetations on the mitral and aortic valves.

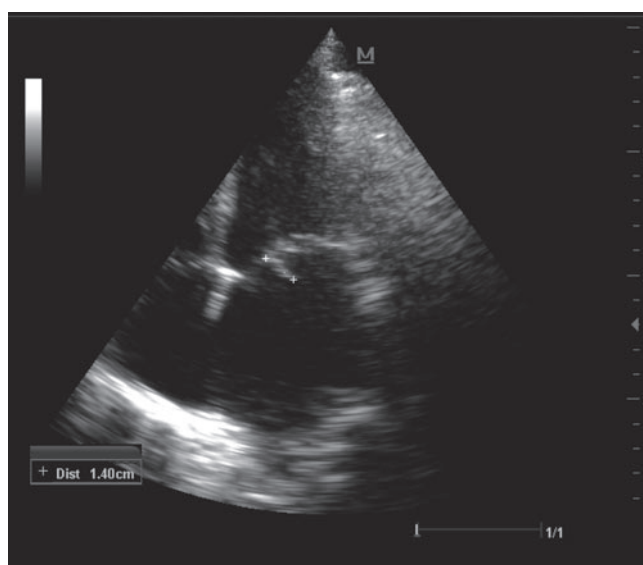


Figure 2. Voluminous mobile vegetation of 15 mm attached to the mitral valve.

reported the case of a woman with hypertrophic cardiomyopathy developing IE with vegetation attached to the septal endocardium at the site of contact with the mitral valve leaflet.

In our patient, mitro-aortic valvular lesions were due to rheumatic fever. The bacterial inoculation of the parietal endocardium of the left ventricular outflow tract may be secondary to chronic aortic regurgitation with

endocardial trauma.

This location is associated with a higher risk of systemic embolic complications such as stroke, acute limb ischemia and myocardial infarction. In our case, an asymptomatic cerebral mycotic aneurysm was detected.

Surgical treatment of native valve endocarditis involving a single valve is well documented, with

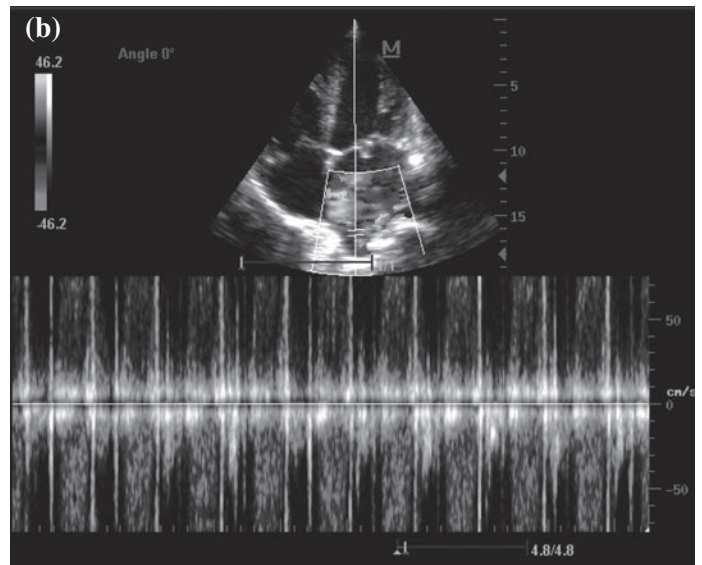
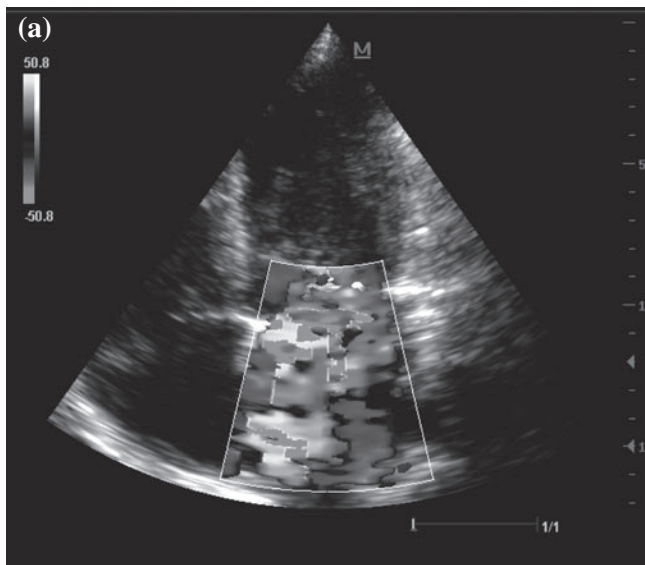


Figure 3. (a) Severe mitral regurgitation due to a large defect on the anterior leaflet of the mitral valve. (b) Pulsed-Wave Doppler: pulmonary vein flow reversal.

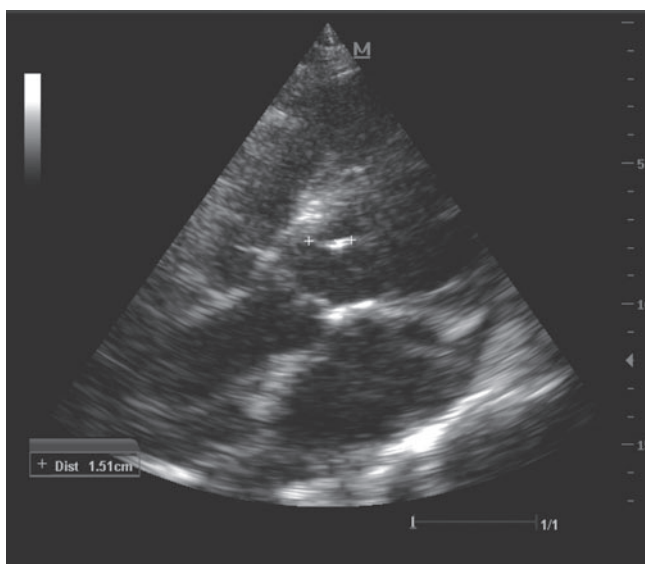


Figure 4. Voluminous mobile vegetation of 15 mm attached to the left ventricular outflow tract.

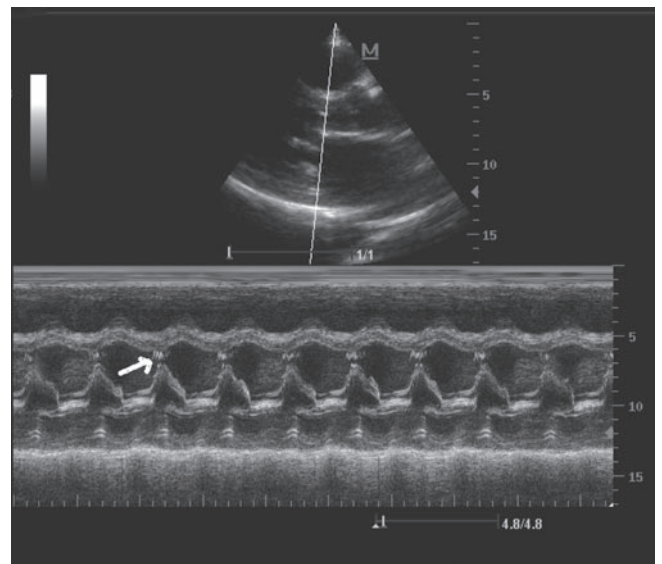


Figure 5. Para-sternal left axis M-mode echocardiography, the arrow points to the mural vegetation in the left ventricular outflow tract.

excellent results reported with both valve repair and replacement. Data concerning patients with MVE are limited. In Yao's⁷ and Mihaljevic's⁸ series operative mortalities were respectively 12.5% and 16%.

Despite the double valves involvement associated with mural vegetation, that is rather uncommon, the outcome was good in our patient. This is probably due to the early intervention with an intensive medical treatment and the absence of associated comorbidities.

Conclusion

Mural endocarditis is rare and mostly located around parietal defects. The left ventricular outflow tract involvement may be caused by endocardial trauma secondary to chronic aortic regurgitation. Associated to a MVE, it can be responsible for higher rate of mortality and embolic complications. A combined medical and surgical approach remains the best attitude.

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Three-dimensional Echocardiographic Evaluation of Severe Tricuspid Regurgitation due to Leaflet Damage by Endocardial Pacing Lead

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LEE ET AL.: *Three-dimensional Echocardiographic Evaluation of Severe Tricuspid Regurgitation due to Leaflet Damage by Endocardial Pacing Lead.* A 76-year-old woman developed congestive heart failure within a year following permanent pacemaker implantation. She was found to have moderate to severe functional mitral regurgitation and severe tricuspid regurgitation. However, two-dimensional echocardiography was unable to delineate the impact of pacing lead on tricuspid regurgitation. Subsequent three-dimensional echocardiography visualized that the pacing lead had passed through the tricuspid septal leaflet causing severe regurgitation. This finding was confirmed during successful mitral and tricuspid repair. (*J HK Coll Cardiol* 2014;22:5-8)

Echocardiography, Pacing lead, Tricuspid regurgitation, Valve injury, Valve repair

摘要

一名76歲女性患者植入永久起搏器后一年後發生充血性心力衰竭，超聲心動圖檢查發現中到重度二尖瓣返流和重度三尖瓣返流。然而二維超聲心動圖未能分辨起搏導線與三尖瓣返流的直接關係，三維超聲心動圖清楚顯示起搏導線穿透三尖瓣隔瓣，導致重度三尖瓣返流。這一發現在外科手術（二尖瓣和三尖瓣成形）時得到證實。

關鍵詞：超聲心動圖，起搏導線，三尖瓣返流，瓣膜損傷，瓣膜修復

Case report

A 76-year-old woman with background history of atrial fibrillation had repeated episodes of non-sustained ventricular tachycardia and associated syncope, which even led to head injury with radiological evidence of subdural and subarachnoid hemorrhage. Electrophysiological investigation demonstrated inducible ventricular tachycardia and long pause (>4 seconds). Thus a single-chamber VVIR permanent

pacemaker (St Jude Medical, St Paul, MN, USA), with single transvenous right ventricular pacing lead, was implanted for her. She had no previous history of heart failure and her echocardiogram before pacemaker implantation showed well-preserved left ventricular function, without significant valvular problem.

Within one year after the pacemaker insertion, she gradually developed congestive heart failure. Transthoracic echocardiography (TTE) showed impaired left ventricular function (left ventricular ejection fraction = 38%), moderate to severe functional mitral regurgitation, and severe tricuspid regurgitation (TR). However, the mechanism of pacemaker lead causing severe TR was not directly visualized on two-dimensional (2D) TTE imaging (Figure 1). Subsequent three-dimensional (3D) TTE revealed the pacing lead was "stuck" to the septal leaflet of the tricuspid valve, raising the suspicion of pacing lead damage of the valve

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Received February 8, 2014; revision accepted April 20, 2014

as the cause of severe TR (Figure 2). Her preoperative coronary angiogram confirmed normal findings.

Mitral and tricuspid valves repair was then performed through standard median sternotomy, with the application of cardiopulmonary bypass. Following anesthetic induction, 3D transthoracic echocardiography demonstrated clearly the pacing lead passed through the body of the tricuspid septal leaflet (Figure 3), hindering its excursion and causing organic regurgitation. Surgical inspection through right atriotomy confirmed the perforation of the tricuspid septal leaflet by the pacing lead (Figure 4). The lead was surgically freed from the tricuspid valve and the septal leaflet perforation was repaired with Gore-Tex sutures. The tricuspid valve was stabilized by an annuloplasty using a Carpentier-Edwards MC₃ ring

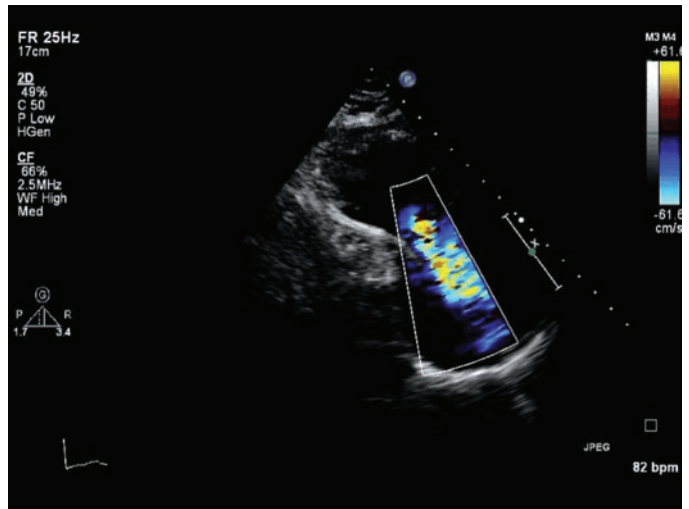


Figure 1. Preoperative two-dimensional transthoracic echocardiography imaging.

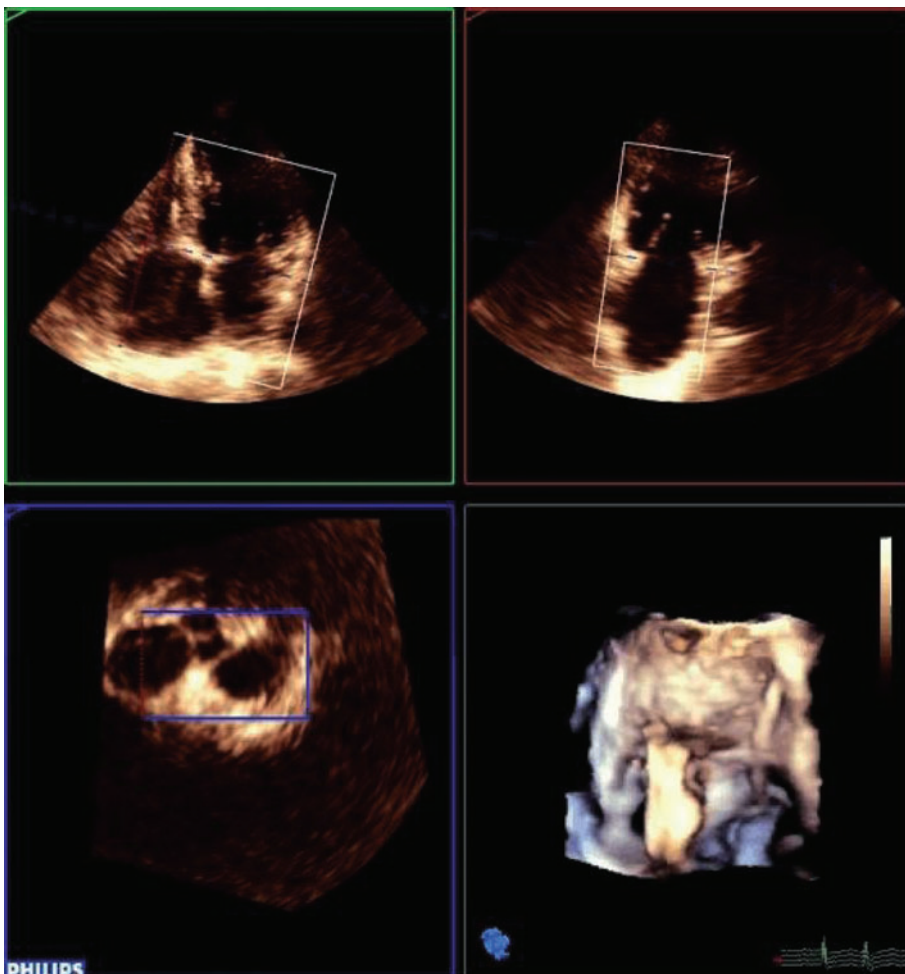


Figure 2. Preoperative three-dimensional transthoracic echocardiography imaging.

(Edwards Lifesciences, Irvine, CA, USA). The endocardial pacing lead was not removed as the intraoperative test confirmed satisfactory pacing function. The mitral valve was also repaired with a "down-size" annuloplasty using a Rigid Saddle ring (St Jude Medical, St Paul, MN, USA). Postoperative 3D transesophageal echocardiography confirmed competent mitral and tricuspid valve closure (Figure 5). The patient had an uneventful recovery. Her follow-up echocardiography 3 months after the operation showed trivial TR only, with much improved bi-ventricular function.

Discussion

Endocardial pacing lead-induced TR has not been widely documented, either clinically or echocardiographically.¹ However, this complication is expected to become increasingly important owing to the worldwide aging trend and the expanding capabilities of pacing devices or the implantable cardioverter-defibrillators. In severe cases such as the present one, it can result in congestive heart failure and tricuspid valve surgery would be unavoidable. Although the underlying mechanisms and the time course of the development of TR remain largely unclear,¹⁻³ significant lead-induced TR was observed in 38% of patients 1-1.5 years

following lead placement.³ More importantly, such type of TR was independently associated with much worsened long-term survival.³ Previously it was believed by many that a blunt-tipped pacing lead can hardly perforate valve leaflet edge particularly due to the mobility of the leaflet. Hence, it was even proposed that the pacing lead may pass through "a natural hole" on the leaflet, instead of truly penetrates it. Nevertheless, our intra-operative finding does not support such skepticism. Moreover, in a recent report,² the pacing lead-induced leaflet damage was identical as in the

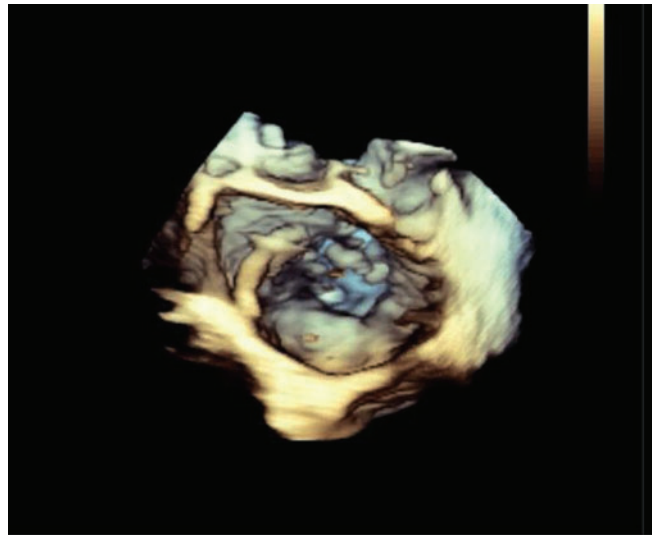


Figure 3. Preoperative three-dimensional transesophageal echocardiography imaging.

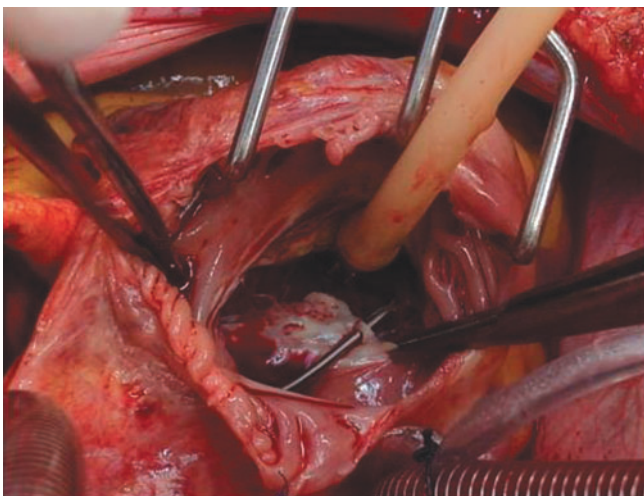


Figure 4. Intra-operative surgical finding showed the pacemaker lead perforated the tricuspid septal leaflet.

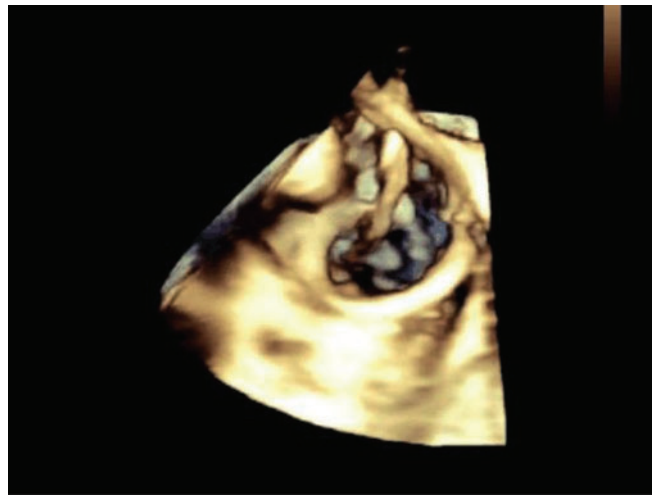


Figure 5. Postoperative three-dimensional transesophageal echocardiography imaging.

current case. A high index of suspicion for direct lead-induced valvular injury is essential to early diagnose this specific pathological condition and to limit its long-term consequences.

It has been recognized that the mechanism and the severity of endocardial lead-induced TR may not be well evaluated by 2D echocardiography.¹ Real-time 3D echocardiography appears to be a promising technique to appraise the mechanism of TR and may allow the early detection of patients who will develop severe lead-induced TR.¹ Our current case illustrated how 3D echocardiographic imaging was useful to clearly delineate the location of the pacing lead and its impact on the tricuspid valve. Even through the worsened heart failure in this particular case may not be solely attributed to pacing lead-induced damage, severe TR was definitely the most important contributor to her deteriorated cardiac function and symptoms. For determining surgical indication and to plan the appropriate intervention, it would be extremely helpful to appreciate this rare etiology preoperatively. Obviously, a better understanding of the mechanism of lead-induced TR will also be essential to the future development of preventive strategies.

