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# Journal of the Hong Kong College of Cardiology

April 2014  
Volume 22, No. 1

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Double Site Left Heart Endocarditis With Ventricular Outflow Tract Mural Vegetation

Z IBN ELHADJ, M BOUKHRIS, I KAMMOUN, A BEN HALIMA, F ADDAD, S KACHBOURA

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

Introduction

Despite great improvements in general health care and antibiotic therapy, the incidence of infective endocarditis (IE) has not changed during the past decades. The involvement of two valves occurs much less frequently, and triple or quadruple valve involvement is extremely uncommon. 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/mm³, 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%. Mortality rate is higher in patients with multi-foci infection that may require early surgical treatment to prevent complications.

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 al 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 al

![Figure 1. Para-sternal left axis view: large vegetations on the mitral and aortic valves.](image1)

![Figure 2. Voluminous mobile vegetation of 15 mm attached to the mitral valve.](image2)
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

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**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’s \(^7\) and Mihaljevic’s \(^8\) 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.

References

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

OSWALD J. LEE,1 ALEX P.W. LEE,2 MICKY W.T. KWOK,1 SONG WAN1

From 1Division of Cardiothoracic Surgery, Department of Surgery; 2Division of Cardiology, Department of Medicine & Therapeutics, The Chinese University of Hong Kong, Prince of Wales Hospital, Hong Kong

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

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.
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 transesophageal 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.
(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. 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, significant lead-induced TR was observed in 38% of patients 1-1.5 years following lead placement. More importantly, such type of TR was independently associated with much worsened long-term survival. 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, 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. 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. 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.

References

Multi-modality Imaging of a Subclavian Artery Pseudoaneurysm

VIKAS SINGH¹ AND PRAKASH KUMAR²

From ¹Department of Cardiology, Paras HMRI Hospital, Patna; ²Department of Cardiology, LPS Institute of Cardiology, Kanpur, India

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

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 A glimpse of
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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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 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 & 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  David CW Siu (HK)
  PVC in Structurally Normal Heart  Gary CP Chan (HK)
  PVC in Coronary Artery Disease and Cardiomyopathy  Cyril YK Ko (HK)

1700-1730  **Terraces of Coffee Break & Visit Exhibits**

1730-1900  **Ching Room**  Symposium on Transcatheter Structural Heart Intervention
  Update on LAAO for Stroke Prevention in Atrial Fibrillation  Ngai-yin Chan (HK)
  TAVI – Update on Asian and QEH Registries  Michael KY Lee (HK)
  MitraClip – What We Learnt from Our Experience  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  
I-chang Hsieh (Taiwan)

A Case with Chest Pain and Refractory Hypotension  
Beijing Fu Wai Hospital  
Min Yang (China)

Left Atrial Appendage Occlusion with the Domestic Device in a Patient with Atrial Fibrillation  
Shanghai Tenth People’s Hospital  
Ya-wei Xu (China)

A Typical Case of High-Risk Acute Coronary Syndrome  
People’s Hospital of Peking University  
Jun-xian Song (China)

A Case with Syncope and Severe Myocardial Ischemia  
Beijing Tong Ren Hospital  
Yi Yang (China)

The Only 1.5%  
Queen Elizabeth Hospital  
Shing-fung Chui (HK)

DES Restenosis: What Can We Do?  
Beijing An Zhen Hospital  
Xian-tao Song (China)

Choice of Revascularization in a Patient with Multiple Coronary Artery Diseases  
Wannan Medical College Yijishan Hospital  
You-sheng Ke (China)

Clopidogrel Resistance in a Case of Acute Coronary Syndrome after CABG  
Cheng Hsin Hospital  
Wen-pin Huang (Taiwan)

A Missing Link Between Multiple Discipline  
Guangdong General Hospital  
An-ping Cai (China)

On the Wrong Way: A Case of STEMI with an Ignored Cause  
People’s Hospital of Peking University  
Zhong-you Li (China)

Arrhythmia Post PCI Angina  
Conde S Januario General Hospital  
U-po Lam (Macau)

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  
David Muller (Australia)  
Art of Bifurcation Stenting  
What Have We Learned about Renal Denervation?  
Symplicity HTN-3 Trial and Global Symplicity Registry

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 10:30-11:30 & 17:30-18:30 at Terraces of Tang and Sung Room.*
Sunday, 8 June 2014