Declaration of Interest

All authors have no conflict of interest.

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Multi-modality Imaging of a Subclavian Artery Pseudoaneurysm

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SINGH AND KUMAR: Multi-modality Imaging of a Subclavian Artery Pseudoaneurysm. Accurate diagnosis and anatomical delineation as well as extent of pseudoaneurysm is important for the precise management of the patient. A number of techniques like ultrasonography, doppler imaging, computed tomography angiography, magnetic resonance angiography as well as conventional angiography are currently available. The image submitted shows the delineation of a subclavian artery pseudoaneurysm by different imaging modalities. (*J HK Coll Cardiol* 2014;22: 9-11)

Angiography, Computed Tomography, Imaging, Pseudoaneurysm

摘要

精確的診斷和解剖形態描述以及病變範圍的判斷是假性動脈瘤患者準確處理的關鍵。目前多種技術可以運用於此，例如超聲成像、多普勒成像、電腦斷層掃描血管造影術、核磁共振血管造影術及傳統的血管造影術等。該圖像通過不同的立體成像方式展現了鎖骨下動脈假性動脈瘤的形態。

關鍵詞：血管造影術，電腦斷層掃描，成像，假性動脈瘤

Introduction

Pseudoaneurysms are encapsulated hematomas that communicate with an artery because of an incomplete seal by the media. Femoral artery pseudoaneurysms are often seen by cardiologists¹⁻³ particularly post-intervention; however subclavian artery pseudoaneurysm is rarely encountered. Due to their non-compressibility, relative proximity to vital structures, likelihood of distal thromboembolism and the unpredictable risk of rupture, they pose unique challenges in the management. Accurate delineation of the aneurysm is very important for efficient management whether planned percutaneously or by open technique. A number of techniques are available.

The pseudoaneurysm can be depicted by different imaging modalities, each with its own pros and cons. Pseudoaneurysm lacks the layers of arterial wall compared to a true aneurysm.⁴ Moreover, the neck of the pseudoaneurysm is wider compared to true aneurysm. Ultrasonography⁵ can demonstrate a sac communicating with the main cavity; however it has its limitation in differentiating a true from a pseudoaneurysm. Doppler can show the flow of blood and thus the communication of the cavity with the main sac. Computed tomography (CT) scan⁶ and magnetic resonance angiography have the advantage of identifying the walls of the aneurysm, and thus labeling it as either true- or pseudoaneurysm. CT has the obvious disadvantage in terms of radiation and the potential for nephrotoxicity if dye is required.⁶ Magnetic resonance imaging has the limitation of use in patients with pacemakers and metallic prosthetic heart valves.

Surgery has been the traditional treatment of choice for most of the cases.⁷ However, endovascular stent graft placement is gaining popularity as an alternative modality to open surgery.^{8,9} A glimpse of

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Received March 19, 2014; revision accepted May 13, 2014

PSEUDOANEURYSM IMAGING

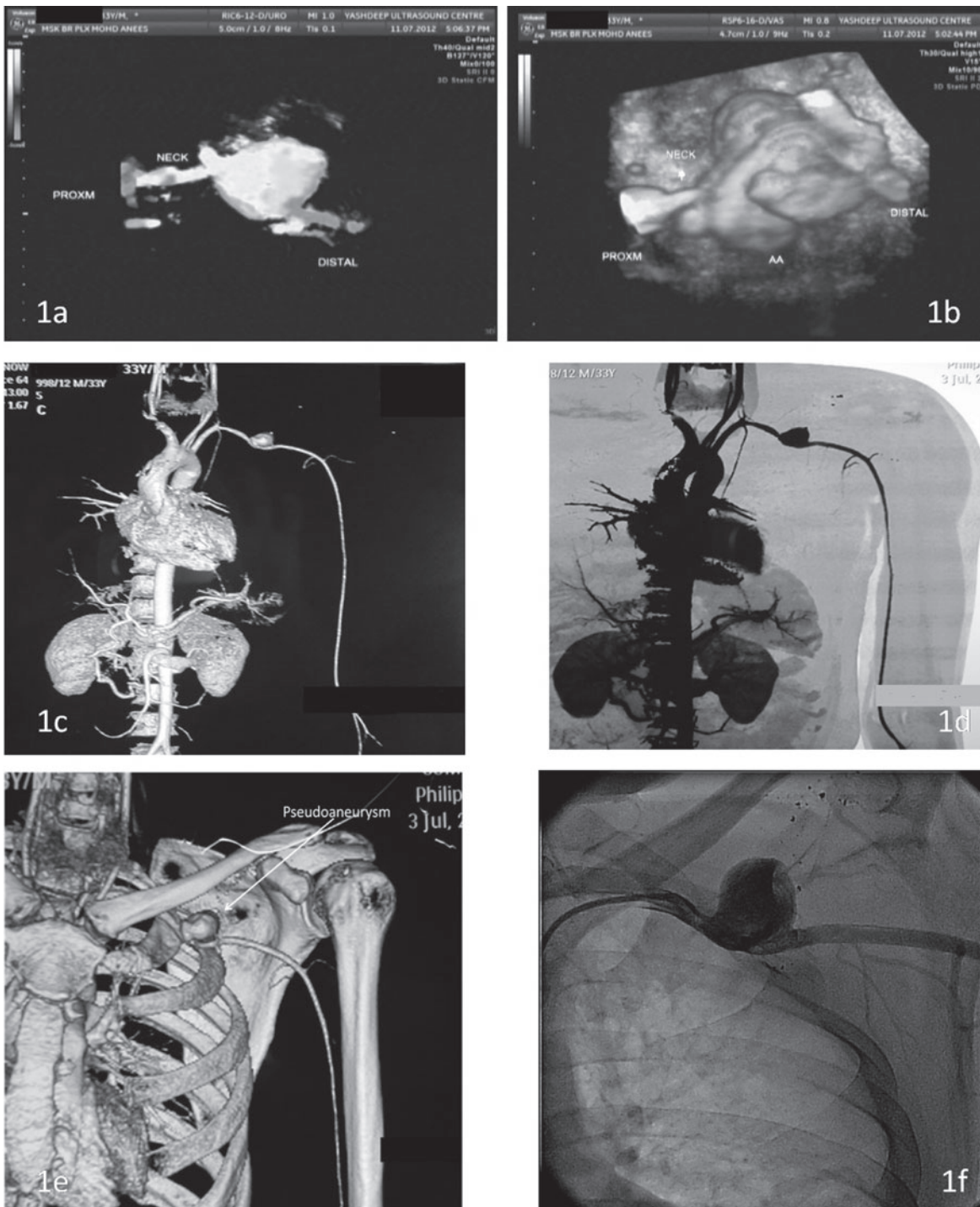


Figure 1. (a) High-resolution sonography with colour flow imaging showing a well defined cystic mass in the mid part of the left subclavian artery. On colour flow imaging blood is seen flowing into it suggestive of aneurysm; (b) 3D reconstruction of the sonography of left subclavian artery, showing the aneurysm; (c&d) CT angiography of great vessels and left arterial system to the upper limb, showing a well defined aneurysmal dilatation in subclavian artery; (e) 3D reconstruction of the CT angiography images; (f) Peripheral angiography using iodinated contrast, showing a large aneurysm in the subclavian artery.

the common techniques for demonstration are imaged in the picture presented in a 40-year-old male presenting with a post-gun shot subclavian artery pseudoaneurysm.

Case

This 40-year-old male had a history of gunshot injury over left shoulder region a month prior to presentation; and was being managed conservatively with intercostals tube drainage for left hemothorax when he started noticing weakness of left upper limb. Left brachial plexus injury was suspected. Ultrasonography of the neck was done for brachial plexus evaluation which showed that infraclavicular part of brachial plexus trunk was severed. In addition, there was a mass in distal part of subclavian artery. On colour flow imaging blood was seen flowing into it through a neck. CT-angiography was done which showed it to be a pseudo-aneurysm in distal part of left subclavian artery. Diagnostic peripheral angiography of left upper limb was done which showed a wide neck aneurysm, in the distal part of left subclavian artery directed posteriorly and superiorly.

Endovascular procedure was performed via access through the right femoral artery. The pseudoaneurysm was communicating with the main subclavian artery via a large neck. Using 8F multipurpose guiding catheter, pseudoaneurysm was crossed with a floppy wire and then 0.035" exchange wire was crossed. Endovascular exclusion of the pseudoaneurysm was achieved with the deployment of a 6x22 mm balloon expandable peripheral stent-graft (Adventa, ATRIUM MEDICAL CORPORATION) within the lumen of left subclavian artery. Completion angiography showed complete closure and exclusion of the pseudoaneurysm.

Financial Support

This research received no specific grant from any funding agency, commercial or not-for-profit sectors.

Conflicts of Interest

None

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Hong Kong College of Cardiology



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Scientific Programme

Friday, 6 June 2014

0800	4/F	Registration	
0900-1100	Ching Room	Free Paper Session Percutaneous Coronary Intervention Structural and Congenital Heart Diseases Hypertension and Hyperlipidemia	
	Ming Room II	Ischemic Heart Diseases Cardiac Surgery	
1100-1130	Terraces of Tang and Sung Room	Coffee Break & Visit Exhibits	
1130-1300	Ching Room	Free Paper Session EPS Cardiac Arrhythmia Pacing Echocardiography	
	Ming Room II	Heart Failure Miscellaneous	
1300-1430	Oyster Bar & Sky Lunge	Lunch	
1430-1530	Ballroom C	Best Paper Oral Presentation	
1530-1700	Ballroom C	Symposium on Cardiac Arrhythmia: Ectopic Beat – When is it Malignant? Premature Atrial Complex PVC in Structurally Normal Heart PVC in Coronary Artery Disease and Cardiomyopathy	David CW Siu (HK) Gary CP Chan (HK) Cyril YK Ko (HK)
1700-1730	Terraces of Tang and Sung Room	Coffee Break & Visit Exhibits	
1730-1900	Ching Room	Symposium on Transcatheter Structural Heart Intervention Update on LAAO for Stroke Prevention in Atrial Fibrillation TAVI – Update on Asian and QEH Registries MitraClip – What We Learnt from Our Experience	Ngai-yin Chan (HK) Michael KY Lee (HK) Boron CW Cheng (HK)
1900-2030	Ballroom A&B	Welcome Dinner	

Saturday, 7 June 2014

0800	3/F	Registration	
0830-1230	Ballroom C	Joined Symposium – Cross-straits Medicine Exchange Association of Ministry of Health / Hong Kong College of Cardiology Guidelines and Practice: Clinical Case Based Conference (GAP-CCBC)	
		An Invisible Complication Chang Gung Memorial Hospital 長庚紀念醫院	I-chang Hsieh (Taiwan) 謝宜璋
		A Case with Chest Pain and Refractory Hypotension Beijing Fu Wai Hospital 北京阜外心血管病醫院	Min Yang (China) 楊敏
		Left Atrial Appendage Occlusion with the Domestic Device in a Patient with Atrial Fibrillation Shanghai Tenth People's Hospital 上海市第十人民醫院	Ya-wei Xu (China) 徐亞偉
		A Typical Case of High-Risk Acute Coronary Syndrome People's Hospital of Peking University 北京大學人民醫院	Jun-xian Song (China) 宋俊賢
		A Case with Syncope and Severe Myocardial Ischemia Beijing Tong Ren Hospital 北京同仁醫院	Yi Yang (China) 楊毅
		The Only 1.5% Queen Elizabeth Hospital 伊利沙伯醫院	Shing-fung Chui (HK) 徐城烽
		DES Restenosis: What Can We Do? Beijing An Zhen Hospital 北京安貞醫院	Xian-tao Song (China) 宋現濤
		Choice of Revascularization in a Patient with Multiple Coronary Artery Diseases Wannan Medical College Yijishan Hospital 皖南醫學院弋磯山醫院	You-sheng Ke (China) 柯永勝
		Clopidogrel Resistance in a Case of Acute Coronary Syndrome after CABG Cheng Hsin Hospital 振興醫院	Wen-pin Huang (Taiwan) 黃文彬
		A Missing Link Between Multiple Discipline Guangdong General Hospital 廣東省人民醫院	An-ping Cai (China) 蔡安平
		On the Wrong Way: A Case of STEMI with an Ignored Cause People's Hospital of Peking University 北京大學人民醫院	Zhong-you Li (China) 李忠佑
		Arrhythmia Post PCI Angina Conde S Januario General Hospital 仁伯爵綜合醫院	U-po Lam (Macau) 林如波
0830-1230	Ballroom A&B	Allied Cardiovascular Health Professionals Symposium: Back to Basics – Essential Cardiac Anatomy Relevant to Intervention	
		Essential Cardiac Anatomy Relevant to Percutaneous Coronary Intervention	Edmond ML Wong (HK)
		Essential Cardiac Anatomy Relevant to Radiofrequency Ablation	Ngai-yin Chan (HK)
		Essential Cardiac Anatomy Relevant to Structural Heart Disease Intervention	Boron CW Cheng (HK)
		Essential Cardiac Anatomy Relevant to Peripheral Artery Disease Intervention	Chad CW Tse (HK)

1230-1415	Ballroom C	AstraZeneca Mainland–Hong Kong–Macau ASC Expert Forum (Lunch will be provided)	
		ACS Management in China – From Guideline to Hospital Protocol	Zhi-min Du (China)
		Case Sharing from Mainland	Yue-jin Yang (China)
		Case Sharing from Hong Kong	Chiu-on Pun (HK)
		Case Sharing from Macau	U-po Lam (Macau)
		Closing Remarks: Looking Forward for Better Outcome	Chung-seung Chiang (HK)
1430-1500	Ballroom C	Opening Ceremony Guest-of-Honour: Professor John CY Leong, Chairman, Hospital Authority	
1500-1600	Ballroom C	Medtronic Symposium	
		An In-depth Look of Durable Polymer and Long Term Safety Art of Bifurcation Stenting What Have We Learned about Renal Denervation? Symplivity HTN-3 Trial and Global Symplivity Registry	David Muller (Australia)
1600-1700	Ballroom C	BMS/Pfizer Symposium	
		Stroke Prevention in Patients with Atrial Fibrillation: From Evidence to Clinical Practice	Jack Ansell (USA)
1700-1830	Ballroom C	Plenary Lectures	
		Bioresorbable Vascular Scaffold – From Clinical Trials to Daily Practice	Stephan Achenbach (Germany)
		Outcomes of Antithrombotic Therapies in SPAF: Insights from a Local Registry	David CW Siu (HK)
		BioFreedom Drug Coated Stent – How might the DCS Impact your Practice?	Paul Ong (Singapore)
1845-1930	Ballroom C	Hong Kong Heart Foundation Lecture	
		The Role of Cardiovascular Imaging in the Heart Failure Patient	Fausto Pinto (Portugal)
1930-2100	Ballroom A&B	Dinner	

**Coffee break will be served from at 10:30-11:30 & 17:30-18:30 at Terraces of Tang and Sung Room.*

Sunday, 8 June 2014

0800	3/F	Registration	
0830-1030	Ballroom C	PCI Cases Discussion Prize Presentation	
1030-1100	Terraces of Tang and Sung Room	Coffee Break & Visit Exhibits	
1100-1130	Ballroom C	Plenary Lecture Antiplatelet Therapy in High Risk ASC-PCI Patient	Paul Ong (Singapore)
1130-1230	Ballroom C	A. Menarini Symposium SENIORS – Same Therapy for Different Subgroups Controversy of Beta-blocker in Hypertension – The Role of Nebivolol	Andrew Coats (Australia) Bernard Wong (HK)
1230-1400	Ballroom C	Plenary Lectures Cardioprotective Role of Beta-blockers in Hypertension and Other Cardiovascular Diseases Latest Update on COMBO Dual Therapy Stent Prevention of Stroke in East Asian AF Patients	John Cruickshank (United Kingdom) Tiong-kiam Ong (Malaysia) Kai-hang Yiu (HK)
1400-1530	Ballroom A&B	Lunch	
1530-1700	Ballroom C	Joint European Society of Cardiology / Hong Kong College of Cardiology / Macau Cardiology Association Symposium The Role of Scientific Societies in Promoting Good Clinical Practice New Frontiers on Coronary Stent Development Current Status of TAVI Procedure in Taiwan	Fausto Pinto (Portugal) Chung-seung Chiang (HK) Wei-hsian Yin (Taiwan)
1700-1730	Terraces of Tang and Sung Room	Coffee Break & Visit Exhibits	
1730-1845	Ching Room	Plenary Lectures Management of Coronary Disease When Light Illuminates Multivessel PCI – Which Artery First Post Cardiac Arrest Care and Therapeutic Hypothermia	Stephen WL Lee (HK) James SM Yeh (United Kingdom) Jeffrey KF Hong (HK)
1900-2030	Sung Room	Farewell Dinner	

Paediatric Cardiology Symposium Programme

Saturday, 7 June 2014

0830-1030	Ching Room	Paediatric Cardiology Symposium I Correction of Complete AVSD – Surgical Techniques and Pitfalls Screening for Congenital Heart Disease in Newborns The Strategy of the Diagnostic and Treatment of Pulmonary Atresia/Critical Pulmonary Stenosis with Intact Ventricle Septum in Neonate and Infants Right Ventricular Outflow Tract Reconstruction: Monocusp Valve Using CorMatrix Interventional Treatment of ASD: Difficulties and Pitfalls	Christian Brizard (Australia) Guo-ying Huang (China) Kun Sun (China) Xin Li (HK) Hui-shen Wang (China)
1030-1100	Terraces of Tang and Sung Room	Coffee Break & Visit Exhibits	
1100-1240	Ching Room	Free Paper Session Paediatric Cardiology I	
1230-1415	Ballroom C	AstraZeneca Mainland–Hong Kong–Macau ASC Expert Forum (Lunch will be provided)	
1430-1500	Ballroom C	Opening Ceremony Guest-of-Honour: Professor John CY Leong, Chairman, Hospital Authority	
1500-1640	Ching Room	Paediatric Cardiology Symposium II Hypoplastic Left Heart Syndrome: Management Options Interventional Therapy and Follow Up Results of Ventricular Septal Defects in Close Proximity to the Aortic Valve Assessment and Management of Pregnancy in Patients with Congenital Heart Disease Acute and Long-Term Outcome after Catheter Ablation of Atrial Tachycardia in Post-Fontan Patients to Present	Christian Brizard (Australia) Zhi-wei Zhang (China) Pak-cheong Chow (HK) Jin-jin Wu (China)
1640-1900	Ching Room	Free Paper Session Paediatric Cardiology II	

**Coffee break will be served from at 10:30-11:30 & 17:30-18:30 at Terraces of Tang and Sung Room.*

ABSTRACTS

Abstracts for Free Paper Session:

HYPERLIPIDAEMIA, HYPERTENSION, PERCUTANEOUS CORONARY INTERVENTION AND STRUCTURAL & CONGENITAL HEART DISEASES

Diagnostic characteristics of the hybrid iFR–FFR decision making strategy – a single centre experience

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Purpose: Fractional Flow Reserve (FFR) has been used as a decision-making tool for studying functional significance of coronary lesions after the publication of the DEFER, FAME and FAME II results. Recently, iFR (Instantaneous wave-Free Ratio) has been available to provide a functional measurement of ischemia in an artery and it can be performed very quickly without the need of a vasodilating agent. This study aims to analyze the diagnostic characteristics of using the Hybrid iFR–FFR decision making strategy performed in Queen Elizabeth Hospital.

Methods: A retrospective review of all patients undergoing iFR study between 8th October 2013 and 28th March 2014 in Queen Elizabeth Hospital was performed. iFR and FFR were measured using a 0.014-inch PrimeWire PRESTIGE®PLUS pressure guide wire and Volcano system. After iFR interrogation, maximal hyperemia was induced by the continuous intravenous infusion of adenosine at 140µg/kg/min. iFR and FFR values were calculated using fully automated algorithms. iFR and FFR results were analyzed.

Results: 85 patients with 100 lesions studied were identified. 92 lesions had both iFR and FFR done. Eight lesions were not tested with adenosine and FFR was not done due to the presence of contraindications. Mean iFR was 0.93 with standard deviation of 0.076 and mean FFR 0.87 with standard deviation of 0.077. Among those lesions with both iFR and FFR done, a total of five lesions had iFR <0.86. Four of them had iFR <0.86 and FFR < 0.8. Four lesions had iFR <= 0.86 while FFR measured <0.75. 48 lesions had iFR >0.93. Only one (2.1%) of them with iFR >0.93 and FFR < 0.8. 39 lesions had iFR fallen into the range of grey zone 0.86 to 0.93. 10 (25.6%) of them had FFR <0.8. If Hybrid iFR–FFR decision making strategy is used, 98% of lesions will be deferred in the same way as using an FFR-only strategy. Limiting vasodilator drugs to cases with iFR values between 0.86 and 0.93 would spare vasodilator drugs use in 58% of the episodes. There was a strong correlation between iFR and FFR values with Pearson correlation of 0.79 (p<0.01).

Conclusion: The result of using Hybrid iFR–FFR decision making strategy is similar in magnitude to that observed with an FFR-only strategy. It had the potential to simplify lesion physiological assessment without any concern on achieving maximal hyperemia and can be performed in patients with contraindication for vasodilator, such as adenosine.

Clinical profile and predictors of outcomes of patients with mitral stenosis undergoing percutaneous transseptal mitral commissurotomy

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Introduction: Mitral stenosis (MS) remains one of the top causes of cardiovascular mortality and morbidity in our country. Percutaneous transseptal mitral commissurotomy (PTMC), since its introduction in 1984 has gained popularity and has supplanted surgery as the treatment of choice for severe mitral stenosis. Our present study describes the clinical profile and enumerates the predictors of outcomes of patients with mitral stenosis undergoing PTMC at the Philippine General Hospital (PGH). We aim to present the clinical, echocardiographic, and hemodynamic profile of adult patients with MS who have undergone PTMC from 2010 to 2013 at the PGH.

Methods: We conducted a retrospective study of all adults with MS who underwent PTMC. Successful PTMC is defined as a post-procedural hemodynamic study of a mitral valve area (MVA) >1.5cm and/or a mean gradient <5mmHg. Other outcomes were new or worsening of mitral regurgitation and death.

Results: 104 patients with a mean age of 38 years old, predominantly female, were included. Majority had a severe MS with a mean Wilkins score of 7.9. A successful PTMC was achieved in 89%. Having a repeat PTMC (ie. PTMC for the second time) was associated with an increased risk of developing an unfavorable outcome or failed PTMC [(OR 7.62, CI 1.73–33.6)]. Moderate to severe or worsening of prior mitral regurgitation determined by hemodynamic studies developed in 3%. In-hospital mortality occurred in 3%. Pre-procedural hypertension was associated with increased risk of developing a new or worsening MR or death.

Conclusion: The typical patient undergoing PTMC at PGH was a middle-aged female with minimal co-morbidities, CHF functional class II from severe MS, in sinus rhythm. Overall outcomes were excellent, but prospective studies are recommended to evaluate hard outcomes such as functional capacity and long-term mortality.

Effects of niacin on plasma Lp(a) and glucose levels were less favourable in patients with diabetes among Hong Kong dyslipidaemic patients

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Objective: Niacin has potential benefits on most lipid parameters including a unique effect to reduce lipoprotein (a) [Lp(a)], an independent cardiovascular risk factor. However, niacin had no overall benefit in addition to intensive statin treatment in recent studies, possibly because of adverse effects such as increasing plasma glucose. We examined factors which might influence the effects of ER niacin /laropiprant on plasma LDL-cholesterol, Lp(a) and glucose in Chinese dyslipidaemic patients.

Methods: Patients were treated with ER niacin 1 g/ laropiprant 20 mg for 4 weeks then the dose was doubled for a further 8 weeks in an open label study.

Results: In 123 patients (47 females, 49 with diabetes, 76 on statins and/or other lipid treatments) tolerating 12 weeks treatment, there were significant dose-dependent effects (P<0.001) with mean ± SD maximum decreases in LDL-cholesterol of -19.7 ± 26.2% and triglycerides -32.5 ± 28.1%, and increases in HDL-cholesterol of 23.7 ± 22.0% and glucose 9.5 ± 13.1%. The absolute (-6.4 ± 9.7 mg/dl) but not the percentage decreases (-37.8 ± 20.6%) in Lp(a) were related (r= -0.885, P<0.001) to the baseline levels (17.2 ± 23.5 mg/dl). Patients with diabetes had less reduction in Lp(a) (-32.1 ± 24.2% vs. -41.5 ± 17.0%, P<0.05) and greater increases in glucose levels (12.4 ± 15.8% vs. 7.1 ± 10.4%, P<0.05) than those without, but overall the changes in the two parameters were not associated with each other.

Conclusion: Having diabetes was the most predictive baseline feature associated with less reduction in Lp(a) and greater increases in glucose. Whether early changes in glucose and lipids may be useful to predict longer term effects and cardiovascular benefits requires further testing.

Effect of the common DGAT1 and DGAT2 polymorphisms on the lipid responses to niacin in Chinese patients with dyslipidaemia

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Objective: Acyl-CoA: diacylglycerol acyltransferase (DGAT) enzymes catalyze the final step in the biosynthesis of triglycerides. Niacin competitively inhibits DGAT2 in cell lines and this may be relevant to the action of niacin *in vivo*. This study examined the effect of common polymorphisms in DGAT1 and DGAT2 on the lipid responses to niacin in two separate studies with the ER niacin/laropiprant combination and ER niacin alone, respectively.

Methods: Chinese patients with dyslipidaemia were treated with extended release (ER) niacin 2 g /laropiprant 40 mg combination for 8 weeks (n=121) (the primary study) or with ER niacin 1.5 g (the replication study) for at least 4 weeks (n=68). Fasting lipids were measured at baseline and during the studies. The DGAT1 rs7003945 T>C and DGAT2 rs3060 T>C polymorphisms were genotyped.

Results: In the primary study in 121 patients, neither DGAT1 rs7003945 T>C nor DGAT2 rs3060 T>C polymorphisms had a significant effect on the triglyceride or HDL-C responses to ER niacin/laropiprant. The DGAT2 rs3060 T>C polymorphism tended to be associated with a reduced LDL-C response, but this association is likely to be driven by an association between this polymorphism and baseline LDL-C levels. In the replication but not the primary study, the DGAT2 rs3060 T>C polymorphism was associated with a reduced triglycerides and HDL-C response in a recessive model (P<0.05 for both). The DGAT1 rs7003945 T>C polymorphism had no effect on either baseline lipids or the lipid response to niacin in both studies.

Conclusion: The DGAT1 rs7003945 polymorphism had no significant effects on the lipid responses to niacin in Chinese dyslipidaemic patients, whereas the DGAT2 rs3060 polymorphism may influence the lipid response to niacin in patients with high triglyceride levels and this needs to be verified in large clinical studies.

ABSTRACTS

Abstracts for Free Paper Session:

HYPERLIPIDAEMIA, HYPERTENSION, PERCUTANEOUS CORONARY INTERVENTION AND STRUCTURAL & CONGENITAL HEART DISEASES

Investigating the relationship between stroke and serum fatty acids in hypertensive population

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Background: Stroke is prevalent in hypertensive population. It has been suggested that monospecific unsaturated fatty acids (USFAs) have potential effect on protection against stroke. However, the effect of saturated fatty acids (SFAs) on stroke is controversial. Therefore, we studied the relationship between recent stroke and serum levels of fatty acids including both USFAs and SFAs in hypertensive patients.

Methods: 89 pairs including 100 men and 78 women matched by sex and age were recruited. Each pair included a hypertensive patient experiencing an ischemic stroke within 48 hours before examination and a hypertensive patient without stroke. 6 categories of serum fatty acids were methylated before concentration determination which was repeated twice with percent recovery estimated. Data were analyzed using R version 3.0.1.

Results: There were differences in educational level (P=0.002) and occupational status (P<0.001) between stroke and non-stroke participants. Non-stroke participants had higher levels of total cholesterol (P<0.001), triglyceride (P=0.041), LDL (P=0.048) and HDL (P=0.001). All the 6 fatty acid levels were higher in non-stroke participants (P=0.017 for palmitoleic acid, 0.001 for palmitic acid, <0.001 for linoleic acid, <0.001 for behenic acid, <0.001 for nervonic acid and 0.002 for lignoceric acid). Before adjustment, recent stroke was inversely associated with all the tested 6 serum fatty acid levels. After adjustment for education, occupation, the palmitoleic acid, systolic blood pressure, smoking and drinking, the association of the levels of all the tested 6 serum fatty acids with recent remained significant. After further adjustment for total cholesterol (TC) and triglyceride (TG), the inverse associations of linoleic acid (OR=0.09, 95%CI=0.04-0.24, P<0.001), behenic acid (OR=0.26, 95%CI=0.14-0.48, P<0.001), nervonic acid (OR=0.19, 95%CI=0.10-0.37, P<0.001) and lignoceric acid (OR=0.57, 95%CI=0.35-0.91, P=0.021) with recent stroke were still highly significant, but the inverse association did no longer remain in palmitoleic acid and palmitic acid.

Conclusion: The serum levels of the fatty acids including both the USFA and SFA tested in our study were inversely associated with recent stroke. The inverse association of palmitoleic acid and palmitic acid levels with recent stroke was not significant after controlling for TC and TG indicating lipids may play a role in the association. Our results raise the possibility that both USFAs and SFAs may have beneficial effect on reduction of stroke risk in hypertensive population.

Funding: Kunshan City and Social Development of Science and Technology Plan Project (NO. KS1260).

Use of wrist device (BPro) for ambulatory blood pressure monitoring: comparison with arm device (A&D)

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Purpose: Blood pressure (BP) monitors that measure BP at the arm level are regarded as more accurate than wrist devices and are preferred for ambulatory BP monitoring (ABPM). We evaluated two validated devices; a wrist monitor (BPro, HealthSTATS International, Singapore) and an upper arm monitor (A&D TM-2430, Tokyo, Japan) for agreement of recordings and acceptability.

Methods: 27 hypertensive patients (aged 55±10 years) were enrolled. The wrist monitor measured BP at 15-min intervals over 24 hours on the left wrist and the arm monitor measured BP at 15-min intervals in the daytime and hourly from 22:00 to 07:00 on the right arm. Waking and sleeping periods were analyzed based on patients' diaries. ABPM profiles were edited according to conventional criteria to correct for measurement errors and outliers. Valid readings measured within 5 minutes by the 2 monitors and with a difference in heart rate of <5 beats/min were compared.

Results: There were 673 readings (498 awake, 175 asleep readings) compared between monitors. The wrist monitor obtained fewer successful BP measurement (total 59±17%, awake 56±16%, sleeping 68±25%) than the arm monitor (total 84±9%, awake 83±11%, sleeping 94±6%, all P<0.01). No significant difference in 24-hour SBP (138±17.9 vs. 138±17.9 mmHg, P=0.60), or awake and sleeping values were observed. However, DBP values were higher with the wrist compared to the arm monitor (24-hour 89±13.6 vs. 85±14.4 mmHg, awake 91±13.5 vs. 88±13.4 mmHg, sleeping 83±12.0 vs. 77±14.3 mmHg, all P<0.01). Bland-Altman analysis showed the differences of 0.4±18.1 (range -47 to 49) mmHg and -3.9±12.9 (-46 to 39) mmHg between arm and wrist monitors for SBP and DBP (Figure 1).

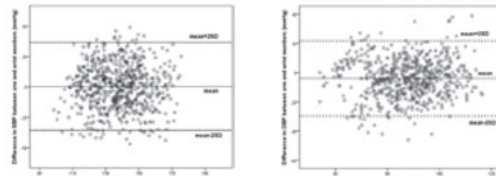


Figure 1: Bland-Altman plots of systolic blood pressure (SBP) and diastolic BP (DBP) with wrist and arm monitors.

Conclusion: The wrist monitor showed reasonable agreement with the arm monitor for ABPM and patients found it more comfortable to use but the successful recording rate was considerably lower. This study supports the use of the BPro device to obtain ABPM data.

Can central aortic blood pressure be lowered effectively with a beta-blocker? Acute and long term effects of bisoprolol

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Purpose: In the treatment of hypertension beta-blockers have been criticized for having less effect on central aortic pressure than other antihypertensive treatments. This study was performed to evaluate the effect of bisoprolol on brachial and central aortic pressure in Chinese with essential hypertension.

Methods: This was an open-label study in 41 hypertensive patients. Central systolic pressure (C-SBP), pulse pressure (C-PP), radial augmentation index (rAI), radial augmentation pressure (rAP), brachial SBP (Br-SBP), pulse pressure (Br-PP) and heart rate (HR) were measured at baseline, 24 hours after a single dose of bisoprolol 2.5 mg and after 6 weeks, by pulse wave analysis using the BPro radial pulse wave acquisition device with A-PULSE software.

Results: 41 patients (age 55±11 years, 59% male) completed a single dose of bisoprolol and 35 patients (age 54±10 years, 58% male) completed 6 weeks treatment. At 24 hours after a single dose, the changes in C-SBP, Br-SBP, C-PP, Br-PP, HR, rAI and rAP were -9.6±10.3 mmHg (p<0.01), -10.7±10.8 mmHg (p<0.01), -3.5±8.8 mmHg (p=0.02), -4.7±9.8 mmHg (p<0.01), -2.9±5.4 bpm (p<0.01), 3.3±14.7% (p=0.16) and -1.1±5.0 mmHg (p=0.24), respectively. After 6 weeks of treatment, the pre-dose changes were -15.3±13.6 mmHg (p<0.01), -15.8±13.7 mmHg (p<0.01), -5.4±9.1 mmHg (p<0.01), -6.3±9.4 mmHg (p<0.01), -3.0±5.0 bpm (p<0.01), 1.3±15.8% (p=0.65) and -0.5±5.3 mmHg (p=0.62). There were significantly greater reductions in Br-SBP than in C-SBP (1.1±3.0 mmHg, p=0.03) and in Br-PP than C-PP (1.1±3.0 mmHg, p=0.03) after the first dose whereas after 6 weeks of treatment pre-dose differences in reduction of C-SBP and Br-SBP (0.5±3.9, p=0.44) and C-PP and Br-PP (0.9±2.8, p=0.08) were not significant.

Conclusion: Low dose bisoprolol reduced central and brachial SBP to a similar extent after the first dose and with long-term treatment.

Arteritis in a pregnant patient masquerading as severe pre-eclampsia: a case report

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Takayasu arteritis is a rare inflammatory vasculitis. Most patients are pulseless, but hypertension may occur especially if there is concomitant renal artery stenosis. We present a young pregnant female manifesting as a hypertensive emergency initially managed as severe pre-eclampsia. Post-delivery, worsening blood pressure control and overall clinical status led to a diagnosis of Takayasu arteritis. She was discharged improved with anti-hypertensives and immunosuppressants.

Case: A 29 year old G1P0 on her 35th week of pregnancy sought consult for headache. Blood pressure on her right arm was 200/100 mmHg. Laboratory work up were compatible with pre-eclampsia. Because conservative obstetric management did not improve symptoms, an emergency cesarean section was done. Post delivery, she had deteriorating status. This led to a suspicion of a secondary cause of hypertension. Further examination revealed a blood pressure of 190-210/220 on her right upper extremity, 150-160 / 80-90 on her left upper extremity and both lower extremities. Pulses on her left brachial and radial pulse were diminished. Electrocardiogram was suggestive of an old septal wall infarction. Cranial CT scan showed chronic lacunar infarcts. Suspicion of Takayasu arteritis was confirmed by a CT aortogram which revealed multiple areas of stenosis (left subclavian, superior mesenteric, and both renal arteries). She was started on prednisone and antihypertensives. She was discharged improved on the 16th hospital day. Significance we are presented with a young female presenting with a hypertensive emergency during pregnancy. Though pre-eclampsia remains a possibility, the deteriorating clinical status post delivery suggests an underlying comorbidity. This case highlights that clinical history and physical examination are still the best tools in diagnosis, supported by ancillary tests. Because of the rarity of this combination, management was a challenge. Early recognition, a multidisciplinary team, and optimal medical management were the keys to a successful outcome.

ABSTRACTS

Abstracts for Free Paper Session:

HYPERLIPIDAEMIA, HYPERTENSION, PERCUTANEOUS CORONARY INTERVENTION AND STRUCTURAL & CONGENITAL HEART DISEASES

Arrhythmia post transcatheter closure of perimembranous ventricular septal defect: a risk factor analysis based on long term follow-up

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Objective: The applications of transcatheter closure of perimembranous ventricular septal defects (pmVSD) were limited by complications, especially arrhythmia. Although some factors have been found that related with such arrhythmia, but no regression study had been carried out to make full of explanation.

Methods: A group of 553 of 645 patients were received symmetric Amplatzer-type pmVSD occluders for transcatheter closure of pmVSD from June 2003 to December 2010 in our center and completed follow-up of 2-8 years. The cases with early arrhythmia, continuous arrhythmia and late occurred arrhythmia were drawn out. After that, risk factors analyses were carried out for impulse formation disorders and heart block including atrioventricular block (AVB) and branch block using Logistic regression.

Results: 190 cases suffered early arrhythmia post procedure, and severe AVBs can be changed into mild ones after treatment. Only 54 cases still suffered continuous arrhythmia in long term follow-up. 13 cases were identified late occurred arrhythmia. The size of occluders was identified as a contributing factor for post-procedural early and continuous arrhythmia, while the distance between the defect to the tricuspid rim for continuous arrhythmia. For the late occurred arrhythmias, larger occluders and pre-procedural arrhythmias were identified as confounding factors.

Conclusion: The size of occluders mainly impacted the prognosis. Unusually larger devices were related to continuous arrhythmia and late occurred arrhythmia. Especially patients with pre-procedural arrhythmias were found to have increased risk for late complications.

Differential cyanosis between the hands of an adult with coarctation of the aorta, patent ductus arteriosus, bicuspid aortic valve, double chambered left ventricle and mitral stenosis: a curious syndrome

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Differential cyanosis occurs in an Eisenmengerized patent ductus arteriosus (PDA) due to a right-to-left shunt through the ductus, presenting with cyanosis of the lower extremities but preservation of the upper extremities. We present a unique case of a young male with cyanosis of the left upper extremity and both lower extremities but with preservation of the right upper extremity. Non-invasive work-up revealed an enigma of multiple congenital left sided obstructions.

Case: A 22 year old male sought consult for cyanosis at rest. He was diagnosed with an unrecalled congenital heart disease presenting with intermittent cyanosis. Blood pressure on all extremities was normal. He had a grade 4/6 ejection murmur and clubbing on all extremities. Cyanosis was only noted on his left hand and both feet. The right radial pulse demonstrated pulsus parvus et tardus ("weak and late pulse"), compared to the stronger left radial pulse. The femoral, popliteal, and dorsalis pedis pulses were barely palpable. He had erythrocytosis and severe hypoxemia only on the cyanotic extremities. Diagnosis was confirmed by cardiac MRI revealing severe coarctation of the aorta after the left subclavian artery with a PDA at the level of coarctation, mitral stenosis, bicuspid aortic valve, and a double chambered left ventricle with severely depressed systolic dysfunction. Outcome Operative repair was offered. Due to the high risk nature of surgery, our patient opted medical palliative management, including regular phlebotomy. Significance This case demonstrates a unique adaptation of the body in response to severe congenital obstructions. Because of preferential flow from the pulmonary artery to the descending aorta thru a PDA, severe congestive heart failure was palliated during childhood enabling this patient to survive at an age of 22 years.

Mechanical thrombectomy with intrapulmonary arterial thrombolysis followed by oral thrombolysis in pulmonary embolism – a novel multipart approach

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Pulmonary embolism (PE) is a life-threatening condition with a high early mortality rate caused by acute right ventricular failure and cardiogenic shock. We report a series of 3 patients who presented with acute and subacute massive PE. They were successfully treated by catheter-based mechanical thrombectomy and intrapulmonary arterial thrombolysis followed by adjunctive oral thrombolytic therapy. Mechanical fragmentation and aspiration of thrombus was performed by commonly used J-wire and guiding catheters and this obviated the need of specific thrombectomy devices. To the best of our knowledge, the approach utilized is being reported for the first time. The use of oral thrombolytic as an adjunctive maintenance therapy appears very promising and benefitting maximally in this subset of patients.

3 years after Transcatheter Aortic Valve Implantation (TAVI) in Queen Elizabeth Hospital

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Introduction: Transcatheter Aortic Valve Implantation (TAVI) for treatment of inoperable or high-risk symptomatic patients with severe aortic stenosis has become a well-established and rapidly growing field in structural heart intervention. This involves percutaneous implantation of a porcine aortic valve housed inside a nitinol metal frame through the femoral or subclavian artery routes without subjecting the patients to open heart surgery or cardio-pulmonary bypass. Although a high-risk procedure with 5-10% immediate complications and 30-day mortality of 5.6-12.7%, it reduces all-cause mortality by 27% at 3 years.

Objective: We report the 3-year intermediate term results of our TAVI program in Queen Elizabeth Hospital since its introduction in December 2010.

Methods: The TAVI procedures are done in Queen Elizabeth Hospital by a multi-disciplinary TAVI heart team comprising cardiologists, cardiac surgeons, anaesthesiologists, radiologists and cardiac nurses. All potential patients would be interviewed independently by the cardiologists and cardiac surgeons. The TAVI Heart Team then decided whether the patient should undergo SAVR or TAVI. All patients were assessed by echocardiogram, CT scan and angiogram to decide on suitability. Echocardiogram and 6-minute walk test would be performed according to schedule post-procedure. All complications would be reported to an independent Safety Monitoring Committee. All data will be captured by the local QEH Registry, HA TAVI Registry and the multi-centred Asia TAVI Registry.