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<td>0830-1030</td>
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<td>1100-1130</td>
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<td>1130-1230</td>
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<td>Controversy of Beta-blocker in Hypertension – The Role of Nebivolol</td>
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<td>(United Kingdom)</td>
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<td>Prevention of Stroke in East Asian AF Patients</td>
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<td>1400-1530</td>
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| 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  |
|         |               | Fausto Pinto (Portugal)                                               |
|         |               | New Frontiers on Coronary Stent Development                           |
|         |               | Chung-seung Chiang (HK)                                               |
|         |               | Current Status of TAVI Procedure in Taiwan                            |
|         |               | Wei-hsian Yin (Taiwan)                                                |
| 1700-1730 | Terraces of | Coffee Break & Visit Exhibits                                          |
|         | Tang and Sung Room |                                                      |
| 1730-1845 | Ching Room   | Plenary Lectures                                                       |
|         |               | Management of Coronary Disease When Light Illuminates                 |
|         |               | Stephen WL Lee (HK)                                                   |
|         |               | Multivessel PCI – Which Artery First                                  |
|         |               | James SM Yeh (United Kingdom)                                         |
|         |               | Post Cardiac Arrest Care and Therapeutic Hypothermia                  |
|         |               | Jeffrey KF Hong (HK)                                                  |
| 1900-2030 | Sung Room    | Farewell Dinner                                                        |
Paediatric Cardiology Symposium Programme

Saturday, 7 June 2014

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<td>Correction of Complete AVSD – Surgical Techniques and Pitfalls</td>
<td>Christian Brizard (Australia)</td>
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<td>篳creening for Congenital Heart Disease in Newborns</td>
<td>Guo-ying Huang (China)</td>
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<td>The Strategy of the Diagnostic and Treatment of Pulmonary Atresia/Critical Pulmonary Stenosis with Intact Ventricle Septum in Neonate and Infants</td>
<td>Kun Sun (China)</td>
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<td>Right Ventricular Outflow Tract Reconstruction: Monocusp Valve Using CorMatrix</td>
<td>Xin Li (HK)</td>
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<td>Interventional Treatment of ASD: Difficulties and Pitfalls</td>
<td>Hui-shen Wang (China)</td>
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<td>AstraZeneca Mainland–Hong Kong–Macau Expert Forum</td>
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<td>1500-1640</td>
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<td>Paediatric Cardiology Symposium II</td>
<td>Hypoplastic Left Heart Syndrome: Management Options</td>
<td>Christian Brizard (Australia)</td>
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<td>Interventional Therapy and Follow Up Results of Ventricular Septal Defects in Close Proximity to the Aortic Valve</td>
<td>Zhi-wei Zhang (China)</td>
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<td>Assessment and Management of Pregnancy in Patients with Congenital Heart Disease</td>
<td>Pak-cheong Chow (HK)</td>
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<td>Acute and Long-Term Outcome after Catheter Ablation of Atrial Tachycardia in Post-Fontan Patients to Present</td>
<td>Jin-jin Wu (China)</td>
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<td>1640-1900</td>
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*Coffee break will be served from 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
Y W Cheng, C F Tang, C K Reck, N H Luk, S F Chui, Y H Cheng, K C Chan, L K Chan, H S Ma, C Y Wong, L Y Tam, C L Fu, C W Chan, K Y Leu, K C Ho, K T Chan, C S Chiang
Department of Medicine, Queen Elizabeth Hospital, Hong Kong

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. Both 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. 59 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
Edgar Wilson Timböl, Jaime Alfonso Aberrera, Gino Quiizon, Wilfred Dee
Philippine General Hospital, Manila, Philippines

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) >1.5cm² 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 Williams score of 7.9. A successful PTMC was achieved in 96%. Having a repeat PTMC (i.e. PTMC for the second time) was associated with an increased risk of developing an unfavorable outcome or failed PTMC (IOR 7.62, CI 1.73–33.61). Moderate to severe or worsening of prior mitral regurgitation determined by hemodynamic studies developed in 3%. In-hospital mortality occurred in 3%. Pre-procedural hypotension 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
Miao Hu, Yaling Yang, Shinya Yamashita, Daisaku Masuda, Brian Tomlinson
Department of Medicine and Therapeutics, Prince of Wales Hospital, Hong Kong

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 /laroniprant on plasma LDL-cholesterol, Lp(a) and glucose in Chinese dyslipidaemic patients.

Methods: Patients were treated with ER niacin 1 g /laroniprant 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 ± 22.9% and glucose 9.5 ± 13.1%. The absolute (-6.4 ± 9.7 mg/dl) but not the percentage decreases (-7.8 ± 20.6%) in Lp(a) were related (r= -0.855, 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 insulin 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
Miao Hu, Yaling Yang, Chi Tai Ng, Chui Ping Lee, Vistan W Y Lee, Brian Tomlinson
1Department of Medicine and Therapeutics, 2Department of Surgery, 3School of Pharmacy, The Chinese University of Hong Kong, Hong Kong

Objective: Acyl-CoA:diacylglycerol acyltransferase (DGAT) enzymes catalyze the final step in the biosynthesis of triacylglycerides. Niacin competitively inhibits DGAT2 in cells 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/laroniprant combination and ER niacin alone, respectively.