Results: From December 2010 to January 2014, 30 patients (19 males and 11 females) with symptomatic severe aortic stenosis underwent the TAVI procedure. Average age was 81.3±5.7 years. All procedures were done under general anaesthesia in our cardiac catheterization laboratory and hybrid OR. Aortic valve area improved from 0.72±0.17cm² to 1.93±0.32cm² and mean gradient decreased from 51.2±10.8mmHg to 8.6±2.7mmHg. Majority of patients have only trivial to mild aortic regurgitation during subsequent follow-up. Permanent pacemakers were implanted in 4 patients (13.3%). 1 patient was noticed to have subclavian artery subtotal occlusion after surgical repair with successful stenting done. 2 femoral artery dissection were noted both with successful stenting done. No other complications were noted. There was one 30-day mortality (3.3%) due to acute coronary occlusion during the procedure. After an intermediate-term mean follow-up of 17 months (2 to 37 months), 1 more patient died of acute coronary syndrome at 3 months, giving a 1-year mortality rate of 2 out of 22 (9.1%). 3 patients have just celebrated their 3rd anniversary post-TAVI and 12 at their 2nd anniversary. All patients showed marked symptomatic improvement on follow-up with 27.6% improved 2 NYHA functional classes, 65.5% with 1 class and 6.9% with no change. There is also significant benefit in terms of 6-minute walk test and quality of life measurement. This compares favourably with results from Asia and other parts of the world.

Conclusion: Being a high-risk procedure, TAVI was shown to be safe and feasible in a group of high-risk symptomatic severe AS elderly and this benefit can be maintained at an intermediate term follow-up period of 3 years.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC SURGERY AND ISCHEMIC HEART DISEASE

Perceval sutureless aortic valve replacement in a patient with porcelain aorta – a case report

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Aortic valve stenosis is one of the commonest valvular heart disease we encountered in daily practice. Regardless of the etiology of aortic stenosis, open heart surgical valve replacement has been recognized as the gold standard in treating severe or symptomatic aortic stenosis for decades. Aortic valve replacement in calcified aortic root remains a technical challenge for surgeons and requires a long cardiopulmonary bypass. Despite the emergence of transcatheter aortic valve implantation for high surgical risk patients in recent years, TAVI use is limited by the necessity for concomitant complex open heart procedure. We reported a case of successful aortic valve replacement in a 63 year old gentleman with extensively calcified aortic root using Perceval S sutureless valve with concomitant coronary artery bypass grafting. Transverse aortotomy was made at distal ascending aorta avoiding the calcified plaques. With a remote endoaortic view, a medium size Perceval valve was implanted after aortic annular decalcification. Sutureless bioprosthesis has promised to simplify and reduced cross-clamping/bypass time in minimally invasive surgical valve replacement. In addition, it also demonstrated advantages in treating complex heart disease requiring full sternotomy, as in our present case.

Atrial septostomy in treatment of complex congenital heart diseases

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Objective: To evaluate the surgical result of atrial septostomy in treatment of complex congenital heart diseases.

Methods: From January 2010 to December 2012, 28 patients with complex congenital heart diseases underwent atrial septostomy over the same period of palliative or radical operation. There were 19 male patients and 9 female patients with their age of 0 – 168 month (mean age: 33.43±38.57 month) and body weight of 2.6 – 49.5 (mean weight: 10.95±8.85 kg). The oxygen saturation of blood (SpO₂) and the cardiac function was studied before and after operation. Follow-up was made for these patients at the same time. Among them, 6 patients (21.43%) were transposition of great arteries, 2 patients (7.14%) were pulmonary atresia/intact ventricular septum, 3 patients (10.71%) were pulmonary atresia/ventricular septal defect, 2 patients (7.14%) were tricuspid stenosis/tricuspid atresia with borderline left ventricle, 15 patients (53.57%) were functional single ventricle. The major heart surgery at the same period including 11 Pulmonary artery barding, 13 bidirectional Glenn shunt, 4 central aorto-pulmonary shunts, 4 modified Fontan procedures, 1 Blalock-Taussing shunt and 10 ligation of patent ductus arteriosus.

Results: The in-hospital mortality was 21.43% (6/28), 2 patients died during the operation, 4 patients died after the operation. Which were not atrial septostomy-related deaths. Their postoperative mean oxygen saturation of blood (SpO₂) significantly increased from 72.57±19.35% to 84.54±9.44%. The status in short of oxygen of most patients improved immediately. And two patients with transposition of the great arteries who need preoperative mechanical ventilation can also be aggressively wean off at the time of 24 and 76 hours after the operation. 19 surviving patients (86.36%) were followed up from 4 to 37 months. After 0 – 168 months (mean time: 22.00±8.27 month) 36.84% patients of them (7/19) underwent two-stage radical operation or secondary palliative operation, with no patients dead. The New York Heart Association (NYHA) functional class of last follow-up were 1.95±0.52, compared with preoperative (2.21±0.74) was no statistically significant.

Conclusion: For some patients with complex congenital heart diseases who may not meet the conditions for one-stage radical operation. Atrial septostomy is effective at increasing oxygen saturation improving severely hypoxic and cardiac function. Thus underwent atrial septostomy over the same period of palliative or radical operation is a safe and effective palliative procedure. The general condition of patients with complex congenital heart diseases can be improved postoperatively so as to receive a later staging operation.

Temporary ventricular assist device: the Hong Kong experience

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Purpose: The development of mechanical circulatory support has been evolving rapidly in recent decades. The aim of this study is to review our experience on the use of temporary ventricular assist device in Hong Kong.

Methods: Patients who had temporary ventricular assist device implanted in Queen Mary Hospital from July 2010 to May 2013 were reviewed retrospectively. The demographics, indication of device implantation and clinical outcome of these first 12 patients were studied.

Results: Out of the 12 patients who received temporary ventricular device implantation, seven were female and five were male. The mean age was 47.9 years old (Ranging from 13 to 59). Five patients (41.7%) had temporary devices implanted more than once. The commonest indication for implantation was primary heart failure (8 out of 12, 66.7%). Four of these patients suffered from dilated cardiomyopathy, two suffered from acute myocarditis, one suffered from hypertrophic cardiomyopathy and one suffered from ischemic cardiomyopathy. The second commonest indication was post-transplant acute right heart failure (4 out of 12, 33.3%). Six patients had biventricular assist device implantation. Five of these patients had device implanted in a single operation while one patient had the right and left ventricular devices implanted sequentially. Two patients had left ventricular assist device alone and four had right ventricular assist device implanted. Five out of the eight primary heart failure patients survived till heart transplantation. Two out of the four patients who received ventricular assisted device for post-transplant heart failure successfully weaned from support. At the time of this study, a total of five patients survived.

Conclusion: Heart failure remains a disease with high mortality despite modern medical advances. The use of ventricular assist device provide a bridge to transplantation and its application should be further studied to maximize benefits to patients.

Maze versus No Maze procedure in patients with atrial fibrillation undergoing mechanical mitral valve replacement

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Background: One of the major advantage of the Maze procedure for atrial fibrillation is the ability to discontinue warfarin if sinus rhythm is maintained. But the continuation of warfarin is required for patients with mitral valve replacement. The aim of this study is to compare 2 groups of patients with atrial fibrillation undergoing mechanical mitral valve replacement; one group with the Maze procedure, and the other without.

Methods: From Sept 2005 to Sept 2010, 124 patients with atrial fibrillation who underwent mechanical MVR were included in this study. Of these 124 patients, 61 patients underwent concomitant Maze procedure, and 63 patients without Maze procedure. At a median follow up of 80 months, post-operative thromboembolic event, congestive heart failure admissions, warfarin related complications, 30 day and long term mortality, and maintenance of sinus rhythm were documented and analyzed.

Results: At a median follow up of 80 months (range 1 to 102 months), 69% with Maze procedure managed to maintain sinus rhythm, whereas 0% of patients without Maze did. 5% and 30% (p<0.00) had warfarin related complications in the Maze and without Maze group respectively. 0% and 29% (p<0.00) require admission for congestive heart failure in the 2 groups respectively. 7% and 13% (p<0.25) suffered thromboembolic events in the 2 groups. Mortality within 30 days were 0% and 2% (p<0.32) respectively, and long term Mortality were 7% and 21% (p<0.02).

Conclusion: While it is unsurprising that the Maze procedure group have an obvious advantage in the maintenance of sinus rhythm, this group also appear to have advantages in terms of warfarin related, heart failure related admissions and long term mortality on follow up. Although the Maze group appeared to suffer nearly half the thromboembolic events, it was not supported with statistical significance in our set of data. Currently, data available for Maze procedure in this specific group of patients with mechanical mitral valve replacement has not been well published, future randomized data are necessary.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC SURGERY AND ISCHEMIC HEART DISEASE

Outcome evaluation for congenital heart surgery in Hong Kong

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Continuous evaluation of quality of care is becoming a duty of surgical practice. The EACTS Congenital Heart Surgery Database is one of the largest database in the world dealing with congenital cardiac malformations. It currently has 424 centres from 77 countries registered containing more than 160,000 operations performed since 1992. The database provides a platform on quality outcomes, research works and benchmark reports.

Purpose: To review the surgical outcome for congenital heart disease between year 2002 and 2003 at Queen Mary Hospital, Hong Kong.

Methods: Registered with the EACTS Database was made in early 2012. Continuous perioperative data has been collected for all the patients underwent congenital heart surgery at Queen Mary Hospital since 2012.

Results: There were 730 procedures in 72 different types performed during year 2012 and 2013. Open heart surgery occupies 70% of all the operations. The commonest open heart operation is VSD repair (7.8%), followed by ASD repair, TOF repair, AVSD repair and Fontan operation. The commonest closed heart operation is PDA ligation (6.5%), followed by shunt operation and coarctation repair. Complex operations account for more than 50% of the workload. 51% of the procedures are done for patients under one year of age, in which neonatal surgery contributes to 21% of the workload. Adult congenital heart operations contain 7.8%. Arrhythmias (2.3%), prolonged ventilation >7 days (2.2%), low cardiac output (1.6%), sepsis (1.4%) and renal failure (1.3%) account for the five commonest complications. 30-day mortality achieves 2.1%. The observed versus expected mortality (O/E ratio) is 0.6.

Conclusion: Satisfying performance has been achieved for congenital heart surgery at Queen Mary Hospital. The quality of care and outcomes of congenital heart surgery at QMH are auditable and comparable to world standards.

Upper hemi-sternotomy for congenital ventricular septal defect repair in adolescent and adult patients

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Purpose: To summarize the application of minimal invasive cardiac surgery using upper hemi-sternotomy in repairing congenital ventricular septal defects in adolescent and adult patients in Hong Kong.

Methods: A retrospective case-control study including all consecutive cases between 2010 – 2014. A total of 22 patients aged 12 – 49 were included. Upper hemi-sternotomy was used in six repairs. Conventional median sternotomy approach was used in 16 repairs within this period. The type of defects included 20 subarterial and two outlet muscular septal defects. Upper hemi-sternotomy employed a 4 – 6 cm small skin incision. All operations were performed through main pulmonary arteriotomy under cardiopulmonary bypass and cardioplegia. Demographic and peri-operative data were collected and analyzed.

Results: There was no peri-operative mortality. Upper hemi-sternotomy required longer operative time (mean 165 minutes) than conventional median sternotomy (mean 110 minutes) ($p < 0.001$) but similar bypass time and aortic cross-clamp time. No intra-operative conversion to median sternotomy was required. Total drain output in first 24 hours was similar in both groups. The hemi-sternotomy group was extubated later than conventional sternotomy group, but total intensive care unit stay and hospital length of stay were similar in both groups. No significant difference in post-operative complications was detected between the two groups. Small residual shunts could be detected in color Doppler in one patient in hemi-sternotomy group and three patients in median sternotomy group but none required re-intervention. Post-operative pericardial effusion occurred in two patients in hemi-sternotomy group and three among median sternotomy group, one from each group required pericardial window for drainage. Post-operative analgesia required more narcotics usage in addition to non-opioids/NSAID in conventional sternotomy group ($p = 0.05$). Duration of sick leave from school or work was similar in the two groups.

Conclusion: Our initial experience in employing minimally invasive approach in congenital ventricular septal defects repair was satisfactory in terms of peri-operative conditions and post-operative results. It is potentially attractive to patients in terms of cosmetic outcomes. With increasing surgical expertise and refinement in anaesthetic/intensive care logistics further improvements in performance in minimally invasive approach in congenital heart surgery is anticipated.

The relationship of fibroblast growth factor 21 with cardiovascular outcome events in the Fenofibrate Intervention and Event Lowering in Diabetes Study

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Objective: The purpose of this study was to investigate the relationship of plasma FGF21 levels with cardiovascular events in patients with type 2 diabetes.

Background: Recent animal studies and a proof-of-concept human clinical trial support anti-inflammatory, anti-diabetic, and hypolipidemic properties of fibroblast growth factor 21 (FGF21). However, in human studies, circulating FGF21 levels are often elevated in obesity, dyslipidemia, insulin resistance, and type 2 diabetes.

Methods: Plasma FGF21 levels were measured at baseline in 9,697 study participants with type 2 diabetes from the Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) study by enzyme-linked immunosorbent assay. We assessed the association of FGF21 levels with incidence of coronary events, total stroke, cardiovascular mortality, coronary and carotid revascularization, total cardiovascular events, and hospitalization for angina pectoris over 5-years.

Results: Higher baseline FGF21 levels were associated with higher risks of all cardiovascular outcome events after adjusting for the study treatment allocation (all $p < 0.01$). The associations remained significant for total stroke, coronary and carotid revascularization, total cardiovascular events, and hospitalization for angina pectoris after further adjusting for confounding factors with hazard ratios being 1.48 (95% confidence interval [CI], 1.08 – 2.03), 1.26 (95% CI, 1.01 – 1.56), 1.28 (95% CI, 1.10 – 1.50), and 1.51 (95% CI, 1.15 – 1.98) respectively, for the highest tertile compared to the lowest tertile ($p = 0.04, 0.007, 0.002, \text{ and } 0.007$ respectively).

Conclusion: Higher plasma FGF21 levels at baseline predict cardiovascular events in patients with type 2 diabetes. Studies of treatments which modify FGF21 levels and may influence cardiovascular risk would be justified.

Association of the Neutrophil-Lymphocyte Ratio (NLR) with outcomes in patients admitted at the UP-PGH with acute coronary syndromes

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Patients with documented Acute Coronary Syndromes (ACS) exhibit a wide spectrum of early risk of death. An elevated leukocyte count has been identified as a predictor of increased risk mortality. An elevated neutrophil count predicts a worse outcome in ACS. In contrast, a low lymphocyte count is related to high risks of adverse outcomes and mortality in patients with ACS. The neutrophil-lymphocyte ratio (NLR), therefore, integrates for two WBC subtypes with opposite actions in terms of vascular inflammation.

Objective: Among patients with ACS in the Philippine General Hospital, we aim to determine if an elevated NLR (>6.5) taken on admission is associated with higher rates of cardiovascular events.

Methods: A prospective cohort of admitted with a diagnosis of ACS was conducted. Participants were stratified into: low to intermediate NLR (NLR <6.5) and high NLR (NLR > 6.50). The primary outcome was in-hospital mortality. Secondary outcomes include congestive heart failure (CHF), shock, re-infarction, dialysis-requiring renal failure, high-risk pneumonia, and arrhythmias.

Results: 117 patients with a mean age of 60 were included. Diagnosis on admission was unstable angina (28%), NSTEMI (40%), and STEMI (37%). Among the non-survivors, the mean NLR was significantly higher at 9.91 compared with the survivors who had a mean NLR of 5.47. Analysis of data showed that the odds of in-hospital deaths among those with a high NLR is 5.71 times higher compared to those with low-intermediate NLR [OR 5.71 (1.53–21.23, $p = 0.009$)]. A high NLR was also predictive of the development or worsening of CHF [OR 4.75], shock [OR 5.0], re-infarction [OR 6.26], and development of significant arrhythmias [OR 4.12 (1.45–11.7, $p = 0.008$)].

Conclusions: Among patients with ACS, an elevated NLR (>6.5) taken within 24 hours of presentation is a useful marker to predict in-hospital mortality, development or worsening of CHF, and development of shock, re-infarction, and arrhythmias.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC SURGERY AND ISCHEMIC HEART DISEASE

Effect of benidipine in human internal mammary artery and clinical implications

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Purpose: Graft spasm remains challenging in coronary artery bypass grafting (CABG) surgery. Calcium antagonists are commonly used in patients with coronary heart disease. Third-generation dihydropyridine calcium channel antagonist benidipine appear to have effects in addition to blockade of the L-type calcium channel. This study investigated the inhibitory effect of benidipine on the vasoconstriction induced by potassium chloride (KCl) and U46619 in human internal mammary artery (IMA) from patients undergoing CABG.

Methods: Isolated human IMA rings (n = 29, taken from 23 patients undergoing CABG) were studied in myograph in two ways: the relaxing effect of benidipine on vasoconstrictor-induced precontraction by KCl and U46619 and the depressing effect of benidipine at plasma concentrations on the contraction.

Results: Benidipine caused relaxation in KCl-contracted (85.4% ± 5.1%, n=6) and in U46619-contracted (59.8% ± 5.2%, n=8) IMA rings, with 10.2-fold higher potency to KCl than to U46619 (effective concentration causing 50% of maximal response [EC50]: -8.94 ± 1.45 vs. -7.93 ± 1.6 log M, p<0.01). Pretreatment of IMA with plasma concentrations of benidipine (-7.92 log M) significantly depressed subsequent contraction to KCl (from 14.07 ± 1.57mN to 8.11 ± 2.9 mN, n=5, p< 0.01).

Conclusion: We conclude that in human IMA, benidipine has a potent inhibitory effect on the vasoconstriction mediated by a variety of vasoconstrictors. Thus, use of benidipine in CABG patients is favored for treating and preventing graft spasm.

Perioperative management and outcome in cardiac surgery for end stage renal failure patients

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Introduction: Despite certain number of independent risk factors are common to both heart failure and end stage kidney failure, the combination of these diseases amplifies the risk of poor outcomes when these patients undergo cardiac surgery. The objective of this study was to evaluate the effect of chronic preoperative hemodialysis for end stage renal failure in patients undergoing cardiac surgery.

Methods: A retrospective review of end stage renal failure patients undergoing open heart surgery (including most commonly coronary artery bypass grafting and valve surgery as well as sporadic cases of aortic dissection and cardiac myxoma) between year 2000 to 2013 was performed. The outcomes were evaluated using Student's T test was used for linear data, Chi Square and Fisher's Exact Test for categorical data, multi-variate analysis for independent risk factors affecting survival and life table using actuarial survival and Log Rank test for long term survival analysis.

Results: Total 100 patients were included in this study. 68 patients underwent coronary artery bypass grafting, among which 3 of them had concomitant aortic valve replacement. 28 patients received valve surgery, 3 patients with aortic surgery for acute dissection and 1 patient with left atrial myxoma excision. The mean calculated EuroSCORE for these patients was 7.1 +/- 4.4 (Range 2-18), which warranted them to fall into the high risk group (EuroSCORE >6%). The in-patient mortality rate was 17%. Altogether there were 40 late death and the 5 year and 10 year survival was 18±4% [24 at risk] & 3±1% [5 at risk] respectively.

Conclusion: Preoperative diagnosis of end stage renal failure indicates an adverse effect in both the early and late outcome for open cardiac surgery. Early referral to surgery may improve surgical outcome, however long term survival in these patients remain poor.

Case report: a unique severe CAD related syncope

Yi Yang

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Case: Man, 76 years old.

Chief complaint: lost of consciousness suddenly 5 days ago.

Present history: 5 days ago, the patient lost consciousness and fell down onto the sofa suddenly without any precipitating factors, no palpitation, no beforehand chest pain, no tongue or lip biting or other body injury, no twitching, no incontinence, no limb numbness or weakness after waking up. He regained consciousness 5 minutes later by himself without any intervention, no profuse sweating. Physical examination at that time: BP: 178/103mmHg, heart rate: 160bpm (not so reliable). No recurrence of similar symptoms later. He kept normal appetite, sleep and stool.

Past history:

Be in "orthostatic hypotension" for 15 years, be suspected to have Shy - Drager syndrome, but no evidence.

Said to have unknown "arrhythmia" for more than 10 years, without systematic diagnosis and treatment.

Cerebral infarction history of 13 years, multi-episode TIA, water choking cough after cerebral infarction, walking unsteadily.

Be in hyperthyroidism for 20 years, supposed to have been cured.

Be in type 2 diabetes for 3 years, oral acarbose tablets were used in the treatment.

Used to smoke for more than 30 years, average 10 pieces per day, but had ceased smoking for 13 years.

Drink occasionally.

Without any familial hereditary disease.

Positive physical examination:

Height: 180 cm Weight: 180 kg BMI: 29 kg/m²

Blood pressure: 135/90 mmHg (left arm), 160/100 mmHg (right arm), Slurred speech, tongue to right (post cerebral infarction residual).

Laboratory Data:

Blood test: WBC 8.6×10⁹ NE% 46.54% HGB 145g/L PLT 191×10⁹

Urinalysis: microscopy WBC Nearly full view /HP RBC 4-6/HP

Stool routine: normal

Biochemical test: K: 4.10mmol/L

Blood sugar: 8.27mmol/L

Hepatic and renal function: normal, CK, CK-MB: normal.

TG: 3.44mmol/L, TC: 5.00mmol/L, LDL-C: 3.27mmol/L, HDL-C: 0.77mmol/L.

Coagulation function normal, BNP: 91.5pg/ml, TNT 0.14ng/ml (the second day in hospital) <0.05ng/ml the third day in hospital HbA1c 8.3%.

ECG: Sinus rhythm HR 80bpm, II, III, aVF lead qR, V1 - V6 lead T wave flat.

Diagnosis: Cardiac syncope? TIA? Orthostatic hypotension? Epileptic seizure

ECHO: Segmental ventricular wall motion abnormalities SUGGESTING CAD is a possible diagnosis

MRI: Bilateral cerebellum hemisphere (right), the right Angle of cerebellum and brainstem multiple infarcts, Most formation softening oven, bilateral cerebellum, pons and medulla oblongata ischemic lesions (showed past multiple episode of brain infarction)

TCD: slowed cerebral artery blood flow

Luckily, the patient was wearing a HOLTER while in the hospital when syncope occurred again. HOLTER showed Torsades de pointes ventricular tachycardia for about 20 seconds, converting to sinus rhythm spontaneously. Coronary angiography showed: very severe triple vessel disease.

LADp 90% segmental stenosis, LADd 50% Diffuse stenosis, LCXp50%segmental stenosis, LCXm-p50% Diffuse stenosis, RCAM occlusion 100%, 1 DES were implanted in LADp.

The patient received standard secondary prevention of coronary heart disease after PCI. Half a year of FU, syncope not reoccurred.

Discussion: The patient has no history of coronary heart disease, no angina episode, but he had experienced "orthostatic hypotension" and multi-episode of TIA. During the syncope, he had no obvious accompanied symptoms, the evidence of fast heart rate did not support bradycardia Arrhythmia. The admission ECG and UCG indicate the patient have asymptomatic myocardial infarction which was still not sure for the cardiac syncope. Finally, he just wear HOLTER to diagnosis with syncope. To sum up the above analysis, we considered the direct cause of syncope attack is torsades de pointes ventricular tachycardia (relatively rare).

Half a year of FU, syncope not reoccurred. We make sure of the reasons for Torsades de pointes ventricular tachycardia is closely related to severe myocardial ischemia (LAD is severe stenosis).

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC ARRHYTHMIA, EPS AND PACING

Resting heart rate predicts new-onset heart failure among patients with atherosclerotic disease and/or diabetes: implications of chronic hyperglycemia and cardiac autonomic dysregulation

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Background: Resting heart rate (HR) is recently found to predict adverse cardiovascular events. However, the role of resting HR in new-onset heart failure (HF) among high-risk cardiovascular/diabetic patients in relation to hyperglycemia and cardiac autonomic dysregulation was not known.

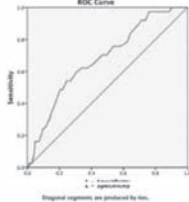
Methods: We studied 550 high-risk patients with prior coronary artery disease (CAD), ischemic stroke and/or type 2 diabetes in a prospective clinical cohort. Baseline electrocardiogram, carotid intima-media thickness (IMT) and pulse wave velocity (PWV) were performed. New-onset HF was ascertained from the computerized medical record system over a 5-year follow-up period. Heart rate-PR interval dissociation was defined as counter-physiological co-occurrence of increased PR interval (> median; 173.3ms) and increased resting HR (>median; 64.4 BPM) as a marker of autonomic dysregulation.

Results: 37 patients (6.7%) developed new-onset HF over 63.0 +/- 10.9 months of follow-up. Baseline resting HR was associated with increased mean maximum carotid IMT (R=0.20, P<0.001) and brachial-ankle PWV (R=0.30, P<0.001), and was strongly associated with new-onset HF at follow-up (P<0.001). C-statistic for prediction of new-onset HF by resting HR was 0.68 (Figure 1, P<0.001). Adjusted for potential confounders, cox regression analysis showed that resting HR>75bpm was independently predictive of new-onset HF (HR=3.35, 95%CI: 1.24 - 9.04, P=0.017).

Furthermore, baseline resting HR was associated with HbA1c (R=0.11, P=0.012). Mean resting HR was increased in patients with HbA1c >7 (66.2 +/- 15.0 versus 63.2 +/- 14.0, P=0.022). Adjusted for potential confounders (age, gender, history of CAD/ischemic stroke, systolic/diastolic blood pressure, use of cardiovascular medications, physical activity, BMI), HbA1c remained independently associated with increased resting HR >75 bpm (OR=1.18, 95%CI 1.003-1.396, P=0.046). Moreover, the normal inverse relation between PR interval and resting HR is lost in this group of high-risk cardiac patients (R=-0.03, P=0.46). Heart rate-PR interval dissociation was significantly associated with HbA1c>7 (28% versus 17%, P=0.006).

Conclusion: Resting HR is an important predictor of new-onset HF in cardiovascular and/or diabetes patients. Chronic hyperglycemia is associated with increased resting HR and counter-physiological dissociation of resting HR and PR interval, which are features of autonomic dysfunction and may provide mechanistic explanation to observed adverse cardiac outcomes.

Figure 1:



Causes of sudden cardiac death among young victims – a five-year review of autopsies done in Hong Kong

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Background and Objective: Sudden cardiac death (SCD) in young people is rare but has significant impact on the community. We sought to study the causes of SCD in victims aged 5-40 years in Hong Kong.

Methods: A review of all autopsies conducted in the years 2008-2012 (inclusive) at 3 local public mortuaries of Forensic Pathology Service which serves over 7 million people in Hong Kong.

Results: There were 17187 autopsies performed during the study period. Of these 2748 (16%) deaths occurred in people aged 5-40 years. Among them 289 (69%) were classified as SCD and 131 (31%) as non-cardiac sudden death (NCSD). 91% of SCD victims were Chinese. The most common cause of SCD was coronary artery disease (CAD, 35%). 25% of SCD was presumed to be due to primary arrhythmogenic disorders as no structural heart disease was found. Other cardiac causes were dilated cardiomyopathy (9%), aortic dissection (6%), myocarditis (6%), hypertrophic cardiomyopathy (5%), arrhythmogenic right ventricular cardiomyopathy (2%) and other structural heart diseases (9%). 90% of SCD due to CAD occurred in males and 82% are in the age group 30-40 years. Physical exercise as a trigger of SCD was documented in only 12 (4%) of cases. The most common causes of NCSD were intracerebral haemorrhage (26%), sepsis (17%), pulmonary embolism (11%) and epilepsy (9%).

Conclusion: CAD is the most common cause of SCD in the young in Hong Kong. Presumed sudden primary arrhythmogenic disorders could be found in one quarter of the victims. Future study on young SCD due to arrhythmogenic disorders by molecular autopsy is warranted to characterize their underlying pathogenic genetic defects and facilitate mutation-specific family screening.

Fever and physical exercise unmasking type 1 Brugada ECG in a cohort of Chinese patients with Brugada syndrome

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Background and Objective: Brugada syndrome (BrS) is an inherited cardiac ion channelopathy characterized by ST-segment elevation in VI-V3. Fever and less commonly physical exercise may augment the Brugada ECG pattern and are proarrhythmic in BrS. We reported the experience of a local referral centre for BrS in Hong Kong.

Methods: ECG, clinical and genetic data of BrS patients in our database were reviewed and analysed.

Results: Of the 110 BrS patients (all Chinese), ten (All males, mean age +/- SD 53.3 +/- 18.9 years) had their Type I Brugada ECG unmasked by fever. Two patients presented with syncope while the rest were asymptomatic. There was no VT/VF documented during fever. When fever subsided no more Type I Brugada ECG was observed. There was a mean drop of 3.6 mm in J point elevation on V2 and mean heart rate dropped from 104 bpm to 76 bpm. Six patients had genetic test done and 1 had SCN5A mutation found. Twenty of the 110 BrS patients had undergone Treadmill exercise test (TET). Two had Type I Brugada ECG unmasked and another patient had NSVT during TET. Among the three patients one had SCN5A mutation and one patient who died of sudden nocturnal death had a novel CACNA1C mutation found on molecular autopsy.

Conclusion: Fever and physical exercise could augment ST-segment elevation in BrS and are potentially proarrhythmic. While all BrS patients should treat fever promptly to minimize risk of arrhythmic death, those with Brugada ECG augmented by TET should avoid strenuous physical exercise and competitive sports.

Utility of saline contrast echocardiography in diagnosis for cyanotic children of uncertain causes

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Objective: To investigate the utility of agitated saline studies during transthoracic echocardiography (TTE) in diagnosis for cyanotic children of uncertain causes, in order to improve the accuracy of diagnosis.

Methods: Two special cases were studied, who admitted to our department for cyanosis during July 2011 to December 2013. Routine examinations and lab studies, such as common TTE, cardiac CT-scan, chest X-ray, arterial blood-gas analysis, were applied, which pointed to pulmonary arterial-venous shunt. They both accepted an agitated saline study during TTE and finally a pulmonary arterial angiogram as well.

Results: Both saline contrast echocardiography showed positive results. Meanwhile, pulmonary arterial angiograms show different kinds of pulmonary arterial-venous fistula (PAVF). One case was diagnosed of a diffuse PAVF caused by a rare congenital vascular malformation named Abernethy malformation (Type Ib), which was so-called congenital extrahepatic portosystemic shunt. The other case was diagnosed of multiple focal PAVF in right-inferior lung, and an interventional therapy was operated.

Conclusion: The easy-operating saline contrast echocardiography is sensitive to pulmonary arterial-venous fistula cases, and this technique may shorten the time of diagnosis for cyanotic cases of uncertain causes, in order to speed up appropriated diagnosis and therapy and avoid further complications.

Key words: Saline contrast echocardiography, Cyanosis, Children, Ulmonary arterial-venous fistula.

ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC ARRHYTHMIA, EPS AND PACING

Reengineer to patient-centred care: cardiac nurse pacemaker clinic in a regional hospital

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The rapid growth of pacemaker population has greatly challenged capacity of our cardiology clinic. Intensive follow-up with appropriate counseling in first year post-implantation is particularly important for its unstable parameters, as well as its psychological impact on living a device that may restrict patient's social life for years.

Objective: 1) To improve quality of care in pacemaker follow-up during acute and early post-implantation phase; 2) To alleviate doctors' workload.

Methods: Reengineer our cardiac nurse pacemaker clinic and intermittent follow-up with doctor's clinic in the first year after implantation. This nurse clinic provides one-stop comprehensive services to device patient, including 1) monitor & optimize pacemaker setting; 2) wound care; 3) education & counseling on living with device; 4) early complications monitoring.

Results: From November 2013 to February 2014, there were total 377 nurse clinic attendances. All new implanted pacemakers were monitored and optimized by trained Cardiac nurse, no adverse effect is noticed. Fifty-eight device wounds have been assessed, 14 with mild complications like gaping (n=6); hematoma (n=6) and with bleeding/discharge (n=2). Most healed or subsided after management in nurse clinic and only one is admitted for infection. For early complication monitoring, 4 with raised pacing thresholds required frequent monitoring or investigation by Cardiologist. Twenty with over-avoidance in shoulder movement during acute lead fixation phase were observed and all improved after counseling. One with sign of frozen shoulder was referred for physiotherapy and two referred to occupational-therapy for hypertrophic scar management. Patient obtained education and counseling on living with device in clinic and their knowledge score improved from average 4.74/9 to 8.67/9 afterwards and sustained at 7.85/9 in a two-month evaluation. Self-care competence (using 5-points scale) average scored at 4.75, and overall patient satisfaction were high at average 4.94.

Conclusion: Our cardiac nurse pacemaker clinic not only empowered patient self-care ability and provide quality post-implantation care, it also alleviated 50% of doctors' workload in first year cardiac devices follow-up.

Left ventricular lead positioning in cardiac resynchronization therapy: an innovative retrograde approach without using snare

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Implantation of the left ventricular pacing lead is one of the important determinants of successful cardiac resynchronization therapy for heart failure. This case describes lead placement in anterolateral branch of coronary sinus (CS), which was not visible in balloon occlusion venography, using collateral route blindly and externalization via CS ostium with the help of micro-guide catheter. This innovative retrograde approach obviated the need for snare technique to capture the distal end of the wire. What's New? Retrograde approach for implantation of left ventricular pacing lead in anterolateral branch of coronary sinus using collaterals and externalization via CS ostium through one delivery sheath with the support commonly available micro-guide catheter. This new technique obviated the need for snare and being reported for the first time.

Usefulness of pulmonary arterial systolic pressure and E/e' in the evaluation of left ventricular filling pressures with atrial fibrillation

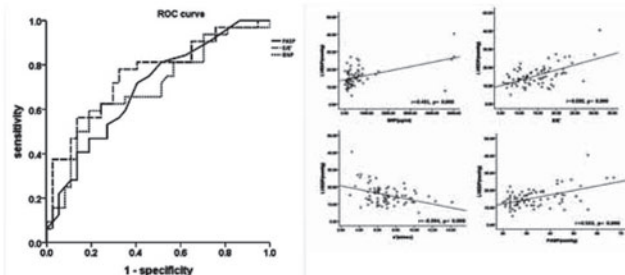
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Introduction: Echocardiographic assessments including E/e' and BNP are good predictors of elevated left ventricular filling pressure during sinus rhythm. However, the evaluation of LV filling pressure using classical echocardiographic assessment has been challenging in the setting of AF. The aim of this study was to investigate the methods for predicting LV filling pressure in the patients with chronic AF.

Methods: Clinical data, echocardiography, and brain natriuretic peptide (BNP) levels were obtained in 82 patients with chronic AF who were undergoing diagnostic left-heart catheterization. LV end-diastolic filling pressure (LVEDP) and standard echocardiographic measurements including pulmonary arterial systolic pressure (PASP) were measured. Blood samples were taken for serum BNP measurements with 24 hours of the echocardiographic examination.

Results: E/e' (r = 0.580, P<0.001), PASP (r=0.503, P<0.001) and BNP (r=0.481, P<0.001) correlated well with LVEDP. Using receiver operating characteristic analysis, the optimal cut-off for E/e' was 14 (sensitivity, 72%; specificity, 70%) and BNP was 315 pg/ml (sensitivity, 66%; specificity, 65%) to predict > 15 mmHg LVEDP. Also PASP>31 mmHg predicted elevated LVEDP (>15 mmHg) with a sensitivity of 66% and a specificity of 68%.



Conclusion: The E/e', BNP and PASP were well correlated with LVEDP in patients with AF. PASP>31 mmHg, BNP>315 pg/ml and E/e' >14 may suggest elevated LVEDP (>15 mmHg) in patients with chronic AF.

Assessment of left ventricle local rotation characteristics in healthy subjects using 2D speckle tracking imaging

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Objective: To assess left ventricular global twist and local rotation deformation in healthy subjects using two-dimensional speckle tracking imaging (2D-STI).

Methods: 31 healthy volunteers were obtained dynamic parasternal short-axis images at left ventricular basal, papillary, and apical levels. From each short-axis level three consecutive end-expiration cardiac cycles were acquired and transferred to a QLAB 7.0 workstation for off-line analysis. The regional rotation of 12 tracking regions at left ventricular basal, papillary levels, the regional rotation of 12 tracing points at left ventricular apical level and the global rotation at the three levels were exported. The peak left ventricular twist/local rotation and the time to peak twist/rotation were calculated and analyzed.

Results: 1) Left ventricle performed a counterclockwise twist in healthy adult. The peaks twist (8.68°±2.27°) developed near the end of systole. There was no significant difference at the time to peak rotation (347.56±47.86ms vs 351.95±40.84ms, P> 0.05) between basal and apical plane. At the basal plane, the anterior wall rotated counterclockwise (5.22°±2.98), while the other segments rotated clockwise. At the papillary plane, the anterior and lateral walls rotated counterclockwise. The peak regional rotation of each segment between two corresponding levels presented great difference except anteroseptal wall (P<0.05). The time to peak regional rotation had no difference except lateral wall (P>0.05). Left ventricular inferior and posteroseptal wall showed stronger rotation than other segments both at basal and the papillary plane (P<0.05).

Conclusion: Left ventricular inferior and posteroseptal wall played an important role in the cardiac function. 2D-STI could be used to describe the local deformation distribution of left ventricular myocardium.

ABSTRACTS

Abstracts for Free Paper Session:

HEART FAILURE AND MISCELLANEOUS

Acquired arteriovenous fistula of the right common iliac artery and left common iliac vein and bilateral lower extremity deep venous thrombosis in a woman presenting as high output heart failure

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Acquired intra-abdominal arteriovenous fistula (AVF) is a rare disorder where the communication most commonly occurs between abdominal aorta and inferior vena cava. Iliioiliac AVF has been reported previously, but is exceedingly rare. We present a case of acquired arteriovenous fistula of the right common iliac artery and left common iliac vein with extensive collateralization (iliioiliac AVF).

Case: A 36-year old female presented with dyspnea and abdominal enlargement. Eighteen years prior, she sustained a gunshot wound through the abdomen and underwent surgical exploration, recovery was uneventful. Over the past five years, she had progressive heart failure symptoms associated with abdominal enlargement and intermittent edema of both lower extremities. She had a displaced apex beat, a right and left ventricular heave, and a systolic murmur at the 4th intercostal space left parasternal border. CT aortogram revealed an arteriovenous fistula of the right common iliac artery and left common iliac vein with extensive collateralization. Venous duplex scan showed deep venous thrombosis of both lower extremities. The final diagnosis was high output heart failure secondary to iliioiliac fistula (right common iliac artery and left common iliac vein), right common iliac artery aneurysm and bilateral DVT. Surgical repair was strongly advised however the patient refused surgery.

Conclusion: We describe a case of progressively deteriorating hyperdynamic heart failure due to the chronic, sustained volume overload caused by a traumatic AVF - specifically connecting right common iliac artery and left common iliac vein. A thorough history and a physical examination are still indispensable tools that aid the physician in diagnosing such an uncommon condition. In conclusion, it is prudent to include AVFs as part of the differentials of patients with a history of penetrating abdominal injury or surgery presenting with signs and symptoms of progressive cardiac decompensation, abdominal bruits, and other signs of high output heart failure.

Merit of ginseng in the treatment of heart failure in type 1-like diabetic rats

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The present study investigated the merit of ginseng in the improvement of heart failure in diabetic rats and the role of peroxisome proliferator-activated receptors δ (PPAR δ). We used streptozotocin-induced diabetic rat (STZ-rat) to screen the effects of ginseng on cardiac performance and PPAR δ expression. Changes of body weight, water intake, and food intake were compared in three groups of age-matched rats; the normal control (Wistar rats) received vehicle, STZ-rats received vehicle and ginseng-treated STZ-rats. We also determined cardiac performances in addition to blood glucose level in these animals. The protein levels of PPAR δ in hearts were identified using Western blotting analysis. In STZ-rats, cardiac performances were decreased but the food intake, water intake, and blood glucose were higher than the vehicle-treated control. After a 7-day treatment of ginseng in STZ-rats, cardiac output was markedly enhanced without changes in diabetic parameters. This treatment with ginseng also increased the PPAR δ expression in hearts of STZ-rats. The related signal of cardiac contractility, troponin I phosphorylation, was also raised. Ginseng-induced increasing of cardiac output was reversed by the co-treatment with PPAR δ antagonist GSK0660. Thus, we suggest that ginseng could improve heart failure through the increased PPAR δ expression in STZ-rats.

Association between polymorphisms and haplotypes of peroxisome proliferators activated-receptor α gene and the level of lipoprotein (a)

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³Jiangsu Provincial Center for Disease Control and Prevention, Jiangsu, China

Objective: The aim of this study was to investigate the association between three single-nucleotide polymorphisms (SNP) of in the peroxisome proliferator-activated receptor (PPAR) α gene and the level of lipoprotein (a) (Lp(a)).

Methods: Participants were recruited with the framework of a cohort populations survey from the PMMJS (Prevention of Multiple Metabolic Disorders and MS in Jiangsu Province) which was conducted in the urban community of Jiangsu province from 1999 to 2007. 644 subjects (234 males, 410 females) were randomly selected and genotyped for three polymorphisms used as genetic marker for PPAR α gene (rs1800206; rs4253778 and rs135539). Individual polymorphism and haplotype data were available for analysis. χ^2 test was used to determine whether the whole population was in Hardy-Weinberg genetic equilibrium. Linear regression models was used to analyze the association between SNPs in PPAR α gene and the level of Lp(a). The association between PPAR α haplotypes and serum Lp(a) levels were analyzed under the SNPstats software.

Results: In the dominant model, after sex, age, smoking, alcohol and BMI were adjusted, the presence of the V162 allele of L162V was associated with a high level of Lp(a) (mean difference was 57.70mg/L, 95%CI 32.03-83.37mg/L, $p < 0.001$). Haplotype analysis revealed that A-G-V and C-G-V haplotype (established by 1A>C, 7G>C L162V) significantly associated with a higher level of Lp(a) ($p = 0.012$ and 0.0097).

Conclusion: These results may help to clarify the role of PPAR α gene in regulation of Lp(a) and the evaluation of its polymorphisms and haplotypes as being characterized as genetic factors for Lp(a).

Funding: Scientific Research Fund of the National Ministry of Health (WKJ 2004-2-014).

The relationship between gene-gene interactions of peroxisome proliferator-activated receptors and the level of apoB in plasma

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Objective: We are aim to study the association of ten single nucleotide polymorphisms (SNPs) in the peroxisome proliferator-activated receptor (α, δ, γ) with the level of apoB in plasma and find whether there is a gene-gene interaction among the 10 SNPs we selected.