Methods: Chinese patients with dyslipidaemia were treated with extended release (ER) niacin 2 g /laroniprant 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/laroniprant. 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

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

W W Zeng, T T W Chu, B S P Fok, M Hu, B Tomlinson

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 (B-SBP), pulse pressure (B-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, B-SBP, C-PP, B-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 mmHg (p<0.01), 3.3±4.7% (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 in C-SBP (p<0.01), -15.8±13.7 mmHg in B-SBP (p<0.01), -5.4±9.1 mmHg in C-PP (p<0.01), -6.3±9.4 mmHg in B-PP (p<0.01), -3.0±0.5 mmHg (p<0.01), 1.3±1.5% (p=0.65) and -0.5±4.3 mmHg (p=0.62). There were significantly greater reductions in B-SBP than in C-SBP (1.1±3.0 mmHg, p=0.03) and in B-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 B-SBP (0.5±3.9, p=0.44) and C-PP and B-PP (0.9±2.8, p=0.28) 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

Antonio Faltado, Anne Quero, Annabelle Marie Lat, Ariel Valores, Jaime Aherrera, Pichy Alan
Philippsen General Hospital, Manila, Philippines

Takayasu arteritis is a rare inflammatory vasculitis. Most patients are pulseless, but hypertension may occur especially if there is concomitant renal artery stenoses. 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 consultation 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 lead to a suspicion of a primary 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. Suspection of Takayasu arteritis was confirmed by a CT aortogram which revealed multiple areas of stenoses (left subclavian, superior mesenteric, and iliac 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 diagnostic, supported by ancillary tests. Because of the rarity of this combination, management was a challenge. Early recognition, a multidisciplinary teams, and optimal medical management were the keys to a successful outcome.
Mechanical thrombectomy with intrapulmonary arterial thrombolysis followed by oral thrombolysis in pulmonary embolism—a novel multipart approach

Rahardl Ahmad, Muhammad Munawar, Dian Andine Munawar
Binawatiya Cardiac Center, Jakarta, Indonesia

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 submassive 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 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

Department of Medicine, Department of Cardiovascular Surgery, Department of Anesthesiology, Department of Diagnostic Radiology and Imaging, Queen Elizabeth Hospital, Hong Kong

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 percutaneous 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 were 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 angioscopy to decide on suitability. Echocardiogram and 6-minute walk test would be performed according to standard post-procedure. All complications would be reported to an independent Safety Monitoring Committee. All data will be captured by the local QEH Registry, 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±34.7 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±0.43cm² and mean gradient decreased from 51.2±10.0mmHg 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 (13.9%). 1 patient was noticed to have subclavian artery stent occlusion after surgical repair with successful stenting done. 2 femoral pseudo aneurysm were noted 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 means 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% of class I and 69.4% with no change. There is also significant benefit in terms of 6-minute walk test and quality of life improvement. 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.
CARDIAC SURGERY AND ISCHEMIC HEART DISEASE

Atrial septostomy in treatment of complex congenital heart diseases
Png Huang, Fang Gong
Affiliated Guangzhou Women and Children’s Medical Center of Guangzhou Medical College, Guangzhou, China

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 months (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 (21.39%) 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 banding, 13 Blalock-Taussig shunt, 4 modified Fontan procedures, 1 Blalock-Taussig shunt and 10 ligature 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%.

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
Rainbow W H Lau, Sally K L Ho, Tommy W K Au
Department of Cardiothoracic Surgery, Queen Mary Hospital, Hong Kong

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 assist 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 of eight the 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 the 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 it 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
Oswald Lee, D T L Chan, T W K Au
Department of Cardiothoracic Surgery, Queen Mary Hospital, Hong Kong

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% in Maze procedure managed to maintain sinus rhythm, whereas 0% of patients without Maze did. 5% and 30% (p=0.001) had warfarin related complications in the Maze and without Maze group respectively. 0% and 29% (p=0.001) require admission for congestive heart failure in the 2 groups respectively. 76% and 76% of 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.
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 – 1.96) respectively, for the highest tertile compared to the lowest tertile (p=0.04, 0.007, 0.002, 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 to 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 is 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 > 6.5), the primary outcome was in-hospital mortality. Secondary outcomes include congestive heart failure (CHF), shock, re-reinfarction, dialysis, revascularization, renal failure, high-risk pneumonia, and arrhythmias.

Results: 117 patients with an 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 4.23), shock (OR 5.0), re-infarction (OR 6.26), and development of significant arrhythmias (OR 4.12 (1.45–11.7, p =0.008)).

Conclusion: 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.