Methods: Participants were all recruited from the framework of the PMMJS (Prevention of Multiple Metabolic Disorders and Metabolic Syndrome in Jiangsu Province). 630 members of all were selected from the population as objects at random. In this research, we have chosen ten SNPs (rs135539, rs4253778, rs1800206, rs2016520, rs9794, rs10865710, rs1805192, rs709158, rs3856806, rs4684847) from the HapMap database to do the research, which are located in genes that encode PPAR α , PPAR δ and PPAR γ . Generalized Multifactor Dimensionality Reduction (GMDR) was used for detecting Gene-Gene Interactions.

Results: The results showed that 3 SNPs (rs135539, rs1800206, rs4253778) of PPAR α were significantly associated with the level of apoB. rs1800206 V allele carriers (LV+VV) had a significantly higher level of apoB than LL homozygotes [Mean difference and 95%CI were 0.11 (0.06-0.15), $P < 0.001$]; rs135539 C allele carriers (AC+CC) had a significantly higher level of apoB than AA homozygotes [Mean difference and 95%CI were 0.12(0.08-0.16), $P < 0.001$]; rs4253778 allele carriers (GC+CC) had a significantly lower level of apoB than GG homozygotes [Mean difference and 95%CI were -0.05 (-0.10-0.01), $P = 0.028$]. In contrast, we didn't discover that other SNPs of PPARs were associated with the level of apoB. After adjusting the factors as age, sex, smoking, drinking, BMI and WC, the outcome of GMDR revealed that the three-dimensional model was the best when the level of apoB was chosen as outcome (Prediction accuracy was 0.6617, cross-validation consistency was 10/10, $P = 0.0010$), which involves rs135539 (Intron 1 A>C), rs1800206 (L162V) and rs3856806 (C161T). Besides the model, the 2, 4, 5 and 9-dimensional model were also statistically significant.

Conclusion: SNPs, including rs135539, rs1800206, rs4253778 were significantly associated with plasma apoB levels, there were gene-gene interactions between multiple SNPs of PPAR $\alpha/\beta/\gamma$.

ABSTRACTS

Abstracts for Free Paper Session:

HEART FAILURE AND MISCELLANEOUS

Study on the association of peroxisome proliferator-activated receptor- α/γ gene-gene interactions and the apolipoprotein (apo) A-1/ apoB-100 ratio levelBo Hai¹, Zhirong Guo¹, Ming Wu², Zheng Yuan Zhou³, Qirong Zhu¹, Mm Liu¹, Huijian Xie¹, Wei Fan¹, Hui Zhou¹¹Department of Epidemiology, School of Public Health, Soochow University, Jiangsu, China²Center for Disease Control and Prevention of Nanjing, Jiangsu, China³Center for Disease Control of Changshu City, Jiangsu, China**Objective:** To explore the correlation between the 8 single-nucleotide polymorphism (SNPs) of peroxisome proliferator-activated receptors- α/γ (PPAR- α/γ) and the apolipoprotein (apo) A-1/ apoB-100 ratio level, and to discuss whether there is a gene-gene interaction among this 8 SNPs of PPAR- α/γ .**Methods:** Participants were recruited within the framework of the Prevention of Multiple Metabolic Disorders and Metabolic Syndrome cohort population survey which was conducted from 1999 to 2007 in Jiangsu Province, China. A total of 630 subjects (212 males, 418 females) were selected in random, and no individuals were consanguineous. 8 SNPs (rs135539, rs4253778, rs1800206, rs10865710, rs1805192, rs709158, rs3856806 and rs4684847) in PPAR- α/γ were genotyped. SNP stats program was used to examine the association between the SNPs and apoA-1/apoB-100 ratio level. A linear regression model was used to analyze the relations between gene polymorphism and apoA-1/apoB-100 ratio level. Mean difference and 95% confident interval (95%CI) were calculated. Gene-gene interactions were explored by the method of generalized multifactor dimensionality reduction (GMDR) method.**Results:** The 8 SNPs were within Hardy-Weinberg equilibrium ($P>0.05$). The linkage analysis showed that there was no significant linkage disequilibrium between these polymorphisms (all $D'<0.75$). Single factor analysis showed that after adjusted for gender, age, smoking, alcohol consumption, high fat diet and low fiber diet, rs1800206 and rs3856806 were significantly associated with a decreased level of apoA-1/ apoB-100 ratio, the Mean difference (95%CI) were -1.21 (-1.91--0.51) and -0.76 (-1.39--0.13), respectively. While rs4253778 was significantly associated with an increased level of apoA-1/apoB-100 ratio, the Mean difference (95%CI) was 0.76 (0.04--1.48). GMDR analysis showed a significant gene-gene interaction among all the 8 SNPs that we studied (rs135539, rs4253778, rs1800206 of PPAR α , and rs10865710, rs3856806, rs709158, rs1805192, rs4684847 of PPAR γ) for a 8-dimension models ($P=0.0010$), in which prediction accuracy was 0.6145 and cross-validation consistency was 10/10.**Conclusion:** It was suggested that rs1800206, rs3856806 and rs4253778 were significantly associated with the apoA-1/apoB-100 ratio level. In addition, a gene-gene interaction on apoA-1/apoB-100 ratio level was identified among rs135539, rs4253778, rs1800206, rs10865710, rs3856806, rs709158, rs1805192 and rs4684847 ($P=0.0010$).**Beyond eNOS: novel cellular mechanisms of coronary endothelial dysfunction caused by homocysteine**Qin Yang, Xiang Chong Wang, Shun Hay Pun, Cheuk Man Yu
Division of Cardiology, Department of Medicine and Therapeutics, Institute of Vascular Medicine, Li Ka Shing Institute of Health Sciences, and Shenzhen Research Institute, The Chinese University of Hong Kong, Hong Kong**Background:** Hyperhomocysteinemia is an independent risk factor for various cardiovascular diseases such as atherosclerosis and hypertension in which endothelial dysfunction is implicated in the pathogenesis. Homocysteine-induced endothelial dysfunction is closely related to decreased bioavailability of NO, however, the mechanisms underlying the loss of NO bioavailability remain incompletely understood. It also remains unexplored whether mechanisms other than NO are involved in homocysteine-induced endothelial dysfunction.**Objective:** We investigated the role of arginase and iNOS in endothelial dysfunction caused by homocysteine with relation to NO bioavailability. Moreover, the effect of homocysteine on calcium-activated potassium channel (KCa)-endothelium-derived hyperpolarizing factor (EDHF) pathway was studied.**Methods:** Vasorelaxation was studied in a myograph and NO concentration was electrochemically measured by a NO micro sensor in porcine small coronary arteries. iNOS expression was detected by western blot. Arginase activity was determined by urea production and O₂-generation by lucigenin-enhanced chemiluminescence. KCa currents were recorded by patch-clamping in primary cultured porcine coronary endothelial cells.**Results:** Exposure to homocysteine for 24 h decreased NO production (19.63±1.80 vs. 50.66±3.22nmol/L) in coronary arteries, associated with impairment of bradykinin-induced relaxation (59.6±4.5% vs.93.1±2.0%) ($p<0.001$). Protein expression of iNOS was upregulated, and arginase activity and O₂-production were enhanced in vessels exposed to homocysteine. Pretreatment of the vessels with either iNOS or arginase inhibitor partially but significantly reversed NO production and improved endothelium-dependent relaxation (iNOS inhibition: 31.22±2.52 nmol/L and 78.9±3.2%; arginase inhibition: 29.83±2.30 nmol/L and 75.6±6.4%). The robust O₂- generation evoked by homocysteine (34.36±4.42 RLU/s/mg dry weight) was reduced by the inhibitor of iNOS (18.86±2.12 RLU/s/mg dry weight, $p<0.01$) or arginase (20.31±1.20 RLU/s/mg dry weight, $p<0.05$). Arginase activity enhanced by homocysteine (956.90±85.35 nmol Urea/min/mg protein) was normalized by inhibition of arginase (435.70±72.91 nmol Urea/min/mg protein) and iNOS (398.30±35.47 nmol Urea/min/mg protein). Homocysteine exposure attenuated the vasorelaxant response mediated by EDHF in coronary arteries that is associated with the inhibition of endothelial KCa activity (IKCa: 4.68±0.79 vs. 18.84±3.43 pA/pF; SKCa: 2.94±0.69 vs.11.33±2.39 pA/pF) ($p<0.05$).**Conclusion:** The decrease of NO bioavailability caused by homocysteine involves the activation of arginase in which iNOS plays a role. In addition to NO pathway, homocysteine impairs coronary endothelial function through KCa-EDHF mechanism.**Funding:** Supported by GRF CUHK4789/09M & 4774/12M, CUHK direct grant 4054015, and NSFC 81200123.**PHD2-shRNA interference by ultrasound targeted microbubble destruction facilitates angiogenesis and enhances myocardial function in ischemic/reperfusion injury in rats**Li Zhang, Zheng Xing Sun, Jing Wang, Xing Fang Wang, Ming Xing Xie
Department of Ultrasound, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, China**Purpose:** Hypoxia-inducible factor-1 α (HIF-1 α), a transcription factor, is naturally degraded by prolyl hydroxylase-2 (PHD2). During ischemic and reperfusion injury, upregulation of HIF-1 α activates downstream angiogenic genes. We hypothesize inhibition of HIF-1 degradation via small hairpin RNA (shRNA) knockdown of PHD2 using ultrasound targeted microbubble destruction (UTMD) of cationic lipid microbubbles (CLM) facilitates angiogenesis, improves myocardial function and provides a potential therapy for ischemic and reperfusion myocardial injury.**Methods:** PHD2-shRNA (shPHD2) and control expression vectors (shScramble) were constructed. A total of 150 rats were randomised into sham-operated control group (n=30), shPHD2 experimental group (n=60) and shScramble control group (n=60). Ligation of the left anterior descending (LAD) artery was performed in rats. Subsequently, shPHD2/CLM and shScramble/CLM were injected intramyocardially at peri-infarct zone and ultrasonic radiation was used (2.0W/cm, 3 min, 20% DC, 1 MHz) epicardially or transthoracically. Echocardiography was performed to evaluate left ventricular ejection fraction (LVEF) before operation (Pre-op) and 7, 14, and 28 days after surgery. Masson staining combined with computed morphometry were employed to evaluate the collagen volume fraction (CVF), perivascular circumferential area (PVCA), and capillary density was detected by CD34 protein expressions in the left ventricular tissue. Protein and mRNA expressions of PHD2, HIF1 α were investigated by immunohistochemistry and its downstream angiogenesis factor of vascular endothelial growth factor (VEGF), basic fibroblast growth factor (bFGF) and transforming growth factor β typ (TGF β) mRNA expression were investigated by RT-PCR.**Results:** Compared with control groups (Sham and shScramble rats), there was significant decreased in EF in the study (shPHD2) at seven days, which recovered at 14 and 28 days after LAD ligation; but there was a much more pronounced decreased in EF for the shScramble rats at 7, 14, and 28 days, which did not recover after 28 days (Figure1). Compared with shScramble control group, CVF was decrease at seven days (4.81%±0.8 vs 3.9%±0.68), 14 days (6.5%±0.78 vs 4.2%±0.69) and 28 days (8.2%±0.7 vs 4.25%±0.58) in shPHD2 group; PCVA was also decrease at seven days (0.45%±0.14 vs 0.52%±0.13), 14 days (0.79%±0.24 vs 0.69%±0.21) and 28 days (0.94%±0.25 vs 0.69%±0.23) in shPHD2 group. A significant reduction in capillary density within the infarcted area was noted in shPHD2 group when compared with the control shScramble group (643.6±170.5/mm² vs 1908.7±353.4/mm²). Immunohistochemistry explained hearts also confirmed that the group had significantly higher levels of HIF1 α expressions. In order to verify the HIF-1 α expression is induced by the shRNA silence PHD2 gene, RT-PCR results further confirmed that after shPHD2 transfection treatment, the expression on the PHD2 mRNA reduced. However, the expression of HIF-1 α and its downstream 3 angiogenesis-related expression gene significantly increased comparing with shScramble group ($p<0.05$).**Conclusions:** Inhibition of PHD2 by shRNA led to significant improvement in angiogenesis and contractility in myocardial ischemic heart disease in rats.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

Clinical follow-up study of coronary artery aneurysms caused by clopidogrel in children with Kawasaki disease

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Objective: To evaluate the clinical efficacy and safety of low-dose aspirin with clopidogrel treating acute Kawasaki disease in children caused by coronary artery aneurysms.

Methods: Using low-dose aspirin with clopidogrel to treat 48 cases coronary artery aneurysms caused by Kawasaki disease (male:female = 41:7, age of onset was from February to 7 years old, average 2.07 ± 1.86 years old. 11 cases with giant coronary artery aneurysms, 29 cases with moderate coronary artery aneurysms, 8 cases with small coronary artery aneurysms. The first dose of clopidogrel was from March to 12.5 years, median age 12 months, the average weight of 11.99 kg, the median weight 12 kg, the dose was 1 mg/kg/day, duration of treatment from January to 48 months, with a median of 6 months, 48 patients were taking aspirin combined 3 – 5 mg/kg/day, reviewed every three months, using echocardiography, electrocardiogram, cardiac CT, coronary angiography and clinical manifestations of self-control assessment studies, efficacy, safety and compliance, analysis of efficacy and adverse events.

Results: 17 cases were cured in 48 cases, 28 cases improved, 3 cases invalid, the total effective rate was 93.75%, the cure rate was 35.42%, one giant coronary artery aneurysms case was cured in 11, 9 cases improved (including 2 cases back to the small aneurysms, 2 cases back to the moderate aneurysms, 2 cases back to the dilation, 3 cases still bulky, but has narrowed before treatment), effective 10/11, 1 case invalid accounts for 1/11. 11 cases were cured in 29 cases secondary aneurysms, 16 cases improved, the total efficiency was 93.10%, the cure rate is 37.93%, improvement in 16 patients recovered five cases of coronary artery dilation, one case of recovery for small coronary artery aneurysms, 10 cases remained moderate coronary artery aneurysms, however, the aneurysms has narrowed over the medication, no new thrombosis, 2 cases invalid in 29 cases. 5 cases was cured in 8 cases, 3 cases improved, efficient 8/8, 48 patients were not the emergence of new coronary thrombosis, blood clots original shrink or fade during treatment, there are 3 cases of skin ecchymosis, 1 patient had epistaxis, adverse events rate was 8.33%.

Conclusion: The clopidogrel treated children with coronary aneurysms caused by Kawasaki disease, which can be well tolerated, and fewer side effects, efficacy satisfactory.

Giant aortic isthmus aneurysm accompanied with cardiac defects: a case report

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Aortic aneurysms are extremely rare in infants and children, and are mostly associated with congenital cardiac or aortic malformations, systemic diseases, connective tissue disorders, or inflammatory diseases. We present a case of giant aortic isthmus aneurysm accompanied with cardiac defects in a 49-day-old infant girl. Her admitting laboratory results including complete blood count, electrolytes, blood urea nitrogen, and creatinine were normal. Blood culture, serology, and rheumatoid factor were negative. The electrocardiography was normal. The chest roentgenogram showed a widened mediastinum. A transthoracic two-dimensional echocardiography showed a small hypertrophied left ventricle and a giant aortic isthmus aneurysm with a maximum diameter of 30 mm. In addition, a patent ductus arteriosus and a perimembranous ventricular septal defect were visualized. The aortic valve was normal. No evidence of coarctation of the thoracic aorta was present. A angiographic computed tomographic scan with 3-dimensional reconstruction demonstrated a 23 mm×31 mm sac-like aneurysm arising from left posterolateral of the aortic isthmus. The aneurysm measured 23 mm in maximal diameter and 31 cm in length. No evidence of coarctation of the aorta was present. No other arterial abnormalities were identified in the chest. The patient underwent resection the aortic isthmus aneurysm and ductus arteriosus, reconstruction the aorta with a direct aorto-aortic anastomosis without prosthetic interposition, and repairment of ventricular septal defect. The postoperative course was unremarkable. Results of duplex ultrasound flow studies remained excellent at 6-month follow-up.

Clinical study of prenatal trans-placental digoxin therapy for fetal heart failure

Kaiyu Zhou, Yimin Hua

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Objective: Study the clinical efficacy and safety of transplacental digoxin therapy for fetal heart failure. Investigate the evaluation and treatment guiding value of cardiovascular profile score (CVPS) and myocardial performance index (Tei index) on fetal heart failure.

Methods: According to the research protocol, with written informed consent, fetal heart failure cases, diagnosed in West China Second University Hospital of Sichuan University during May 2008 to December 2013, were enrolled in this case-control study. According to the prospective parent's opinions, the included subjects were divided into digoxin treatment group (Dig group) and control group (Con group). To dig group, transplacental digoxin therapy was preformed; whereas the Con group only received short-term clinical observation. During the clinical course, fetal CVPS and ventricular Tei index were dynamic monitored, pregnant outcomes were observed and recorded. A number of healthy pregnant women and fetuses were enrolled as normal control group, who were registered in West China second university hospital for their routine antenatal care, the fetal CVPS and right ventricular Tei index were dynamic measured and recorded at the time points of 20, 24, 28, 32, 36 gestational weeks and just before delivery.

Results: 1) Fourteen cases of fetal heart failure were enrolled in Dig group, including 5 cases of fetal supra-ventricular tachycardia (SVT), 5 cases of fetal atrial flutter (AF), 3 cases of fetal anemia (MA) and 1 case of fetal dilated cardiomyopathy (DCM). After a consultation the individual protocol of transplacental digoxin therapy was determined. Fetal heart failure was gradually controlled in AF, SVT and MA fetuses with transplacental digoxin therapy. These cases achieved uneventful post-therapy pregnancy and full-term delivery. CVPS increased gradually, at or near the 10 points, left and right ventricular Tei index decreased gradually, closed to normal range. 10 to 55 months follow-ups have been finished, evaluation from Bayley Scale of Infant Development BSID revealed the normal growth and development of physique and mentality in all the enrolled children. 2) Twelve cases of fetal heart failure cases were enrolled in Con group, including 5 AF, 4 SVT, 2 MA and 1 case of fetal cardiomyopathy. Among these cases, 2 case of SVT and 1 case of AF were observed spontaneously converting to sinus rhythm for 5 days and 7 days observation respectively, and then they were transferred into digoxin group and received transplacental digoxin therapy. The other cases manifested as gradually decreased CVPS and increased Tei index, and had pregnancy termination finally after short-term clinical observation. 30 healthy pregnant women and their healthy fetuses were incorporated into the normal control group. And CVPS of all fetuses at each time points were all 10 points. With the gestational age progression, fetal right ventricular Tei index decreased gradually, the value is 0.48 ± 0.05 at 20 GW and decreased to 0.38 ± 0.04 before delivery.

Conclusion: Digoxin is list in the first line medicaments and has important clinical value in clinical treatment for fetal heart failure. With the alleviating of fetal heart failure, CVPS increases gradually, and ventricular Tei index decreases, negative correlation is showed between the two parameters. CVPS and Tei index can effectively guide the prenatal transplacental digoxin therapy for fetal heart failure. Timely and effective prenatal intervention can significantly improve the prognosis of the suffered fetuses.

Study on the effects of different operation time to percutaneous balloon pulmonic valvuloplasty for critical pulmonary valve stenosis

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Objective: Investigate the effect of different operation time to percutaneous balloon pulmonic valvuloplasty (PBPV) for critical pulmonary valve stenosis (CPS).

Methods: Twenty-one infants (age ≤ 60 days at operating day) suffered from CPS, diagnosed by fetal echocardiogram and confirmed by echocardiography after birth, were enrolled in this case-control study with written informed consent during April 2007 to December 2011. In which there were 7 cases of prenatal diagnosis in our prenatal diagnosis center (prenatal group, Pre) and 14 cases of referral (Postpartum group, according to the time of operation less or more than 28 days, postpartum group was divided into two groups, postpartum group A and postpartum group B, which were named Post A and Post B). To Pre-group, the integrative interventional protocol was cautiously made by the consultative specialists, including intrauterine diagnosis, perinatal care and urgent PBPV soon after birth. To Post-group, emergency PBPV was preformed after the referral. Tei index of right ventricular and Pressure-gradient (PG) between right ventricular and pulmonary artery were measured before and at different time points with one year after PBPV.

Results: The values of SpO₂ in Pre group ranged from 82%–92% ($86.57 \pm 5.34\%$) under state of continuous intravenous infusion of alprostadil. PBPV was successfully preformed within 3–6 days after birth. The values of SpO₂ increased to $97.33 \pm 1.15\%$ post procedure. The values of PG pre- and post-procedure were 86.34 ± 11.77 mmHg and 31.43 ± 8.46 mmHg respectively. Preoperative RV Tei-index was 0.68 ± 0.05 , decreased rapidly after procedure, and recovered to normal one month after procedure. Only one case revealed restenosis seven months after procedure and repeated PBPV. 14 cases of referral (6 cases in Post A group and 8 cases in Post B group, companied with 1 and 3 cases of heart failure), the values of SpO₂ ranged from 83%–91% under state of continuous intravenous infusion of alprostadil. And the operating time was 10 – 57 days after birth. The values of SpO₂ recovered to normal post procedure, and heart failure alleviated. Increased preoperative RV pressure obviously decreased significantly post-procedure. And increased Tei-index lowered gradually, at one-year follow-up, the value of Tei-index in Post A group recovered to normal, and still higher than normal same age children in Post B group. One case revealed restenosis nine months after procedure and repeated PBPV. The hypoxic exposure time durations were (4.43 ± 0.68), (16.33 ± 4.46), (41.25 ± 9.19) d respectively, and there exist significant difference among the three groups (< 0.05).