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 skin incision. All operations were performed through main pulmonary arteriography under cardiodiaphanous 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 observed 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 anesthetic/intensive care logistics further improvements in performance in minimally invasive approach in congenital heart surgery is anticipated.
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 vasocostriction 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 depressin effect of benidipine at plasma concentrations on the contraction.

Results: Benidipine caused relaxation in KCl-contraction (85.4% ± 5.1%, n=6) and in U46619-contraction (59.9% ± 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, 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.

Case report: a unique severe CAD related syncope
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Case: 67 years old man.

Chief complaint: loss of consciousness suddenly 5 days ago.

Present history: 5 days ago, the patient lost consciousness and fell down onto the soft bed 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 limp numbness or weakness after waking up. He regained consciousness 5 minutes later by himself without any intervention, without 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 infraction history of 13 years, multi-episode TIA, water chocking cough after cerebral infarction, walking unsteadily.

Be in hypothyroidism 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). Shrunken speech, tongue to right (post cerebral infarction residual).

Laboratory Data:

Blood test: WBC 8.6x10^9/μL, HGB 145g/L, PLT 191x10^9/μL
Urinealysis: 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: 3.72mmol/L, HDL-C: 0.77mmol/L.
Coagulation function normal, BNP: 91.59g/mL, TNT 0.14g/mL (the second day in hospital) 0.05g/mL the third day in hospital HbA1C: 8.36%
ECG: Sinus rhythm HR 80bpm, II, III, AVF lead qR, V1 ~ V6 lead T wave flat.
Diagnostic Cardiac syncope? TIA? Orthostatic hypotension? Epileptic seizure?
ECHOC: 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 owen, bilateral cerebellum, pons and medulla oblonga 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.
LAD: 90% segmental stenosis, LAD: 50% Diffuse stenosis, LCX:50% segmental stenosis.
LCX:50% Diffuse stenosis, RCA: 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 recurred.

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 tachycardia Arrhythmia. The admission ECG and UCG indicate the patient have symptomatic myocardial infarction which was still not sure for the cardiac syncope. Finally, he just weared 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 recurred. 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 559 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 3-year follow-up period. Heart rate-PWV internal dissociation was defined as a 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 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+/-.15vs 63.2+/-.14, 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 (2364 vs 1747, P<0.0006).

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:

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 ionchannelopathy characterized by ST-segment elevation in V1-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 47.5±SD 33.4±18.9 years) had their Type 1 Brugada ECG unmasked by fever. Two patients presented with syncope while the rest were asymptomatic. There was no VTF/VT documented during fever. When fever subsided no more Type 1 Brugada ECG was observed. There was a mean drop of 5.6 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 one had SCN5A mutation found. Twenty of the 110 BrS patients had undergone Treadmill exercise test (TET). Two had Type 1 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 Abemethly malformation (Type B), which was so-called congenital extraportal 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, Pulmonary arterial–venous fistulas.
ABSTRACTS

Abstracts for Free Paper Session:

CARDIAC ARRHYTHMIA, EPS AND PACING

Reengineering 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 counselling 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: Reengineering 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 & counselling on living with device; 4) early complications monitoring.

Results: From November 2013 to February 2014, there were totally 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 frozem shoulder was referred for physiotherapy and two referred to occupational-therapy for hypertrophic scar management. Patient obtained education and counselling 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 score 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.

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 = 0.505, P < 0.001) and BNP ( r = 0.481, P < 0.001) correlated well with LVEDP. Using receiver operating characteristic analysis, the optimal cutoff 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.

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 using collateral 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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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 parasartal short-axis images at left ventricular basilar, 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 basilar, 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 basilar 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.

Assessment of left ventricular local rotation characteristics in healthy subjects using 2D speckle tracking imaging
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. Billoc 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 (Billoc 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 vein thrombosis of both lower extremities. The final diagnosis was high output heart failure secondary to Billoc 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 hypodynamic 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 decompenation, abdominal bruits, and other signs of high output heart failure.

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

Methods: Participants were recruited from the framework of a cohort populations survey from the PPMJS (Prevention of Multiple Metabolic Disorders and MS in Jiangsu Province) which were conducted in the urban community of Changshu Jiangsu from 1999 to 2007. 644 subjects (234 males, 410 females) were randomly selected and genotyped for three polymorphisms used as genetic markers for PPARα gene (rs1800206; rs253778; rs135539). Individual polymorphism and haplotype data were available for analysis. χ2 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 PPARα gene and the level of Lp(a). The association between PPARα haplotypes and serum Lp(a) levels were analyzed under the SNPlex 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 17.70mg/l, 95%CI 32.37–23.37mg/L, p=0.001). Haplotype analysis revealed that A–G–V and C–G–V haplotype (established by 1A+V, 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 PPARα 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).

Merit of ginseng in the treatment of heart failure in type 1 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 (PPARs). We used streptozotocin–induced diabetic rat (STZ–rat) to screen the effects of ginseng on cardiac performance and PPARα 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 PPARα 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 with changes in diabetic parameters. This treatment with ginseng also increased the PPARα 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 PPARα antagonist GS00660. Thus, we suggest that ginseng could improve heart failure through the increased PPARα expression in STZ–rats.

Association between polymorphisms and haplotypes of peroxisome proliferators activated–receptor α gene and the level of apolipoprotein B 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 (PPARα) with the level of apolipoprotein B 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 PPMJS (Prevention of Multiple Metabolic Disorders and Metabolic Syndrome in Jiangsu Province). 630 members of all selections were from the population as objects at random. In this research, we have chosen ten SNPs (rs135539, rs4253778, rs1800206, rs2016529, rs7794, rs10865710, rs1805192, rs709158, rs3856806, rs48684847) from the HapMap database to do the research, which are located in genes that encode PPARα, PPARγ and PPARβ. Generalized Multifactor Dimensionality Reduction (GMDR) was used for detecting Gene–Gene Interactions.

Results: The results showed that 3 SNPs (rs135539, rs1800206, rs4253778) of PPARα were significantly associated with the level of apol. rs1800206 V allele carriers (LV+VV) had a significantly higher level of apol 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 apol than AA homozygotes (Mean difference and 95%CI were 0.09 (0.04–0.16), P=0.001); rs4253778 allele carriers (GG+CC) had a significantly lower level of apol 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 PPARα were associated with the level of apol. 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 apol was chosen as outcome (Prediction accuracy was 0.6617, cross–validation consistency was 10.10, P=0.0010), which involves rs135539 (Bionot 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 apol levels, there were gene–gene interactions between multiple SNPs of PPARα/B/γ.
PHD2–shRNA interference by ultrasound targeted microbubble destruction facilitates angiogenesis and enhances myocardial function in ischemic/reperfusion injury in rats

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Purpose: Hypoxia–inducible factor-1α (HIF-1α), a transcription factor, is naturally degraded by prolyl hydroxylase-2 (PHD2). During ischemic and reperfusion injury, upregulation of HIF-1α activates downstream angiogenic genes. We hypothesize inhibition of HIF-1α degradation via short 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 randomized 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 (2.0MHz, 0.88W/cm², 20s, Dec. 1 MIP) echocardiographically and histopathological evaluation were 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 collagen volume fraction (CVF), myocardial infarct size (Clas), cardiac function was assessed with echocardiography, and histopathological evaluation was performed to evaluate heart function, myocardial fibrosis, myocyte apoptosis and remodeling.

Results: Compared with control groups (Sham and shScramble rats), there was significant decreased 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). With compared with shScramble control group, CVF was decrease at seven days (4.81±0.8 vs. 3.96±0.68), 14 days (6.59±0.78 vs. 4.26±0.69) and 28 days (8.2±0.7 vs. 4.25±0.58) in shPHD2 group; PCW 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 (463±170.5/mm² vs. 1908±735.1/mm²). Immunohistochemistry explained hearts also confirmed that the group had significantly higher levels of HIF1α expressions. In order to verify the HIF-1α expression is induced by the shRNA silence PHD2 gene, RT-PCR experiments were performed further to confirm that shPHD2 transduction treatment, the expression of the PHD2 mRNA reduced. However, the expression of HIF-1α and its downstream 3-angiogenesis–related expression gene significantly increased compared 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.

Beyond eNOS: novel cellular mechanisms of coronary endothelial dysfunction caused by homocysteine

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Background: Hyperhomocysteinemia is an independent risk factor for various cardiovascular diseases such as atherosclerosis and hypertension in which endothelial dysfunction is implicated. There is ongoing debate whether homocysteine-induced coronary 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 unanswered 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/calmodulin-potassium channel (KCa)–endothelin–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 hightenintened 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 (19.6±3.18 vs. 50.6±3.22 mmol/L) in coronary arteries, associated with impairment of branched-kinin-induced relaxation (59.6±4.59 vs. 93.1±2.09; 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: 31.2±2.52 mmol/L and 78.9±3.26; arginase inhibition: 29.8±3±2.30 mmol/L and 75.6±6.46). The robust O2– generation evoked by homocysteine (54.3±6±4.2 RJU/mm dry weight) was reduced by the inhibitor of iNOS (118.8±12.2 RJU/mm dry weight, p<0.01) or arginase (20.3±1.20 RJU/mm dry weight, p<0.05). Arginase activity enhanced by homocysteine (956.9±85.35 mmol Urea/min/mg protein) was normalized to inhibition of arginase (435.7±0.92 mmol Urea/min/mg protein) and iNOS (398.3±35.47 mmol 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 (KCa: 4.68±0.79 vs. 18.54±3.43 pA/pF; SSKa: 2.94±0.69 vs. 11.33±3.29 pA/pF; p<0.05).