Conclusion: To the fetuses with definitely prenatal diagnosis of critical pulmonary valve stenosis, preoperative general condition can be adjusted to more suitable for emergency operation. Early PBPV can achieve shorter hypoxic exposure and better recovery of right ventricular function post procedure. Perinatal integrated intervention for CPS can significantly improve the prognosis and quality of life in this patient population.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

Mutations on the 3' untranslated region of Hand2 mRNA in congenital heart defects

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Purpose: The basic helix-loop-helix transcription factor Hand2 plays an essential role in cardiac morphogenesis. Two microRNAs, miR-1 and miR-133, has been identified to inhibit Hand2 expression in cardiomyocytes through binding to the 3' untranslated regions (3'UTR) of Hand2 mRNA. Thus we investigated whether mutations on 3'UTR of Hand2 mRNA might play a role in the pathogenesis of congenital heart defect (CHD).

Methods: 1694 patients with all kinds of CHDs and 366 normal children were enrolled in this study. Genomic DNAs were extracted from peripheral white blood cells. Specific primers were designed to amplify the 3'UTR regions of Hand2 mRNA (nm_021973) as well as flanking areas. Direct sequencing and resequencing were performed. Mutations were confirmed through comparing with standard sequences in Genbank database. In silico analyses were first performed with RNAhybrid, PITA, and FindTar to screen the mutations. Those directly on or close to the binding sites of miR-1 and miR-133 were further investigated by dual luciferase reporter assays to demonstrate if they were able to influence the expression of Hand2 gene in vitro.

Results: 9 mutations were detected in the 3'UTR of Hand2 mRNA in CHDs. According to their positions in Genbank database (nm_021973), they were encoded as 1617G>A (rs79766724), 1727A>G, 1800G>A, 1877A>G (rs10024737), 1878T>A (rs145372456), 1982C>G, 2099T>C, 2246T>G (rs200359872), and 2267T>A. Four can be found in the dbSNP database. The other five were first reported. In silico analysis demonstrated that 1800G>A and 1617G>A are on the binding sites of miR-1 and miR-133 respectively, and 1878T>A is one base ahead of miR-1 binding site. Dual luciferase reporter assays showed that 1800G>A and 1617G>A totally abolished the inhibitory effect of miRNAs on Hand2 expression, while 1878T>A slightly impaired the inhibition of miR-1 on Hand2 expression. Clinically, 1800G>A was detected in one patient of pulmonary atresia with ventricular septal defect and not present in normal children, while 1878T>A and 1617G>A were both detected in CHDs and normal controls, with no significant difference in penetrance.

Conclusion: Mutations on the 3'UTR of Hand2 mRNA can alter the binding ability of miR-1 and miR-133, thus influence the expression level of Hand2. If such mechanism in a specific spatial and temporal pattern occurs during cardiogenesis, it might promote the pathogenesis of some CHDs. Further study is required for this hypothesis.

Pulmonary arterial hypertension is associated with altered carbamyl-phosphate synthetase I in congenital ventricular septal defect – a proteomic study

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Purpose: Pulmonary arterial hypertension (PAH), often associated with congenital heart disease with left-to-right shunt, is characterized by increased pulmonary vascular resistance and remodeling, leading to severe consequence such as right ventricular failure and death. Endogenous nitric oxide (NO) is critical for the maintenance of normal pulmonary arterial pressure and is derived from arginine supplied by the urea cycle. The rate-limiting step in the urea cycle is catalyzed by a mitochondrial enzyme, carbamoyl-phosphate synthetase I (CPSI). The present proteomic study examined the hypothesis that CPSI may be associated with the etiology or pathology of PAH.

Methods: Isobaric tag for relative and absolute quantification (iTRAQ) was used to compare protein profiles in pooled plasma samples of 20 VSD patients with PAH (VSD-PAH) and 20 normal controls. Differential proteins were selected for validation by ELISA in enlarged samples.

Results: Among more than 150 differential plasma proteins identified through iTRAQ assay, CPSI was 2-fold down-regulated in VSD-PAH. This differential protein was further validated in plasma of VSD-PAH (n=50) and normal controls (n=37) by ELISA. The plasma CPSI level in VSD-PAH was significantly lower than that in normal controls (51.4±8.9 pg/ml vs. 166.2±34.1 pg/ml, P=0.0004; un-paired t-test).

Conclusion: We have for the first time identified alterations of a mitochondrial enzyme CPSI in the plasma of patients with VSD-PAH. This may suggest that the urea cycle-arginine-NO pathway may play an important role in the development of PAH and that CPSI may be an important factor in predicting susceptibility to increased pulmonary arterial pressure. The present study provides important information for biomarkers in PAH and for possible future interventional strategy.

Hydrogen sulfide suppresses ox-LDL-stimulated monocyte chemoattractant protein-1 generation from macrophages via NF-KB pathway

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Purpose: The study was designed to examine the role of hydrogen sulfide (H₂S) in the generation of oxidized low-density lipoprotein (ox-LDL)-stimulated monocyte chemoattractant protein-1 (MCP-1) from macrophages and possible mechanisms.

Methods: THP-1 cells and RAW macrophages were pretreated with sodium hydrosulfide (NaHS), hexyl acrylate (HA) and then treated with ox-LDL. Endogenous H₂S pathway and MCP-1 generation were examined. The phosphorylation and sulphydration of nuclear factor-κB (NF-κB) p65 were detected by Western blotting. NF-κB p65 nuclear translocation was detected using confocal images. NF-κB p65 DNA binding activity was examined by electrophoretic mobility shift assay, ELISA and chromatin immunoprecipitation assay.

Results: The results showed that ox-LDL treatment downregulated the H₂S/cystathionine-β-synthase (CBS) pathway, with increased MCP-1 protein and mRNA expressions in both THP-1 cells and RAW macrophages. HA promoted ox-LDL-induced inflammation, while the H₂S donor NaHS inhibited it. NaHS markedly suppressed nuclear factor-κB (NF-κB) p65 phosphorylation, nuclear translocation, DNA binding activity and recruitment to the MCP-1 promoter in ox-LDL-treated macrophages. Furthermore, NaHS decreased the ratio of free thiol groups in p65, whereas thiol reductant DTT reversed the inhibiting effect of H₂S on the p65 DNA binding activity. Most importantly, site-specific mutation of cysteine 38 to serine in p65 abolished the effect of H₂S on the sulphydration of NF-κB and ox-LDL-induced NF-κB activation.

Conclusion: These results suggested that endogenous H₂S inhibited ox-LDL-induced macrophage inflammation by suppressing NF-κB p65 phosphorylation, nuclear translocation, DNA binding activity and recruitment to the MCP-1 promoter. The sulphydration of free thiol group on cysteine 38 in p65 served as a molecular mechanism by which H₂S inhibited NF-κB pathway activation in oxLDL-induced macrophage inflammation.

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

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Purpose: Impaired regulation of peripheral vascular resistance is considered as one of the mechanisms of postural orthostatic tachycardia syndrome (POTS). Midodrine hydrochloride, a vasoconstrictor, was reported to improve symptoms and was proven to be effective in about 70% children with POTS. This study was designed to explore the value of flow-mediated vasodilation (FMD) as a predictor of therapeutic response to midodrine hydrochloride (MD) in children with POTS.

Methods: One hundred and eight children diagnosed as POTS by head-up test (HUT) or head-up tilt test (HUTT) and 20 healthy children as control subjects were enrolled in the study. All children with POTS received MD and followed up by clinic visits or telephone communication during three months. FMD of brachial artery for each participant was measured by vascular ultrasound. Symptom scoring was applied to evaluate the therapeutic effect. Symptom scoring, FMD values and HUT/HUTT outcomes were investigated before and after treatment. A receiver operating characteristic (ROC) curve was used to explore the value of FMD as a predictor.

Results: At baseline, FMD (%) and increased heart rate (bpm) during HUT/HUTT were significantly greater in children with POTS vs. controls (11±3 vs. 6±2, P<0.001; 38±9 vs. 7±7, P<0.001). Midodrine hydrochloride treatment was effective in 90 (83.3%) and 95 (88.0%) of the patients after 1 month- and 3 month-follow-up, respectively. Symptom scores, excessive increases in heart rate during HUT and increased FMD values reduced significantly after treatment (all P<0.05). The ROC curve for the predictive value of FMD showed the AUC to be 0.790 (95% CI: 0.679, 0.902; P<0.001) at 1 month and 0.803 (95% CI: 0.669, 0.936; P<0.01) at 3 months therapy. FMD of 9.85% had a high sensitivity (71.6–74.4%) and specificity (77.8–80%).

Conclusion: FMD decreased after the treatment of midodrine hydrochloride for children with POTS and POTS children with greater baseline FMD showed better response to midodrine than the non-responders. FMD can be considered as an indicator for predicting the efficacy of MD for treating children with POTS.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

Clinical study of 86 children with adolescent essential hypertension complicated with target organ damage

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Department of Pediatric Cardiology, Children's Hospital Affiliated to Capital Institute of Pediatrics, Beijing, China

Purpose: To study the clinical features of essential hypertension target organ damage in adolescents.

Methods: From January 2007 to October 2013, eighty-six children were enrolled who were diagnosed as essential hypertension in Capital Institute of Pediatrics, Beijing, China. All children received the following examinations: fundus oculi, electrocardiogram, echocardiography, serum triglyceride, glucose, insulin, C peptide, uric acid, renal function, urine microalbumin, serum and urine β_2 -microglobulin. All data were collected as standard procedure and analyzed using statistic methods.

Results: In all recruited adolescents, there were 68 boys (79.1%) and 18 girls (20.9%) with the average age of (12.3±2.4) years old. There were 46 children (53.5%) with issue I hypertension and 40 (46.5%) with issue II hypertension, 13.5% (7/52) of the children with retinal vessel damage, 21.0% (17/81) with abnormal electrocardiogram, and 2.6% (2/78) with left ventricular hypertrophy and increased left ventricular posterior wall thickness. We also found 37.0% (30/81) of the children had a higher voltage of R_{Vs} than average values of the same ages. Renal damage mainly included increased serum creatinine and microalbuminuria, with the rates of 40.2% (33/82) and 39.7% (23/58) respectively. Metabolic disorders mainly included 87.5% (56/64) hyperuricemia, 32.5% (25/77) hypertriglyceridemia, 22.1% (19/86) hepatic adipose infiltration, and 36.1% (30/83) hyperinsulinemia or sugar intolerance damage. There were 58 (67.4%) children with obesity. There were only 6 children without any target organ damage, and five of them were without obesity. Compared with normal weight children, children with obesity had a higher rate of hyperinsulinemia or sugar intolerance damage (45.5% vs 17.9% $\chi^2=6.123$ $P=0.013$). Children with disease course longer than 6 months showed a higher rate of hyperinsulinemia or sugar intolerance damage than the children with disease course less than 6 months (50.0% vs 25.5% $\chi^2=5.288$ $P=0.021$).

Conclusion: Target organ damage of adolescent essential hypertension is present at diagnosis in most of these children. Electrocardiogram and echocardiography are effective measures for early detection of cardiac damage of hypertension. Serum creatinine and microalbuminuria can be used as early warning and screening indexes. To enhance blood pressure monitoring of children with obesity will be helpful for early diagnosis of essential hypertension, which will decrease the rate of target organ damage with earlier effective interference.

Involvement of ERK5 and JNK in the bone morphogenetic protein-9 induced differentiation of C3H10T1/2 cells into cardiomyocyte-like cells in vitro

Xuejing Geng, Yuan Chen

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

Purpose: This study aims to investigate the roles of extracellular signal-regulated kinase 5 (ERK5) and c-Jun N-terminal kinase (JNK) in the differentiation of C3H10T1/2 cells into cardiomyocyte-like cells induced by bone morphogenetic protein-9 (BMP9) in vitro.

Methods: BMP9 gene was imported into C3H10T1/2 cells by recombinant adenovirus. Cells without transfection or transfected with GFP control vector served as controls. Western blot was used to detect the activation level of ERK5 and JNK after cultivated with BMP9 and different concentrations of ERK5 specific inhibitor BIX02189 or JNK specific inhibitor SP600125; real-time quantitative PCR (RT-qPCR) was performed to analyze the expression of myocardial specific genes GATA binding protein 4 (GATA4), myocyte enhancer factor 2C (MEF2C) after 1 week induced by BMP9; Western blot was conducted to measure the expression of myocardial specific protein connexin 43 (Cx43), cardiac troponin T (cTnT) after 3 weeks induced by BMP9 and the expression position of CX43, cTnT in the cells were observed by immunofluorescence.

Results: In the case of transfection efficiency up to 50%, BMP9 exceedingly activated ERK5 and JNK, and significantly increased their phosphorylation level ($P<0.05$). After BIX02189 inhibited the activity of ERK5, the expression levels of myocardial differentiation markers MEF2C, GATA4, CX43, cTnT of C3H10T1/2 cells were significantly suppressed ($P<0.05$); JNK specific inhibitor SP600125 also inhibited the expression levels of MEF2C, GATA4, CX43, cTnT, but the inhibition of MEF2C and GATA4 were not as notable as BIX02189 ($P<0.05$).

Conclusion: The excessive activation of ERK5 and JNK plays an important role in the differentiation of C3H10T1/2 cells into cardiomyocyte-like cells induced by BMP9.

Study on the etiology of fetal pericardial effusion

Ping Huang, Jia Yuan

Affiliated Guangzhou Women and Children's Medical Center of Guangzhou Medical College, Guangzhou, China

Objective: To investigate the etiology of fetal pericardial effusion.

Methods: We retrospectively analyzed that the clinic data of gravidas, the ultrasound of fetuses, laboratory results of gravidas and fetuses.

Results: Between 1 January 2010 and 30 June 2013, 417 gravidas made two-dimensional color doppler echocardiography in our outpatient clinic and hospitalization. It found that our patient cohort included 22 patients of pericardial effusion, the ultrasonic examination revealed that 22 fetal were small pericardial effusion and 20 were large pericardial. 6 patients were diagnosed in the middle of pregnancy, 16 patients in the late of pregnancy, in the early of pregnancy had no found pericardial effusion. In this group, 20 patients were diagnosis of isolated fetal pericardial effusion, and 2 patients might be a part of generalized oedema. 1 patient was chromosomal anomalies, 2 cardiovascular anomalies, 2 non-cardiovascular anomalies, 7 maternity primary diseases, 2 fetal hydrops, 1 twin-twin transfusion syndrome and 7 patients had no clear etiology.

Conclusion: There were many etiologies of fetal pericardial effusion, such as chromosomal anomalies, cardiovascular anomalies, infection, maternity primary diseases, fetal factors, transitory and iatrogenic factor. The fetuses with effusion were checked a series of tests to seek for primary diseases and offer appropriate intervention.

Development of normal paediatric heart function explored by speckle tracking echocardiography

Shu Juan Li, Huishen Wang, Ling Zhu

The First Affiliated Hospital of Sun Yat-Sen University, Guangzhou, China

Objective: The aim of this study is to evaluate ventricular and atrial function using speckle tracking echocardiography (STI) in healthy children, then explore the development features of cardiac function.

Methods: Healthy children aged 0-15ys and adolescents aged 15-25ys were recruited, then divided into 7 groups according to different age stage: group 1 (0-1y), group 2 (1-3ys), group 3 (3-6ys), group 4 (6-9ys), group 5 (9-12ys), group 6 (12-15ys), group 7 (15-25ys). All subjects were examined by echocardiography, STI was used to measure ventricular and atrial function. All results were compared among different groups.

Results: 148 healthy children and adolescents aged 1.8month to 25ys were analyzed. With growth and maturation of children, left ventricular systolic radial and circumferential strain and apical rotation increased. However, longitudinal systolic strain presented with no significant changes, but the time to peak longitudinal strain was shortest in puberty. No significant differences were found in longitudinal and radial systolic synchrony parameters among different groups. Right ventricular systolic longitudinal strain correlated negatively with age. With aging development, left and right ventricular SRe/SRa ratio increased, significant changes were found around pre-school stage. With growth of children, atrial negative strain decreased, positive strain increased, the ratio of negative strain with global strain decreased, but no significant changes in atrial global strain.

Conclusion: With the growth of children, left ventricular systolic and diastolic function improved accordingly, right ventricular diastolic function also enhanced, but longitudinal systolic strain decreased. The systolic synchrony parameters of both ventricles were not influenced by age. SRe/SRa ratio was a good parameter for assessing ventricular diastolic function in children. Atrial active contractile function decreased with growth of children, while no significant changes in global atrial strain.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

Transcatheter closure of congenital coronary arterial fistulas in children

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Purpose: Percutaneous transcatheter closure of coronary artery fistulas (CAFs) has become an alternative to surgical closure. We described our experiences in 5 pediatric patients who accepted transcatheter closure of congenital CAFs.

Methods: Five children with CAF (age 2.8-7 years, weight 13-19Kg) underwent percutaneous transcatheter closure. After aortic root angiography and selective coronary angiography, an arteriovenous wire loop (AV loop) was created, along which the sheath was inserted to desired occlusion site. Devices were selected according to the anatomy and narrowest diameter of CAFs to embolize the fistula.

Results: The narrowest diameter of CAFs ranged 2.4-10.0mm. A Cook coil (6.5x5mm) and an Amplatzer vascular plug (AVP II, 20x16mm) was used in one patient respectively, and an Amplatzer patent ductus arteriosus (PDA) occluder (6/8,7,8/10mm) was used in 3 patients respectively. Follow-up studies from four months to six years showed no myocardial infarction, vascular dissection or valvular damage. Echocardiography revealed complete occlusion in the 3 patients using PDA occluder while minimal residual shunt (1.5 mm and 1.7mm) without hemolysis was present persistently in the 2 patients using Cook coil and AVP II.

Conclusion: Transcatheter therapy using Cook coil, Amplatzer PDA occluder and AVP II is a safe and effective method of CAF occlusion. Besides the indications, the therapeutic effect also depends on the anatomy of the fistula and the type of occluder used.

The clinical experience of children cardiomyopathy caused by inborn errors of metabolism in 11 cases

Jiao Rao, Yu Fen Li
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Objective: To summarize the diagnosis and treatment of cardiomyopathy caused by inborn errors of metabolism (IEM).

Methods: 11 cases were diagnosed as metabolic cardiomyopathy through tandem mass spectrometry, activity of serum enzyme, detection of urine mucopolysaccharide and gene analysis from 2012 to 2013. 6 cases were diagnosed as primary carnitine deficiency (PCD). 4 cases were diagnosed as glycogen storage disease (GSD) and only 1 case was diagnosed as mucopolysaccharidosis (MPS). 6 PCD cases were placed on carnitine supplementation and received follow-up for 2 -10 months. Other 5 cases were received supportive treatment and follow-up.

Results: Patients with PCD recovered soon after treatment but other 5 cases have died within 5 months.

Conclusion: IEM is an important cause of children cardiomyopathy and the Clinical manifestation, diagnosis, treatment and prognosis of different kinds of metabolic cardiomyopathy is different. Early recognition and treatment could be lifesaving for cardiomyopathy caused by IEM.

Prenatal diagnosis of congenital right ventricular diverticulum: 2 cases report and review of the literature

Sarah Xiaobi Liang, Zhiwei Zhang, Wie Pan
Guangdong Cardiological Institute, Guangzhou, China

Objective: To evaluate the value of the echocardiography in the prenatal diagnosis of right ventricular diverticulum.

Methods: To summarize 2 cases of congenital right ventricular diverticulum which were diagnosed in our hospital, then analyze its morphological features (including size, position, contractibility, velocity, etc.) and screening it whether combined cardiac or extracardiac malformations.

Results: Prenatal echocardiography diagnosis of congenital right ventricular diverticulum is the cardiac abnormalities which usually exists alone, the main characteristics of right ventricular diverticulum in echocardiography were as follows: cystoid accessory which is mainly in the antetheca of the right ventricular chamber out of heart, weaken constriction function. It communicated with the main right ventricular through an orifice, but blood flow is slow. The 2 cases of fetus did the induced labor due to the poor prognosis.

Conclusion: Echocardiography plays an important role in prenatal diagnosis and can differentiate ventricular diverticulum from those diseases which is showed as right ventricle enlargement due to heavy load of right ventricle.

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

Lu Zhao, Fang Liu, Lin Wu, Jia Hou
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Objective: To evaluate the effect of transcatheter closure of post-operational residual ventricular septal defect (VSD).

Methods: From September 2002 to October 2012, 18 patients (11 males and 7 females) who are aged $9.2y \pm 5.8y$ and weighing $27.3kg \pm 12.4kg$ were analyzed prior to interventional therapy, among which, 12 cases are post-operation of perimembranous VSD, 2 cases are post-surgery of Tetralogy of Fallot (TOF), 2 cases are post-surgery of double outlet right ventricle (DORV) and 1 case is post-surgery of complete transposition of great arteries (TGA). The follow-up period after first transcatheter closure ranged from 3 to 96 months.