Conclusion: The decrease of NO bioavailability caused by homocysteine involves the contribution of arginase in which NODS plays a role. In addition to NO pathway, homocysteine impairs coronary endothelial function through KCa–EDHF mechanisms.

Funding: Supported by GRF CUHK4788/09M & 4774/12M, CUHK direct grant 405401, and NSFC 81201023.
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 = 4:7, age of onset was from February to 7 years old, average 2.07 ± 1.36 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 of 30 ± 8.9 mg/kg/day, clopidogrel every three months, using echocardiography, 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 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 normal diameter and the small aneurysm, 2 cases back to the moderate aneurysms, 2 cases back to the dilation, 3 cases still bulge, but has narrowed before treatment), effective 10/11, 1 case invalid accounts for 1/11. 11 cases were 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 giant aneurysms, small coronary artery aneurysms, 10 cases recovered 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 5.23%.

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 echocardiography was normal. The chest roentgenogram showed a widened mediastinum. A transhoracic 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. An 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 mm in length. There was 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 aneurysms and ductus arteriosus, reconstruction the aorta with a direct aortic aortoastomosis 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.

PAEDIATRIC CARDIOLOGY

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

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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 ethical 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 control-study. According to the prospective parent’s opinions, the included subjects were divided into digoxin treatment group (DG group) and control group (CG group). To digoxin group, transplacental digoxin therapy was performed; whereas the CG group only received short-term clinical observation. During the clinical course, fetal CVPS and ventricular Tei index were dynamic monitored, pregnancy 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 Women and Children’s Medical 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 DG group, including 5 cases of fetal supraventricular tachycardia (SVT), 5 cases of fetal atrial flutter (AF), 3 cases of fetal anemia (MA) and 1 case of fetal Meconium (MC). 2) Four cases of fetal 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. These cases achieved successful post-pregnancy pregnancy and full-term delivery, CVPS increased gradually, at or near the 10 weeks, left and right Ventricular Tei index decreased gradually, closed to normal range. 10 to 35 months follow-up have been finished, evaluation from Bayley Scale of Infant Development BSDID revealed the normal growth and development of physique and mentality in all the enrolled children. 3) Twelve cases of fetal heart failure cases were enrolled in CG 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 above 10. 10 other patients of the fetal SVT and SVT-Tei index decreased gradually; the value is 0.840±0.05 at 20 GW and decreased to 0.834±0.04 before delivery.

Conclusion: Digoxin is list in the first line medications and has important clinical value in clinical treatment for fetal heart failure. With the alleviating of fetal heart failure, CVPS increased gradually, and ventricular Tei index decreased, 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 (CPVS).

Methods: Twenty-one infants (age≥260 days at operating day) suffered from CPVS, 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 (Postnatal group, according to the time of operation less or more than 28 days, postnatal group was divided into two groups, postnatal group A and postnatal group B, which were named Post A and Post B). To Pre-group, the integrative intervention protocol was cautiously made by the combinative specialists, including intratouth diagnosis, perinatal care and urgent PBPV soon after birth. To Post-group, emergency PBPV was performed after the referral. Tei index of right ventricle 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 SVp in Pre group ranged from 826±926 (86.5±75.349%) under state of continuous intravascular infusion of adenosilast. PBPV was successfully preformed within 3–6 days after birth. The values of SVp increased to 97.33±11.56% post procedure. The values of PG pre- and post- procedure were 86.3±44±11.77 mmHg and 31.4±34.86 mmHg respectively. Preoperative RV Tei-index was 0.840±0.05, decreased rapidly after procedure, and recovered to normal one month after procedure. Only one case showed 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, accompanied with 1 and 3 cases of heart failure), the values of SVp ranged from 836±916% under state of continuous intravascular infusion of adenosilast. And the operating time was 10 ~ 57 days after birth. The values of SVp 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 showed restenosis nine months after procedure and repeated PBPV. The hypoxic exposure time durations were (4.4±0.68), (16.3±34.40), (41.2±56.19) d respectively, and there exist significant difference among the three groups (p<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 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 (rs01973373) 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 in SiftRnD and Pita that predict the potential functional impact of mutations located 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 are 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 (rs01973373), they were encoded as 1617G>A (rs7976572A), 1773T>G, 1800G>A, 1877T>A (rs10024737), 1878T>A (rs145372456), 192G>C, 2099T>C, 2246G>T (rs200358972), 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 microRNAs 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.

**Hydrogen sulfide suppresses ox-LDL-stimulated monocyte chemotactic protein-1 generation from macrophages via NF-κB 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 chemotactic protein-1 (MCP-1) from macrophages and possible mechanisms.

**Methods:** THP-1 cells and RAW macrophages were pretreated with sodium hydrosulfide (NaHS), hexyl acetate (HA) and then treated with ox-LDL. Endogenous H₂S pathway and MCP-1 generation were examined. The phosphorylation and sulfhydrylation of nuclear factor-KB (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 H₂S suppressed ox-LDL-stimulated monocyte chemotactic protein-1 (MCP-1) 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-KB (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 thiols in p65, whereas thiols reduced 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 sulfhydrylation 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 sulfhydrylation of free thiols on cysteine 38 in p65 served as a molecular mechanism by which H₂S inhibited NF-κB pathway activation in ox-LDL-induced macrophage inflammation.

**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 (CPS1). The present proteomic study examined the hypothesis that CPS1 may be associated with the etiology or pathology of PAH.

**Results:** Among more than 150 differential proteins identified through iTRAQ assay, CPS1 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 CPS1 level in VSD-PAH was significantly lower than that in normal controls (51.4±8.9 pg/ml vs. 166±243.4 pg/ml, P=0.0004; n=paired t-test).

**Conclusion:** We have for the first time identified alterations of a mitochondrial enzyme CPS1 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 CPS1 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.

**Flow-mediated vasodilation in children with postural orthostatic tachycardia syndrome – a predictor of therapeutic response to miodidrine 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). Miodidrine 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 miodidrine hydrochloride (MD) in children with POTS.

**Methods:** One hundred and eight children diagnosed as POTS by head-up tilt 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 (1143 vs. 642, P<0.001; 3849 vs. 747, P<0.001). Miodidrine 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<0.001) at 3 months therapy. FMD of 9.85% had a high sensitivity (71.6-74.4%) and specificity (77.8-80.8%).

**Conclusion:** FMD decreased after the treatment of miodidrine hydrochloride for children with POTS and POTS children with greater baseline FMD showed better response to miodidrine 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 B6 children with adolescent essential hypertension complicated with target organ damage
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**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 microalbuminuria, serum and urine β2-microglobulin. All data were collected as standard procedure and analyzed using statistical 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_s 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 37.5% (56/151) hyperintensemia, 32.5% (25/77) hypertriglycerideremia, 22.1% (19/86) hepatic adipose infiltration, and 36.1% (30/83) hypertension 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 hypertension or sugar intolerance damage (45.5% vs 17.9% χ²=6.123 P=0.013). Children with disease course longer than 6 months showed a higher rate of hypertension or sugar intolerance damage than the children with disease course less than 6 months (50.0% vs 25.5% χ²=5.288 P=0.021).

**Conclusion:** Target organ damage of adolescent essential hypertension is present at diagnosis in most of these children. Echocardiogram 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 intervention.

Study on the etiology of fetal pericardial effusion
Peng 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 maternaty 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 chromosona anomalies, cardiovascular anomalies, infection, maternaty primary diseases, fetal factors transitory and istrogenic factor. The fetuses with effusion were checked a series of tests to seek for primary diseases and offer appropriate intervention.

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
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**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 serves as controls. Western blot was used to detect the activation level of ERK5 and JNK after cultured 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 GATA4, GATA6, MEF2C, and 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.

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 0–15yrs and adolescents aged 15–25yrs were recruited, then divided into 7 groups according to different age stage; group 1 (0–1yrs), group 2 (1–3yrs), group 3 (3–6yrs), group 4 (6–9yrs), group 5 (9–12yrs), group 6 (12–15yrs), group 7 (15–25yrs). 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 1.8months to 25yrs 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 SPr/SRr 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 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. SPr/SRr ratio was a good parameter for assessing ventricular diastolic function in children. Atrial active contraction function decreased with growth of children, while no significant changes in global atrial strain.
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:** Two 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 direct occlusion site. Devices were selected according to the anatomy and narrowest diameter of CAFs to embolise 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 (6x8,7x10mm) was used in 3 patients respectively. Follow-up studies from four months to six years showed no myocardial infarction, valvular dissection or valvular damage. Echocardiography revealed complete occlusion in the 5 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. The clinical experience of children cardiomyopathy caused by inborn errors of metabolism in 11 cases

Jiao Rao, Yu Fen Li
Guangdong Cardiovascular Institute, Guangzhou, China

**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 Xiaohui Liang, Zhewei Zheng, 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, contractility, velocity, etc.) and screening 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 anterobase of the right ventricular chamber out of heart, weak connection 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 shown 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**

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Cardiovascular Center, Children’s Hospital, Fudan University, Shanghai, China

**Objective:** To evaluate the effect of transcatheter closure of post-operative residual ventricular septal defect (VSD).