Results: Amplatzer devices were successfully deployed in 17 cases (94.4%). The diameter of VSDs in right ventricle side was $3.73mm \pm 1.56mm$ (1.6-6.3mm) from angiogram. Pulmonary-to-systemic flow ratios was 1.53 ± 0.23 . The average pulmonary artery pressure was 19 ± 2 mmHg. Three types of devices were deployed, which include asymmetric ventricular septal defect occluder, perimembranous ventricular septal defect occluder and muscular ventricular septal defect occluder. The device size was $6.5mm \pm 2.5mm$ (4-12mm). Occluder device cannot be deployed in one case due to repeated complete atria-ventricular block during the procedure. The follow-up period for the other 17 patients were 3 to 96 months. A 1.65mm shunt was found in a Swiss cheese ventricular septal defect patients after procedure. Two patients had mild residual shunt immediately after procedure, which disappeared after 3 months. No device malposition or embolization, or thrombosis on the device's surface was founded in the follow-up echocardiography. During mid- to long-term follow-up period, all patients were doing well. No episode of endocarditis, procedure-related death or syncope was documented.

Conclusion: Transcatheter closure of post-operational residual ventricular septal defect is safe, effective and less trauma. The mid- to long-term follow-up results of these cases are promising.

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

Inhibition of histone H3K9 acetylation by anacardic acid can correct the over-expression of GATA4 in the hearts of fetal mice exposed to alcohol during pregnancyChang Peng^{1,3,4}, Jing Zhu^{2,4}, Huichao Sun¹, Xupei Huang⁵, Lina Si¹, Min Zheng³, Bo Pan¹, Jie Tian¹¹Heart Center, Children's Hospital of Chongqing Medical University, Chongqing, China²Key Laboratory of Pediatrics, Chongqing, China³Ministry of Education Key Laboratory of Child Development and Disorders, Chongqing, China⁴Chongqing International Science and Technology Cooperation Center for Child Development and Disorders, Chongqing, China⁵Department of Biomedical Science, Charlie E. Schmidt College of Medicine, Florida Atlantic University, Florida, USA

Propose: Multiple cardiovascular malformations are result of an abnormality in GATA4 expression abnormality during pregnancy. In previous study we demonstrate that alcohol could lead to a histone hyperacetylation and GATA4 over-expression in fetal mouse hearts. However, the potential mechanism of histone hyperacetylation and GATA4 over-expression induced by alcohol remains unknown.

Methods: Pregnant mice were gavaged with alcohol. Fetal mouse hearts were collected. GATA4, α -MHC and cTnT gene that physically interacted with HATs protein in mouse hearts were analyzed using chromatin immunoprecipitation (ChIP) assays. Histone acetylation, GATA4, α -MHC and cTnT expression were assessed by western blot and quantitative RT-PCR, respectively.

Results: The results of alcohol fed groups showed that global HATs activities were abnormally elevated in the hearts of fetal mice while global HDACs activities remains unchanged. Binding of p300, CBP, PCAF, SRC1, but not GCN5, were increased on the promoter of GATA4 gene in the hearts of fetal mice given the alcohol. Meanwhile, an increase of acetylation of H3K9 and mRNA expression of GATA4, α -MHC, cTnT was observed in the heart samples of fetal mice exposed to alcohol. Note worthily, treatment of a pan-histone acetylase inhibitor anacardic acid could reduce the binding of p300, PCAF on GATA4 promoter and reverse H3K9 hyperacetylation in fetal mice fed with alcohol during pregnant stage. Interestingly, anacardic acid could also down-regulate over-expression of GATA4, α -MHC and cTnT in fetal mouse hearts induced by alcohol.

Conclusion: These results suggested that p300 and PCAF may be a critical regulatory factor for GATA4 over-expression induced by alcohol. On the other hand, p300, PCAF and GATA4 protein may mediate cardiac downstream genes over-expression through coordination with each other in the mice hearts exposed alcohol. It is suggested that anacardic acid may induce protection against alcohol-induced GATA4, α -MHC and cTnT genes over-expression by inhibiting the binding of p300 and PCAF on the promoter region.

Smad4 is essential to mediated BMP2 induced overexpression of GATA4 and Nkx2.5 by increasing histone H3 acetylation in H9c2 cellsLina Si^{1,2}, Jie Tian¹¹Heart Centre, Children's Hospital, Chongqing Medical University, Chongqing, China²Key Laboratory of Developmental Disease in Childhood, Chongqing Medical University, Ministry of Education, Chongqing, China

Propose: BMPs signal pathway is essential for embryonic and postnatal heart development and remodeling. The intracellular factor Smad4 plays a pivotal role in mediating BMPs signal transduction in the nucleus. Our previous study showed that histone acetylation is critical in the regulation of cardiac gene expression and BMP2 enhances the expression of cardiac transcription factors GATA4 and MEF2C by increasing histone H3 acetylation. The aim of this study was to explore if this process utilize Smad-dependent or -independent pathways.

Methods: Knocking down of Smad4 gene by short hairpin interference RNA (shRNA) lentivirus vector in H9c2 cells. Constructed three Lv-Smad4 shRNA, detected the expression of Smad4 protein after transfection by WB and chose the most efficient one. Real time RT PCR, western blotting (WB) and chromatin immunoprecipitation (ChIP) were employed to determine gene expression, total histone H3 acetylation levels and the histone H3 acetylation levels in the promoter regions of cardiac transcription factor genes.

Results: WB analysis showed that it suppressed 80% expression of total Smad4 in H9c2 cells with the second Lv-Smad4 shRNA transfection. Quantitative real-time RT-PCR analysis showed that Lv-Smad4 substantially inhibited both AdBMP2-induced and basal expression levels of cardiac transcription factors GATA4 and Nkx2.5, but not MEF2C and Tbx5. Similarly, chromatin immunoprecipitation (ChIP) analysis showed that Lv-Smad4 inhibited both AdBMP2-induced and basal histone H3 acetylation levels in the promoter regions of GATA4 and Nkx2.5, but not MEF2C and Tbx5. Meanwhile, Lv-Smad4 inhibited the AdBMP2-induced high level of total histone H3 acetylation, but not basal level.

Conclusion: The data indicate that knocked down of Smad4 could block the BMP2 induced high level of histone H3 acetylation in the promoter regions of GATA4 and Nkx2.5. So Smad4 is necessary for this process. Meanwhile, Lv-Smad4 could not inhibited the basal histone H3 acetylation levels and AdBMP2-induced high histone H3 acetylation levels in the promoter regions of MEF2C and Tbx5, there maybe some other factors to mediated this process.

Histone H3 acetylation and lysine 9 trimethylation are involved in the epigenetic regulation of slow skeletal troponin I expression during heart developmentWeian Zhao¹, Bo Pan¹, Yang Xu¹, Lingjuan Liu^{1,2}, Jing Zhu², Changlong Nan³, Xupei Huang³, Jie Tian¹¹Heart Center, Children's Hospital, Chongqing Medical University, Chongqing, China

Propose: Two main troponin I genes, cardiac (cTnI) and slow skeletal (ssTnI), are expressed in the mammalian heart under the control of a developmentally regulated program. ssTnI is expressed first in embryonic and fetal heart, and is then downregulated by unknown mechanisms after birth. In our previous studies we have demonstrated that ssTnI expression in the heart is partially regulated by hormones, such as thyroid hormone, during heart development. In the present study, we have explored the role of histone modification in the regulation of ssTnI expression.

Methods: Mouse hearts were collected at different time of heart development, i.e. embryonic day 15.5, postnatal day 1, day 7, day 14 and day 21. Levels of histone H3 acetylation (acH3) and histone H3 lysine9 trimethylation (H3K9me³) were detected using chromatin immunoprecipitation (ChIP) assays in SURE domain (TnI slow upstream regulatory element), 300bp proximal upstream domain and the first intron of ssTnI gene, which are recognized as critical regions for ssTnI regulation. The expression of ssTnI mRNA was quantified using real time RT-PCR analysis.

Results: We found that the levels of acH3 on the SURE region were gradually decreased, corresponding to a similar decrease of ssTnI expression in the heart, whereas the levels of H3K9me³ in the first intron of ssTnI gene were gradually increased during the development.

Conclusion: Our results indicate that both histone acetylation and methylation are involved in the epigenetic regulation of ssTnI expression in the heart during the development, however, different histone modifications occur at different domains of ssTnI gene.

Clinical analysis of cardiovascular disease cases who died in Affiliated Children's Hospital of Chongqing Medical University during 2000 - 2013Huilin Yin^{1,2}, Jie Tian¹¹Heart Centre, Children's Hospital, Chongqing Medical University, Chongqing, China²Key Laboratory of Developmental Disease in Childhood, Chongqing Medical University, Ministry of Education, Chongqing, China

Propose: The hospitalized children's (≤ 18 years of age) clinical data characteristics of cardiovascular disease were summarized, who were died in affiliated children's hospital of Chongqing medical university during nearly 14 year, so that it can provide the scientific basis for specify the corresponding preventive measures and reducing the mortality.

Methods: The clinical information of hospitalized 285 cardiovascular disease cases died in affiliated children's hospital of Chongqing medical university during 2000.01.01 and 2013.12.31 was reviewed in retrospective analysis. The general condition, fatality rate, mortality nosology and the changing trend were analyzed and summarized. Using the SPSS20.0 statistical analysis software to analyze the data above.

Results: Cardiovascular disease was the primary reason in death cases (285 cases), of which 169 males (59.30%) and 116 females (40.70%). The death cases was divided into 6 groups according to age stage, the top 3 of which respectively were infancy stage, the neonatal period and toddler period. The top 3 death causes of the cardiovascular disease were: congenital heart disease (CHD), myocarditis and cardiomyopathy. The CHD mortality of the front 7 years was 5.54%, and the rear 7 years was 4.37%, which promoted that the mortality had slight decline but no significant difference ($P < 0.05$). The Lethal myocarditis mainly were fulminant myocarditis, most of it died within 24 hours. Cardiomyopathy cases were less, but its case fatality rate is higher.

Conclusion: The primary death cause of Affiliated children's hospital of Chongqing medical university were cardiovascular disease during the nearly 14 years, the commonest disease was CHD, the mortality of CHD had no significant difference ($P > 0.05$).

ABSTRACTS

Abstracts for Free Paper Session:

PAEDIATRIC CARDIOLOGY

Alcohol exposure increases histone H3 acetylation levels to overexpress cardiac transcription factors in H9c2 cells via BMP signaling pathwayJin Shi^{1,2}, Jie Tian¹¹Heart Centre, Children's Hospital, Chongqing Medical University, Chongqing, China²Key Laboratory of Developmental Disease in Childhood, Chongqing Medical University, Ministry of Education, Chongqing, China

Propose: Dorsomorphin (DM), the specific inhibitor of BMPs signaling pathway was used to research the role of it in alcohol-induced histone hyperacetylation, to verify the hypothesis that BMPs are involved in the alcohol-induced histone hyperacetylation in H9c2 cells.

Methods: (1) H9c2 cells were treated by different concentrations (0mM, 10 mM, 50 mM, 100 mM, 200 mM, 500 mM and 1000mM) of alcohol, MTT assay was used to determine the cells viabilities after 36h. (2) Real-Time qRT-PCR assay was used to detect mRNA expression levels of subtypes of BMPs. Cells were treated by different concentrations of DM (0 μ M, 1 μ M, 2.5 μ M, 5 μ M, 10 μ M and 20 μ M) to block the influence of alcohol. Real-Time qRT-PCR assay was used to detect expression levels of GATA4. (3) H9c2 cells were treated by alcohol and DM. Real-time PCR was used to measure the expression of Mef2c, GATA4, Nkx2.5, TBX5 and Smad4. Westernblot analysis was used to detected the heart development-related gene Cx43 and histone H3 acetylation level in the whole chromatin. ChIP qPCR assay was used to detect the histone H3 acetylation level in the promoter regions of MEF2C, GATA4, Nkx2.5 and Tbx5.

Results: (1) 0mM, 10 mM, 50 mM and 100 mM concentrations of alcohol have no effect for H9c2 cell growth ($P>0.05$), 200 mM, 500 mM, and 1000mM concentrations of alcohol inhibited growth ($P<0.05$). (2) Alcohol induced the expressions of BMP2, BMP4, BMP6 and BMP7 ($P<0.05$); BMP5 and BMP10 compared with the control group had elevated, but the difference was not statistically significant ($P>0.05$). (3) 5 μ M DM blocked the effects of alcohol increasing the expression of GATA4. (4) At 100mM alcohol the expressions of Mef2c, GATA4, NKX2.5, TBX5 and Smad4 were increased ($P<0.05$), meanwhile, the expression of Cx43 was increased too ($P<0.05$). DM at 5 μ M decreased expressions of Mef2c, GATA4, NKX2.5, TBX5, Smad4 and Cx43 to the level of control group ($P>0.05$). (5) 100mM Alcohol increased total histone H3 acetylation ($P<0.05$), that decreased after adding 5 μ M DM ($P>0.05$). DM increased total histone H3 acetylation independently. (6) Alcohol at 100mM induced histone H3 acetylation levels in promoter region of Mef2c, GATA4, Nkx2.5, and TBX5 ($P<0.05$). Adding 5 μ M DM, Mef2c, GATA4 and TBX5 promoter region acetylation levels failed to control group ($P>0.05$), Nkx2.5 acetylation levels in promoter region had down, but did not failed back to control group ($P<0.05$).

Conclusion: (1) Alcohol above 200mM produced toxic effects on H9c2 cells. (2) Alcohol at 100mM increases the expression of BMPs. (3) DM blocked alcohol-induced GATA4 overexpression, and the blocking effect showed elevated concentrations decreased after the first rise, the strongest effect when 5 μ M. (4) Alcohol induced histone H3 acetylation via BMPs signaling pathway in H9c2 cells. (5) Alcohol via BMPs signaling pathway increased histone H3 acetylation in the promoter region role in promoting of MEF2C, GATA4, Nkx2.5, and TBX5, that may one of the mechanisms of alcohol increases the MEF2C, GATA4, Nkx2.5 expression and TBX5. (6) In H9c2 cells, the combined effect of BMPs subtypes may inhibit expression of MEF2C.

Curcumin reduces histone H3 acetylation and reverses the over-expression of Mef2c caused by prenatal alcohol exposure in miceWeihua Zhang^{1,2}, Chang Peng^{1,2}, Wenqun Gao^{1,2}, Min Zheng^{1,2}, Jing Zhu², Lingjuan Liu², Huan Li^{1,2}, Yang Xu^{1,2}, Jie Tian¹¹Heart Centre, Children's Hospital, Chongqing Medical University, Chongqing, China²Ministry of Education Key Laboratory of Child Development and Disorders, Chongqing, China

Propose: Curcumin is one of the phenolic compounds from turmeric and has various pharmacological effect. In the present study, we have performed the experiments to test the hypothesis that curcumin is protective in the fetal heart against the over-expression of cardiac specific gene Mef2c caused by prenatal alcohol exposure.

Methods: Fifty pregnant C57BL/6 mice were divided randomly into five groups (n=10). They were the untreated group, dimethyl sulfoxide group, alcohol exposure group, curcumin treatment group, both alcohol and curcumin treatment group. Fetal mouse hearts were collected on embryonic day 16.5. The acetylation levels of histone H3 (H3ac), the expression levels of cardiac specific genes Mef2c, and structure of chromatin were determined.

Results: The data indicates that curcumin (0.98 \pm 0.11) significantly reduces the levels of histone H3ac in fetal hearts compared to blank group (1.37 \pm 0.08, $P<0.05$) and DMSO group (1.26 \pm 0.15, $P<0.05$). The expression of Mef2c is significantly down-regulated after treated with curcumin (0.41 \pm 0.10) compared to blank group (1.37 \pm 0.08, $P<0.05$) and DMSO group (1.37 \pm 0.08, $P<0.05$). Furthermore, our results from ChIP assays have shown that the histone H3ac connects with the Mef2c are significantly inhibited by curcumin (2.96 \pm 0.64) compared to blank group (4.94 \pm 0.38, $P<0.05$) and DMSO group (5.15 \pm 0.16, $P<0.05$).

Conclusion: Curcumin could reduce histone H3 acetylation and reverse the over-expression of Mef2c caused by prenatal alcohol exposure.

ABSTRACTS

Abstracts for Poster Presentations:

Caught in transit, impending paradoxical embolism

Ryan Yuan, Ruiwu Yuan

Group Health Bellevue Medical Center, Washington, USA

Objective: The objective of this case report is to remind physicians of the challenges facing the diagnosis and management of a rare clinical condition, impending paradoxical embolism.

Methods: We reported a case of thirty-five year old man who was admitted to hospital with dyspnea, diplopia, left side weakness and difficulty with balance. A Brain MRI revealed acute ischemia in the anterior right thalamus. Transesophageal echocardiography showed a large mobile irregular thrombus in the right atrium traversing patent foramen ovale, extending to left atrium and prolapsing into the left ventricle during diastole. Pulmonary CT angiography showed a saddle embolus involving the main pulmonary artery bifurcation and extensive diffuse bilateral pulmonary emboli. Ultrasound study revealed a non-occlusive deep venous thrombus in the left popliteal vein. Impending paradoxical embolism was diagnosed and intravenous heparin was started immediately. With the concern of recurrent systemic and pulmonary embolism associated with thrombolysis and anticoagulation, our patient underwent removal of right and left atrial thrombus, closure of patent foramen ovale, and pulmonary thromboendarterectomy. He did well post surgery with no complications. The serological screening for thrombophilia, primary hypercoagulable state, autoimmune disease and vasculitis was negative.

Summary: Our patient had all components of impending paradoxical embolism, which includes deep venous thrombus, pulmonary embolism, systemic embolism and thrombus-in-transit. To our knowledge, this is the first case with all those components documented simultaneously in the same patient.

Conclusion: Impending paradoxical embolism, a rare diagnosis with high morbidity and mortality, requires prompt diagnosis and emergency treatment.

Endogenous endophthalmitis secondary to endocarditis in a patient with systemic lupus erythematosus

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Endophthalmitis is recognized as a major cause of blindness. It may occur when the eye is seeded by emboli in infective endocarditis (IE), but is very rare. We present a case of IE in a patient with systemic lupus erythematosus (SLE) whose initial presentation was a septic embolus to the eye, causing endophthalmitis.

Case: A 42 year old diabetic female sought consult for blurring of vision. Other than petechiae on her conjunctiva, her eyes were grossly normal. She had a systolic murmur. Initial echocardiogram did not reveal any vegetations. Due to a positive ANA test and joint pains, she was diagnosed with SLE and started on hydrocortisone. On the second day upon waking up, she had corneal opacification with redness of the right eye. She could only visualize hand movements gradually progressing to blindness. Other findings included Roth spots, Janeway lesions, and a hemorrhagic bullae. Echocardiogram was repeated and a small vegetation was detected in the mitral valve. Intravenous antibiotics were given for IE. She was treated as endogenous endophthalmitis with intravitreal antibiotics. On the 6th day, she went into refractory shock leading to her demise. Post mortem studies revealed abscesses on the spleen and kidneys, consistent with systemic embolization.

Conclusion: Literature highlights the rarity of endophthalmitis from IE, which is why management remains a challenge. Due to paucity of typical manifestations, subtle signs were missed at the onset, diagnosis of IE was only clinched when complications occurred, and our patient succumbed to these complications. We emphasize that suspicion should be made early along with anticipation of complications. Despite its rarity, embolization to the eye should be suspected in patients with IE presenting with blurring of vision as not to delay management. Embolization in one system should also lead to suspicion of emboli elsewhere as early intervention may be life-saving.

The outcomes of induced therapeutic hypothermia after cardiac arrestS Y Yau¹, Y L Cheung², P L Fung¹¹The Open University of Hong Kong, Hong Kong²Tuen Mun Hospital, Hong Kong

Background: Sudden cardiac arrest due to cardiovascular diseases is one of the major health issues worldwide. Severe neurological deficit such as brain death after cardiopulmonary resuscitation care is reported as a major concern for the post cardiac arrest patients. Induced therapeutic hypothermia (TH) to 32–34°C for 24 hours after cardiac arrest is employed to these comatose survivors after returning of spontaneous circulation. Research supported that induced TH is beneficial to patients after cardiac arrest.

Purpose: The purpose of this study is to review the clinical outcomes of induced TH for patients after cardiac arrest.

Methods: A systematic review on the current literature related to the outcomes of induced TH after cardiac arrest was conducted. The results were summarized and presented.

Results: Induced TH showed significantly improvement on the neurological outcomes of patients after cardiac arrest. Also, the mortality rates of these patients were decreased after treatment of induced TH. For instance, the neurologic functions at 30-day after induced TH were more favorable than those not treated with induced TH. The outcome was much favor in the treatment group with a 1-year follow-up. For the mortality rate, the 1-year mortality of patients treated with induced therapeutic hypothermia was around 12.5% lower than those not treated with induced TH. The odds ratio in all the studies confirmed improved neurological outcomes and decreased mortality rates. Despite the positive outcomes of induced TH, there were also possible complications including pneumonia, sepsis, arrhythmia, bleeding, rebound hyperthermia, and hypotension.

Conclusion: In summary, induced TH is supported to improve the neurological outcomes and decrease the mortality rate among patients after cardiac arrest. Although there may be possible complications for the induced TH, it is recommended as a consideration for treatment of cardiac arrest patients.