**Methods:** From September 2002 to October 2012, 18 patients (11 males and 7 females) who are aged 9.2±5.8y and weighing 27.3±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 3.7±1.5mm (1.6–6.3mm) from angiogram. Pulmonary-to-systemic flow ratio was 1.5±0.23. The average pulmonary artery pressure was 19±2mmHg. Three types of devices were deployed, which include asymmetrical ventricular septal defect occluer, perimembranous ventricular septal defect occluder and muscular ventricular septal defect occluder. The device size was 6.5mm×2.5mm (4–12mm). Occcluder device cannot be deployed in one case due to repeated complete atresia–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-operative 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 pregnancy
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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, H3K9ac and cTnT gene that physically interacted with HATs protein in mouse hearts were analyzed using chromatin immunoprecipitation (ChIP) assays. Histone acetylation, GATA4, H3K9ac 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, increased on the promoter of GATA4 gene in the hearts of fetal mice given the alcohol. Meanwhile, an increase of acetylation of H3K9 and sRNA expression of GATA4, H3K9ac, cTnT was observed in the heart samples of fetal mice exposed to alcohol. Note worthy, 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 mouse hearts with alcohol during pregnancy. Interestingly, anacardic acid could also down-regulate over-expression of GATA4, H3K9ac 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 mouse hearts exposed alcohol. It is suggested that anacardic acid may induce protection against alcohol-induced GATA4, H3K9ac and cTnT genes over-expression by inhibiting the binding of p300 and PCAF on the promoter region.

Histone H3 acetylation and lysine 9 trimethylation are involved in the epigenetic regulation of slow skeletal troponin I expression during heart development
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Propose: Two main troponin I genes, cardiac (cTnI) and slow skeletal (sTnI), are expressed in the mammalian heart under the control of a developmentally regulated program. sTnI 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 sTnI 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 sTnI 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 sTnI gene, which are recognized as critical regions for sTnI regulation. The expression of sTnI 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 sTnI expression in the heart, whereas the levels of H3K9me3 in the first intron of sTnI gene were gradually increased during the development.

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

Smad4 is essential to mediated BMP2 induced overexpression of GATA4 and Nkx2.5 by increasing histone H3 acetylation in H9c2 cells
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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, tolle 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 expressed 80% expression of total Smad4 in H9C2 cells with the second Ls-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 knockdown 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 inhibit 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.

Clinical analysis of cardiovascular disease cases who died in Affiliated Children’s Hospital of Chongqing Medical University during 2000 – 2013
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Propose: The hospitalized children’s (518 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 morbidity.

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 morbidity 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 fulminating 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 for Free Paper Session:

**PAEDIATRIC CARDIOLOGY**

**Alcohol exposure increases histone H3 acetylation levels to overexpress cardiac transcription factors in H9c2 cells via BMP signaling pathway**

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**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 24hs. (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 (0mM, 1μM, 2.5μM, 5μM, 10μM and 20μM) 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 SNA4. Westernblot analysis was used to detected the heart development-related gene Cx43 and histone H3 acetylation level in the whole chromat. ChIP qPCR assay was used to detect the histone H3 acetylation level in the promoter region of MEFC2, 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, but the difference was not statistically significant (P>0.05). (3) 5μM DM blocked the effects of alcohol increasing the expression of GATA4. (4) At 100mM alcohol the expressions of MeF2c, GATA4, Nkx2.5, Tbx5, Smad4 and Cx43 increased (P<0.05), meanwhile, the expression of Cx43 was increased too (P<0.05). DM at 5μM 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 5μM 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 5μM 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 fail 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 5μM. (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 MEFC2, 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 MEFC2.

**Curcumin reduces histone H3 acetylation and reverses the overexpression of MeF2c caused by prenatal alcohol exposure in mice**

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**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±0.11) significantly reduces the levels of histone H3ac in fetal hearts compared to blank group (1.37±0.08, P<0.05) and DMSO group (1.26±0.15, P<0.05). The expression of MeF2c is significantly down-regulated after treated with curcumin (0.41 ± 0.10) compared to blank group (1.37±0.08, P<0.05) and DMSO group(1.37±0.08, P<0.05). Furthermore, our results from ChIP assays have shown that the histone H3 acetylated with the MeF2c are significantly inhibited by curcumin (2.96±0.64) compared to blank group (4.94±0.38, P<0.05) and DMSO group (5.15±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
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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
Jaime Alfonso Aberrera, Jose Ederardo Daya, Adrian Fausto, Jonney Magallanes, Jose Donato Magno
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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 pectechiae 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 rheumatoid nodules, anemia, lesions, and a hemorhagic 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 arrest
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2Tuen 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 in 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 groups 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.